Narrative of an expedition of exploration in north-western Australia / by Herbert Basedown.

Mrs Burroughs, Wellcome &c
with the Compliments
of
H. Basedow
Kent Town
South Australia

NARRATIVE

OF AN

EXPEDITION OF EXPLORATION IN NORTH-WESTERN AUSTRALIA.

p106

BY

HERBERT BASEDOW,

M.A., M.D., B.Sc., F.G.S., ETC.

REPRINTED FROM THE TRANSACTIONS OF THE ROYAL GEOGRAPHICAL SOCIETY OF AUSTRALASIA, SOUTH AUSTRALIAN BRANCH, VOL. XVIII., SESSION 1916-1917.

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TO THE

Memory of My Father,

M. P. F. BASEDOW.

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EXPEDITION OF EXPLORATION IN NORTH-WESTERN AUSTRALIA.

By Herbert Basedow, M.A., M.D., B.Sc., F.G.S., etc.

INTRODUCTION.

In the latter part of the year 1915 it was notified for public information that the Commonwealth Government had entered into an arrangement with the Imperial Government to acquire all such minerals as were needed by the Home Munitions Department.* This proclamation revived the interest and the confidence in a long reported existence of certain tungstate ores in the far North Western region of our Continent. Prompted by a desire not only to help the Federal Minister of Defence, but also to procure, if possible, the necessary supplies for the Imperial Authorities, a number of prominent citizens of Adelaide resolved to have the mineralogical possibilities of the aforesaid locality thoroughly exploited.

It was in November that I received a message from Mr. J. L. Andrews, as the official representative of the Syndicate, intimating that his Board of Directors would be pleased if I could arrange to take charge of the contemplated expedition. I immediately consented to do so. My previous experience in tropical Australia had taught me that it would be unwise, if not useless, to undertake the journey until after the "wet season."

*Commonwealth of Australia, Gazette, No. 111, Sept. 18th, 1915, pp. 2311 et 2312.

Consequently it was agreed to make a start from Adelaide not earlier than about the beginning of March, 1916. In the meantime all preliminaries were to be arranged.

Realising the rare opportunity for conducting scientific research in a tract of practically unknown country, I resolved that, after the work entrusted me by the Syndicate had been completed, I would on my own account continue the explorations farther afield. With that end in view, I had several consultations with the President (Hon. John Lewis, M.L.C.), and the Hon. Treasurer (Mr. Thos. Gill, I.S.O.), of the Geographical Society of Australasia (South Australian Branch), and it was decided to make the second portion of my undertaking of a semi-public character. My scheme was laid before the Premier of South Australia (Hon. Crawford Vaughan, M.P.), who courteously recommended the suggestions to the Premier of Western Australia (Hon. John Scaddan, M.P.). As a result, I received from the latter Minister an open letter to the Heads of all Government Departments, and, in addition, a liberal assistance in the transport of my party and equipment by land and by water.

Thanks to the characteristic enthusiasm of Mr. R. Etheridge, Jun., the Trustees of the Australian Museum, Sydney, readily contributed towards the Expedition's funds, and in other ways helped to bring the project to a successful issue. The local Branch of the Geographical Society and their worthy Treasurer presented me with a valuable set of charts and reports relating to the North West. This collection was added to in Perth through the generous presentations by the Government Geologist (Mr. A. Gibb-Maitland, F.G.S.) and the Surveyor General (Mr. F. S. Brockman). Messrs. S. P. Bond & Co., of Adelaide, kindly lent a valuable reflex camera, and Messrs Burroughs, Wellcome & Co., of Sydney, forwarded a complete "Tabloid" outfit in a leather case to meet the medical needs of the expedition members and ailing aborigines. I am, moreover, indebted to the Proprietors of Meda, Kimberley Downs, and Napier Downs Stations for placing their horse, mule, and donkey teams at our disposal. My thanks are no less due to the Board of Diocesan Missions, Perth, the Rev. E. R. Gribble, Forrest River, Mr. R. H. Wilson, and the

other Missionaries at Port George IV., for facilitating my ethnological investigations among the local tribes. Acknowledgement of all courtesies is herewith recorded.

FROM ADELAIDE TO DERBY.

It was noon of Saturday, March 4th, 1916, when we left Port Adelaide per S.S. "Indarra" *en route* for Western Australia; my only companion was Mr. Gilbert St. John Sanders who had agreed to act as my assistant. The journey was ordinary across the Great Australian Bight. On the third day we entered King George's Sound and sighted a vessel—a Norwegian whaling steamer towing a slain monster lashed to her side. Soon after we dropped anchor in the granite bound harbour of Albany. Thence H.M.A.S. "Encounter" escorted us into the darkness of night, when all lights on board were doused by order. The explanation of these precautionary measures was perhaps tendered by a paragraph in the dailies to the effect that a strange craft had been noticed in the neighbourhood which would not respond to the customary code. When the morning broke we had crossed the ever angry surge of the Leeuwin, and were steaming north. As Fremantle was approached towards evening of the same day (March 8th), we were again reminded of the fact that our Country was at war by the appearance of a naval patrol boat which bade the "Indarra" stop. When the Commander had satisfied himself as to the identity of the newcomer, the pass-colours were sounded by megaphone to our Captain, and we moved half-steam ahead. But even then we could not enter the Swan, for right across the way stood the grey hulk of a troopship grounded on a shoal. Only late that night we found ourselves alongside Fremantle wharf.

The next few days were spent in completing our supplies and transhipping our equipment.

In Perth I had the honour and pleasure of meeting the Premier (Hon John Scaddan) and other Ministers, Sir John Forrest, Mr. A. Gibb-Maitland, Mr. J. North, Mr. F. S. Brockman, Mr. J. Black, Mr. Canning, and many other public and Government men.

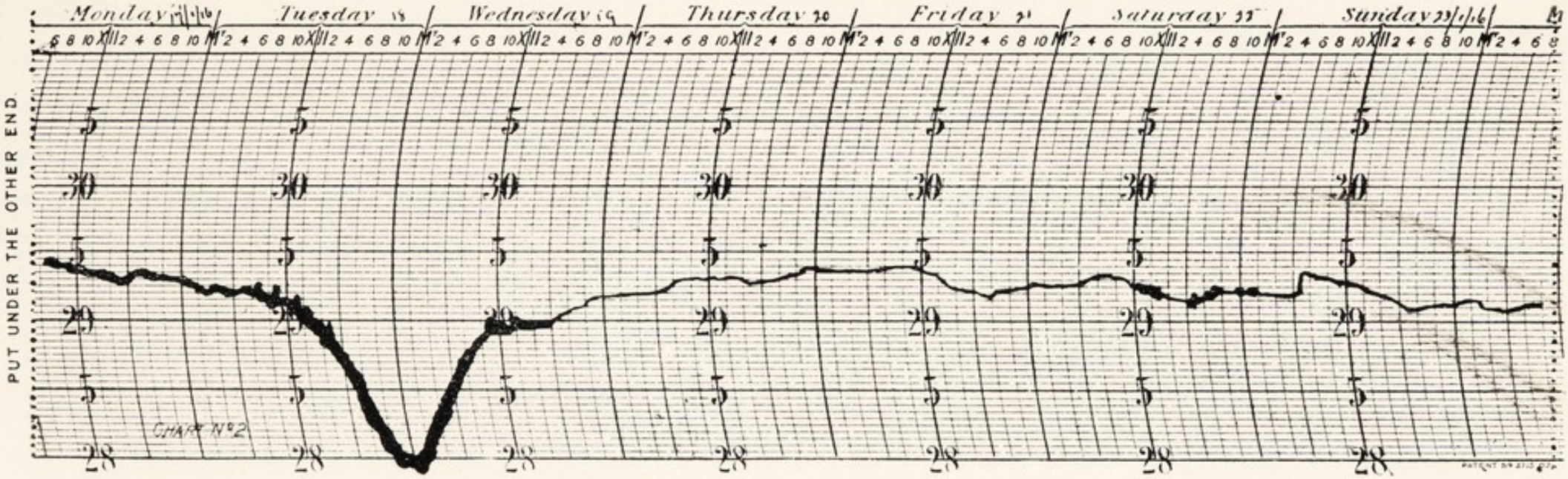
On Monday night (March 13th), we boarded the northern bound boat of the State Steamship Service, which in place of a name bore a plate marked "N2". It was the captured S.S. "Prinz Sigismund," formerly belonging to the North German Lloyd. This being the first boat after the "wet season," the cabins, passages, and decks were crowded with northern settlers, mostly squatters and miners returning home with their families. Two hundred men were also aboard who had been engaged by the Government to start the building of the Freezing Works at Wyndham. We were but eight hours on our way when the steering gear collapsed, and we were tossed about unmercifully for three-quarters of a day. Thus it took thirty-eight hours to cover the 220 miles to Geraldton, the first port of call.

Among the passengers we found a number of interesting personages—hardy, sun-burnt men of the pioneer type. There were Mr. M. P. Durack, one of several of that name who effected the first settlement in the Cambridge Gulf country; Mr. A. H. Salmond, sometime Government Surveyor, who in 1903 travelled overland from Wyndham to Napier Broome Bay, Mr. Lewis, the pioneer prospector of the Bamboo Creek Goldfield, Mr. J. Milne, a Government official who has opened up several important stock routes in the North-West, and many more.

After a little over a day's run from Geraldton we were abreast of Dirk Hartog's Island, named after the first white man who visited the West Coast of Australia in 1616 as commander of the ship "Endragt" sailing from Holland to India. We turned into Shark's Bay and threw anchor to allow a lighter to come alongside. Shark's Bay was discovered and named in 1699 by Captain Dampier, of H.M.S. "Roebuck." The locality is of more than passing interest from a natural history point of view, since it was upon the occasion of Dampier's visit that the animal destined to become the national emblem of Australia—the kangaroo—was first noticed.

Our stay was brief, and Carnarvon was made after a few hours' steam. Opposite the mainland lay Bernier and Dorre Islands, upon which the Government Lock-Hospitals for diseased aboriginals have been established. In the afternoon we continued northward, and having recorded a good day's run, turned via Cape North-West

PLATE I.



BAROGRAPH RECORD OF CYCLONE, S.S. "N2," 17/1/16 TO 23/1/16.

into the port of Onslow where we met with the red silt-laden waters of the flooded Ashburton River contending with an unbroken front against the leak-green rip of an opposing tide.

We were now in the region of the dreaded storm, known locally as the "Willy-Willy" or "Cockeye-Bob", which has accounted for the loss of valuable craft, and many gallant lives. The period of these cyclonic disturbances ranges from October to March. The origin is no doubt local since the storms are encountered only between Onslow and Broome, and also along the Port Darwin Coast. The wind immediately preceeding a storm is easterly or north-easterly. Short, sudden fluctuations in the barometric pressure follow. Some of the old, experienced pearlers maintain that they can predict a pending storm by observing the ground swell beneath an otherwise calm and innocent looking sea. On her previous voyage north the "N2" was exposed to the play of such a cyclone which blew her some hundred miles out of her course, and severely battered her about. Captain Saunders allowed me to copy the following particulars from the official log which graphically explain the troubled conditions of the atmosphere during that particular gale. See also the Barograph Record on Plate I.

Monday, 17/1/16: 6 p.m. thunderstorm, with variable wind, strong to light southerly, and moderate sea. Temp. 79° F. Midnight barometer 29.28. Strong, showery, S.E. wind.

Tuesday, 18/1/16: 8 a.m. barometer 29.22, wind E.S.E., sea rising. Noon barometer, 29.40; heavy gale, wind E.S.E.; thick rain. Midnight barometer, 28.15; cyclone raging, terrific squalls, wind E.; mountainous sea.

Wednesday, 19/1/16: At 1 a.m. wind changed N.W., glass rising. 4 a.m. barometer, 28.40; 10 a.m., wind changed to N.E.; noon barometer, 29.00; hurricane, wind N.E. "Cockeye-Bob." 8 p.m. barometer, 29.15; moderate gale; high confused sea; midnight barometer, 29.26; fresh N. wind; moderate gale.

Thursday, 20/1/16: Fresh to light N. breeze; moderate sea with S.W. swell; fine and clear; temperature, 76° F.

Friday, 21/1/16: Light S.E. wind and smooth sea; fine and clear; temperature 86° F.

Saturday, 22/1/16: Moderate to light W. breeze; smooth sea; fine and clear; slight "Cockeyes."

Sunday, 23/1/16: Moderate to slight W. breeze; smooth sea; fine and clear; temperature 86° F.; slight "Cockeye" at 6 a.m.

It was difficult to conceive how the quiet waters which surrounded us could ever and so quickly alter their demeanour and rise to such disastrous seas.

I submitted the notes on this hurricane, together with the barograph record, to Mr. H. A. Hunt, Commonwealth Meteorologist, who kindly supplied the following interesting comments: "The minimum pressures seem to have been confined to the sea, and the 28·15 in. which you quote is almost a record. From 1877 to 1912 there are fairly complete records of thirtyone Willy Willies. In 1882 the barometer at Cossack was 28.1, and in 1898 S.S. "Albany" registered 27.8.

The storm followed the usual path along the coast, and may have originated in the well-marked "Low" which hung over Darwin from the 10th to the 14th. If so, on the 15th and 16th it moved seawards for it next appears off Cossack on the 17th as a moderate "Low" (29.7 inches).

The very hot weather experienced along the coast (106° F. Onslow, 109° F. Hamelin Pool, and 111° F. at Winning Pool); the recent rainfall (Cossack 91 points, Roeburne 88); the season of the year, and the strong easterly winds were all favourable for the formation of a Willy Willy. Accordingly, storm warnings were sent to ports along the west coast.

Your own notes give the conditions at sea very fully. If you will refer to page 61 of 'Climate and Weather' (Hunt, Taylor, Quayle) you will see that your storm agrees closely with the average type. In January, normal areas of low pressure are much more likely to develop into Willy Willies than in any other month, as a glance at the book referred to will show."

Another short day and we found the "N2" berthed at Point Sampson, the seaport of Cossack. Passengers are in the habit of going ashore here to collect the blue opercula of littoral univalves.* When mounted in gold or

* Astrea species.

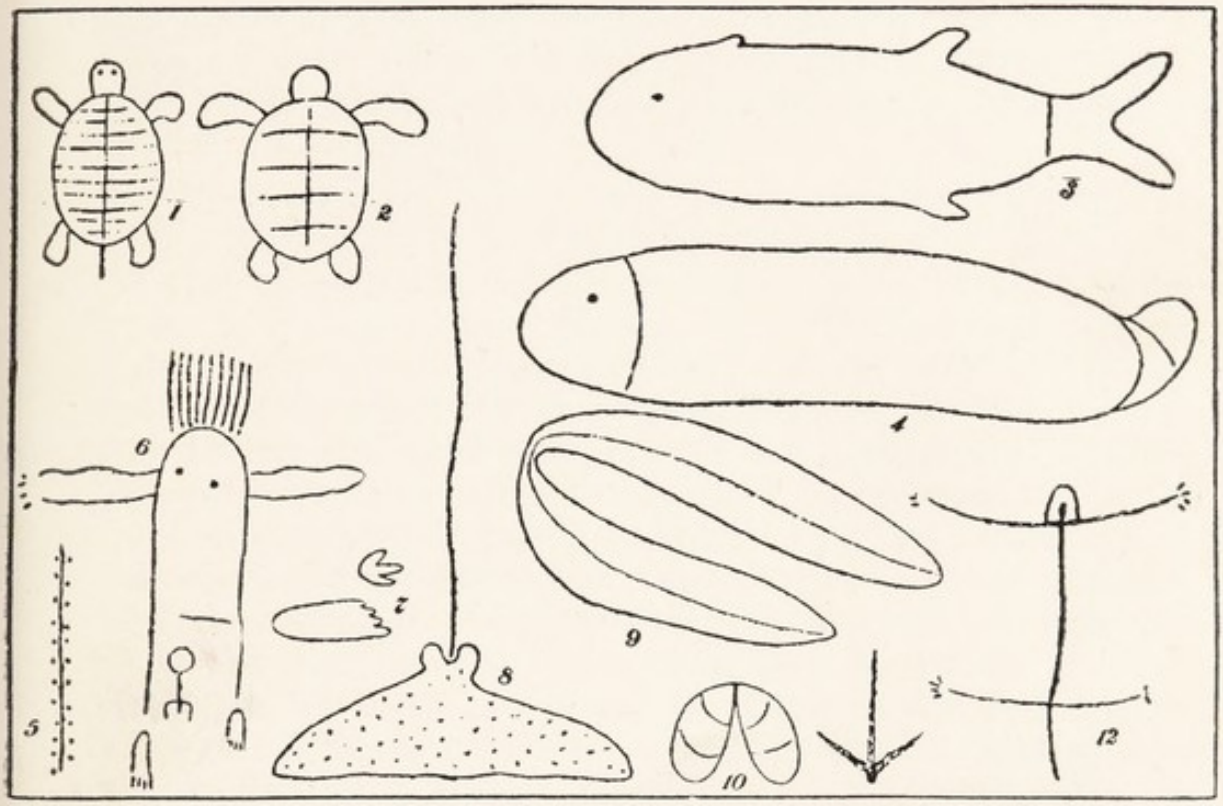


FIG. 1. ABORIGINAL ROCK CARVINGS, PORT HEDLAND, NORTH WEST AUSTRALIA.

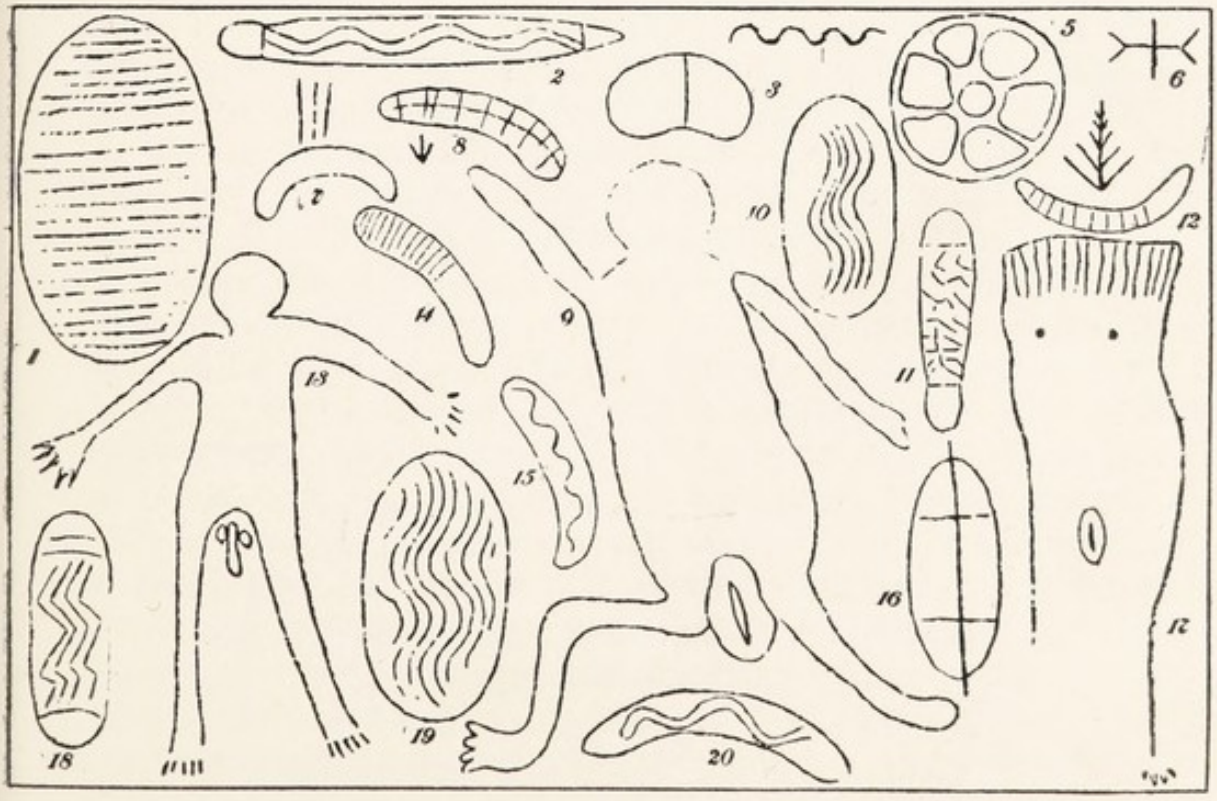


FIG. 2. ABORIGINAL ROCK CARVINGS, PORT HEDLAND, NORTH WEST AUSTRALIA.

silver and linked together they are prized as a novel form of decorative jewelry. The bay is bordered by very hard, baked, and banded siliceous rocks, presumably of Pre-Cambrian age.

The climatic conditions were particularly trying while travelling from Point Sampson to Port Hedland. At the latter place low, level beds of late Tertiary limestone bear, upon their surface, the artistic handiwork of a defunct aboriginal generation. Many acres of the ground are covered with carved designs of the human and diverse animal forms, tracks and ornamental figures. The type of art is similar to one I have described from Central Australia,* and, judging by the amount of denudation the designs have suffered since their making, must be very old. Each figure has been chipped or carved in outline into the rock with a sharp instrument. Occasionally the whole space is pitted in contrast to the uniform surface of the rock. The illustrations on the accompanying plate include a number of incised designs, which may be regarded as characteristic. They were sketched to scale on the spot. In the upper picture we recognise two turtles (Figs. 1 and 2). a sting-ray (Fig. 8), a human being (Fig. 6), emu, and man tracks (Figs. 7 and 11), a lizard track (Fig. 5), a lizard (Fig. 12), and other doubtful markings. The lower group consists principally of human images of both sexes (Figs. 9, 13, and 17), spear-throwers (Figs. 2 and 11), shields (Figs. 1, 10, 16, 18, and 19), boomerangs (Figs. 7, 8. 12, 14, 15, and 20), a snake (Fig. 4), a peculiarly symmetrical design (Fig. 5), and other less apparent objects.

The glaring heat and monotonous surroundings of Port Hedland did not arouse regret within us when, in the midst of tracing and sketching the designs referred to, the "N2" sounded her warning whistle to notify the passengers ashore that she was preparing for departure.

Broome, the famous pearling centre and "metropolis" of the North-West, came next. This township has a population of about 800 whites, and some 3,000 men of mixed colour. The pearling fleet consists of 300 boats, of which, however, a goodly number were lying idle. The township spreads over a considerable area, and its inhabitants may well be proud of the fine array of

* Journ. Roy. Anthrop. Institute, London, Vol. XLIV., 1914, p. 195 et seq.

imported trees and flowering shrubs which adorn the streets and private gardens. The difference between high and low water mark at Broome is 28 ft. At ebb the water disappears entirely from the harbour, and leaves the vessels standing on the muddy bottom. Thus a natural "dry dock" is afforded, and our Captain made use of the opportunity to scrape and paint the sides of the "N2" during the delay. In the meantime we called upon the Resident Magistrate (Major Woods) and Bishop Trower.

We arrived at Derby on Thursday afternoon, March 23rd, and those of the residents who could leave their business or domestic ties (and there were not many who could not) ran down in the old horse tram to see the boat come in. It was a hot and thirsty day, which I was told was not the exception to the rule. The elite were garbed in white, with sun hats and canvas shoes; the ladies carried silk umbrellas. The picture bore semblance to a tropic port, but one thing was wanting—the bustle of the coloured man. From the upper deck I cast my eyes across the space. So this was Derby! Below me were the gurgling muddy waters of King Sound, fringed by tall mangroves; behind the latter a vast expanse of low saltmarsh, across which a seeming never-ending pier with heavy rails on either side verged to some distant white-washed sheds or domiciles surrounded by big trees. The heated air which rose above the glistening plain hid the farther skyline in a dancing maze. This was our starting point which lay just 3,000 miles from home.

Among the numerous visitors I met on board was the Resident Medical Magistrate, Dr. F. J. Elliot, who in 1891 accompanied the Elder Scientific Exploring Expedition to Central Australia.

The remainder of the afternoon was spent in supervising the landing of our equipment, and we were indebted to Mr. Wharfinger Moore and staff for expediting matters as they did. In the evening Captain Saunders tendered us a farewell dinnner, and late that night we sought our beds in the Port Hotel at Derby.

During the next few days followed the task of unpacking, arranging, and repacking our stores and impedimenta. The iron sheds in which they were stored were like drying ovens, and the smelly atmosphere enough to stifle the hordes of rats that overran the place.

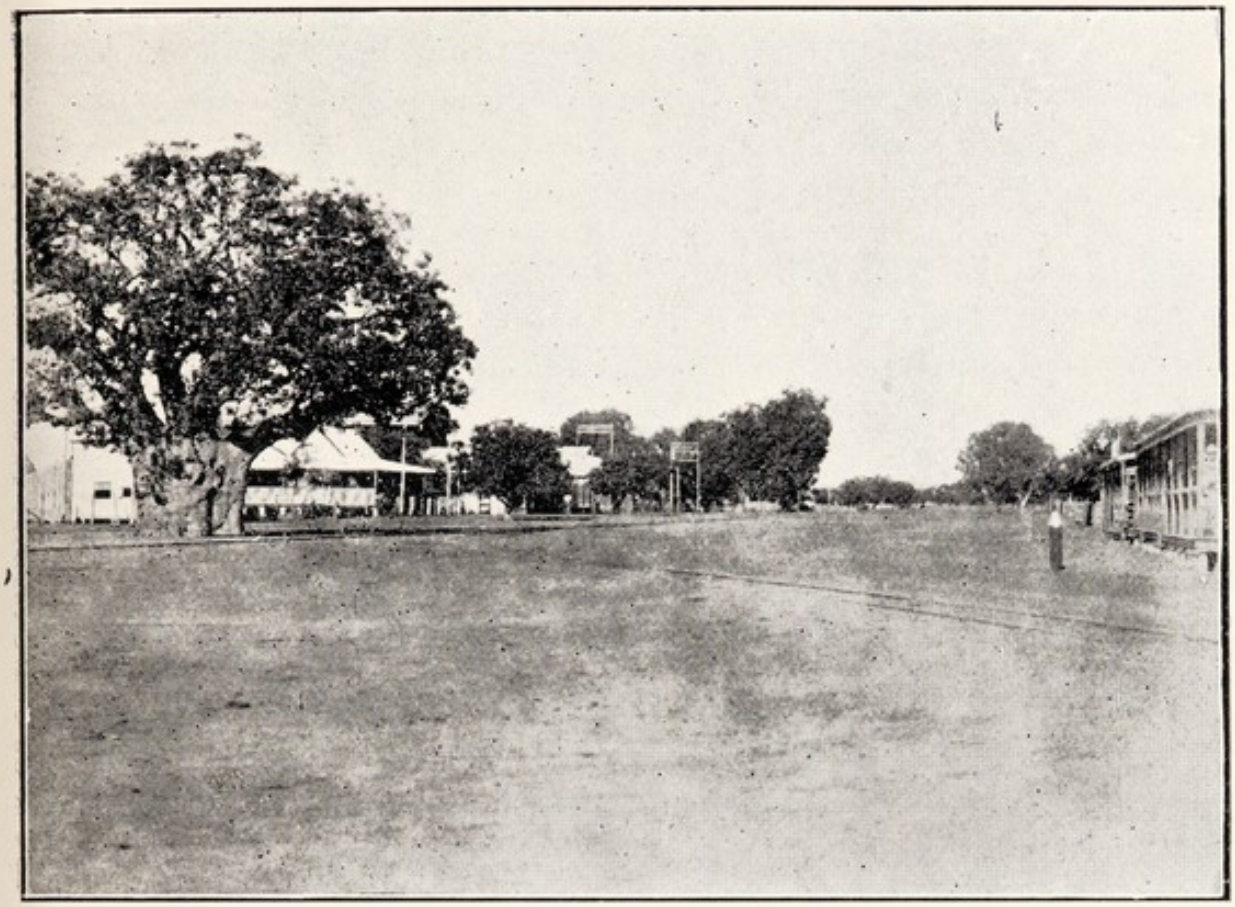


FIG.1. THE MAIN STREET OF DERBY, MARCH 23rd.

FIG. 2. THE GREAT TIDAL MUD FLAT WHICH LIES IN FRONT OF DERBY. The dark line on the horizon is the fringe of Mangroves along King Sound. Bullock teams delivering wool from a. distant station

We soon adopted the local mode of dress, which meant discarding all but pants and singlet. With the least exertion the perpiration simply ran from all the pores, the clothes became sopping wet, and the moisture could be wrung from them as though they had left the washing tub. To mop the honest sweat, the residents find an ordinary handkerchief totally inadequate; they favour a small porous towel resembling that used by firemen, engineers and others. To soothe a parching throat and keep the human system's sap in equilibrium, the only drinks the town supplied were theoretically "cooled" by hanging in the canvas bag; in practice they were not appreciably below the atmospheric temperature.

On Saturday, not long after we had left the luncheon table, Mr. Sanders caused me some anxiety. He was overcome by heat exhaustion. Although his face had been unusually pale throughout the morning, the prostration overtook him suddenly. As he lay on his bed in a semi-conscious state, he complained of rumbling noises in his ears, and in a slight delirium muttered morbid presentiments. His pulse was feeble and rapid, and a stimulant was necessary. When he rallied I administered quinine and brandy. His convalescence was rapid. Talking of the use of quinine, I might mention that when travelling in the tropics I always take a 2-grain tabloid daily as a general tonic, and a prophylactic against malaria if the anopheles is about. A pinch of the powder, moreover, placed upon the tongue at about 11 o'clock in the morning is an effective "appetizer" under the trying conditions. I was interested to note that Dr. Elliot dispenses the drug in the form of Warburg's Tincture, which in other tropical countries has a good reputation, not only in the treatment of malarial fevers, but also in the accompanying nervous complications, exhaustion and collapse.

It must be admitted that, from a scenic point of view, Derby is rather attractive. Trees always lend charm to a spot, and Derby certainly has some very beautiful boababs (*Adansonia Gregorii*), "wooden pears" (*Xylomelun occidentale*), red-flowering *Bauhinias*, and other trees growing in the streets, and the immediate surroundings. The houses are all built after the bungalow pattern, with open ceilings and high, spacious verandahs. The ubiquitous galvanised

iron is the only material used for covering the sides and roof of the skeleton frame of jarrah. The wooden or cement supports upon which the structure rests are insulated by the interposition of discs of tin, ostensibly to minimize the ravages of the white ant. The main street is wide, and has a very homely appearance. Goats and fowls lie resting beneath the stately trees, the solid trunks of which are used to nail the public notices and general placards upon. The street is very long. It appears that the township was originally surveyed further inland; thus the hospital is now about a mile out, and the police station half that distance. Most of the private gardens are well-kept, the favourite tree being the red-flowering *Poinciana*, which grows to a height of twenty feet in three of four years' time. The township is supplied with excellent water obtained from an artesian bore, over which a pumping house and large tanks have been erected. Despite this fact vegetables are scarcely grown. In the course of conversation with the local residents, my companion and I were wont to refer to the town as "Darby", but invariably our truly English pronunciation was greeted with a scoffing smile. We thought our sense betrayed us until one day a half-drunken bush tramp enlightened us; our education was to blame. When he heard one of us say "Darby", he exclaimed, "Darby! Good God! Don't ye know Darby? Poor chap, he's ill! So in future we decided to throw in our lot with the local school, and simply said "Derby."

In the evenings Mr. Sanders and I used to walk out on to the pier for fresh air, and to witness the heavenly pyrotechnics in the distant north-east. Massive cumulus lodged in those quarters, and were intermittently lit by flickering blazes of white and pink light. The storms, we surmised, were attracted by the King Leopold Ranges; they were too far off for the sounds of thunder to reach our ears.

Although the police officers had received instructions from Headquarters to concede to me any horses which were not in immediate requisition, the Inspector at Broome and the Sergeant at Derby assured me that the Department was understocked, and not a single animal was available. After some little disappointment occasioned by this unforeseen trouble, it was through the friendly zeal of Mr. McGlew that we arranged to start

our inland journey by means of a donkey team and waggon owned by the Kimberley Downs Station. Within a week of our arrival at Derby we had completed all preliminaries and packed our provisions and gear upon the waggon. The date of departure was fixed for Saturday, April 1st. Some cynics maintained that the date was appropriate because it was foolish to attempt inland travelling so early in the season. We were, however, prepared to take the risk.

FROM DERBY TO NAPIER AND PATERSON RANGES AND RETURN.

SATURDAY, APRIL 1st, 1916.

With the first glimpse of dawn, I left Derby, accompanied by Mr. Sanders, per police buggy and pair to overtake the donkey team which had left the day before. The immediate surroundings inland from Derby consist of low, flat tracts bearing a thin growth of timber and grass. The surface is largely composed of a red sand and sandy loam, beneath which occasionally finely nodular laterites are seen to rest. Several quarries have been opened up in the latter deposit, which yield the material for the municipal roadways of the small settlement. Our course was east along the great salt marsh which, later, we found sufficiently dry to enable us to take a short cut across to Gooda Gooda Well, eight miles out. During the wet season, and immediately after the Spring tide it is impossible to cross the marsh; a circuitous course along its borders is then a necessity. At the well we found the team in charge of driver Perkins, Blackboy Whistle and his gin, preparing to leave. The well lies on the opposite edge of the swamp, which is fringed with paper-barks; it contains a good supply of fresh water which has to be lifted about ten feet to the surface. The water is slightly laxative. Eveything was in apple-pie order. Besides our own belongings there were station supplies neatly packed away, which made the burden about 4½ tons; to this another 2 tons had to be added to account for the weight of the wagon. Thirty donkeys were in the tow, chained three abreast. Beside them stood Perkins with his long-handled whip in

readiness. We had but a few private belongings to stow away among the "top-loading" when everything was ready for the start. It was exactly 8 a.m. A nod to Perkins and the air was alive with orders, oaths, and crackings of the whip. The near-side leader was called upon, "Up Tom," the lash at the same time touching his rump, then the off-side, "Up Grobin," and all the others in succession received their turn. Each donkey has a name, and is individually known to the driver; and each animal has its particular place and collar. There was a clinking of chains, and a creaking in the waggon when with a united effort the caravan was set in motion, and the big ironshod wheels ploughed through the sand. Whistle ably assisted his master from the opposite side. while Nellie, his gin, had found her place on the top of the load. We walked. Laterite and sand covered most of the surface, with occasional fragments of micaceous and ironstained sandstone of Carboniferous age strewn upon the ground. It was heavy going, and a halt was made at 9.30 a.m. to rest the panting team. We had entered the characteristic undersized forest land or bush, consisting of a variety of eucalypts, acacias, and other scrubby trees and grass, which is locally called the "Pindan." This word is evidently of aboriginal origin, but the history is obscure. Enclosed by a wall of vegetation on all sides, as we were, the day seemed very sultry, with just an occasional momentary breeze. The shade temperature at 2 p.m. was 37° centigrade. Alternately walking and riding on the waggon, we arrived at Native Well, a strenuous ten-mile stage from Gooda Gooda, and camped. This well is on the western side of a fresh water swamp, and a number of smaller holes have also been sunk to water at the edge of the Pindan. Several large boababs occur in the neighbourhood. Under one, upon the trunk of which the aborigines had carved an emu track,* Nellie lit the camp fire; we made up our bunks and swung our mosquito nets not far from it. We had with us folding stretchers which, apart from the comfort, afforded protection against ground moisture and vermin. The mosquitoes came along early in the evening, and it was not long before we rested our throbbing limbs and found a close but peaceful night.

* Specimen placed in Australian Museum, Sydney.

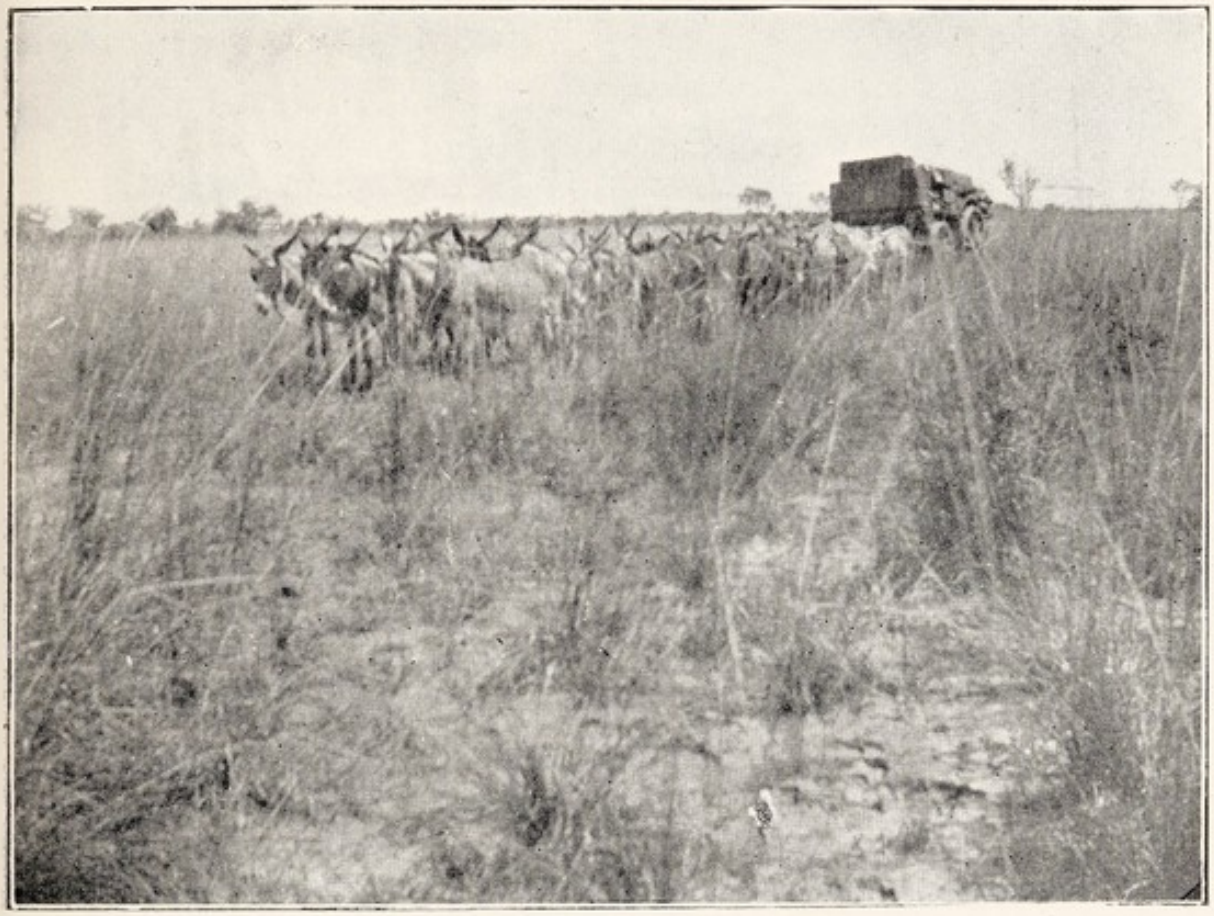


FIG. 1. OUR DONKEY WAGON *en route*.

FIG. 2. EXPEDITION CAMP AT NATIVE WELL, APRIL 1st.—APRIL 4th.

SUNDAY, APRIL 2nd.

We remained in camp at Native Well. The donkeys strayed far into the bush over night, and kept Whistle busy tracking them the greater part of the forenoon. Mr. Sanders and I penetrated the "Pindan" in the afternoon, collecting, but the tall, rank speargrass (*Heteropogon contortus*)* impeded progress, and we reluctantly retired after but a short advance. The grass in places stood from 12 to 14 feet high, and its growth was so dense that nothing could be seen of the landscape. The air was stagnant and hot, but what was worse were the arrow-shaped seeds which, being weighted at one end, always strike with their pointed end, and work their way through the clothing into the skin.

MONDAY, APRIL 3rd.

The swamp ahead of us was still so sodden and locked with water that Perkins considered it unwise to attempt a crossing with the heavy waggon. He saddled his mule and rode across to test the ground. After an absence of two hours he returned and reported that we might attempt the task in the morning, but he was far from sanguine that we would succeed. At dusk the western sky blazed forth in all its glory; the scene was enveloped in flame. And through the solid haze the sun had lost his sting, and lay above the rigid line of scrub like a tranquil, silvery ball. There was not a stir, the Pindan slept. In the gathering twilight the trees assumed a half-toned slatey green, which reflected a mellow coppery glow from the radiant sky above, and thus erased the harshness of the line. Beneath the green stood the tall stockade of spear-grass in two separate bands; the seed stalks were a fulvous tint, the tufts a rare maroon.

TUESDAY, APRIL 4th.

The day broke blue with a cloudless sky, and the slanting beams sipped hotly at the brilliant dew drops which graced the drooping limbs of the eucalyptus. We were resolved to dare the swamp. We crossed it and

* Determined by Mr. J. H. Maiden, who writes that the tall spear grass of the Northern parts of Australia is *Heteropogon insignis* but the above species is also sometimes called "Spear Grass."

then, successively, some flats and Pindan. The sigh of relief was premature, before us lay another swamp. Our team breasted it pluckily; but soon the wheels sank to the axles, and the donkeys were treading mud up to their bellies. Then one of the shafters fell and was literally consumed by the slush. With a united effort the poor brute was extricated, and now resembled a prehistoric animal with a horny hide. We were all in it, stalking the quagmire like cranes. Perkins looked at, me, shook his head and murmured in an undertone, "Hopeless bloody mess;" then, suddenly turning to Whistle, bellowed at him to cut down some trees and branches. Nellie, who was standing by, gracefully holding her flourbag skirt above the mud, regardless of the height, immediately scaled a wheel and threw down the axe to her sire, who waded and forded and flapped towards the nearest trees. We were bogged, there was no doubt about it. The heavy waggon was sinking, and the animals, not finding a solid footing, were becoming restless. Perkins worked his way along the living train like a fly through treacle, and unlinked the off-side string which he placed in the lead. He then converted the "three-abreast" to a "two-abreast". The idea was to lengthen the chain of animals, and so allow the foremost to obtain a solid footing on the opposite side. By this time Whistle had cut a quantity of timber and laid it at the side of the waggon; and Nellie was clearing the cakes of mud from the wheels with her fingers. We soon reduced the loading by stacking it carefully on the makeshift platform. Then all of us made ourselves responsible for the working of a certain number of donkeys, and upon a given signal the game began. Perkins' temper was naturally not too good, and his vocabulary prolific. In our frantic effort to "get things moving" we repeated words after him which I confess I had never heard before. We each had a long stick with which to "touch up" the beasts assigned to our care. But, however willing our intentions might have been to rush from one poor brute to another, our legs would stick in the mud, and we often lost our balance. However, after several fruitless endeavours, we at last succeeded in shifting the wheeled monster; and every inch forward meant a new footing for the donkeys. Hurrah! We had reached the other side—but what spectacles we were. Clad in an armour of mud, we would have been

fit for the stage as men from the Nether World, or messengers from Pluto. But there were not only outward signs of the struggle, our systems were steaming, and all our clothing drenched with perspiration. The hot air mixed with the nauseating gases which escaped from the bog, when it was so violently disturbed, had thoroughly fatigued us. Nellie was told to light the fire and boil the "billy",* while all men waded back to the platform of boughs to secure some instruments and divers perishable articles. It was arranged that Perkins should return for the balance some time to-morrow. After a modest snack, during which time I noticed Whistle empty a quart pot of tea without taking a breath, we continued over grassy flats and swamps and Pindan; and fortunately all went fairly well. But how tiring, and at times revolting, donkey travelling is. We usually walked; at times the ground traversed was worse than ploughed fields. Then came the sandy Pindan, and a cloud of dust would hide the caravan for miles. There were so many noises, and each came at so regular a time, that one could in rotation fashion tunes or rhymes to suit the blending of the notes—the creaking and squeaking of the woodwork, the grinding of the sand beneath the ponderous wheels, the swinging of the buckets on the axle, the rattling of spokes in the hubs, the clinking of the chain-traces, the merry trip of the donkeys' hoofs, the driver's mellow caressing note. Then suddenly there would be an awful crash or bump—the waggon had snapped a tree or struck an ant hill.

We had passed along a natural avenue of acacias—a lovers' walk in the making—when another swamp had to be negotiated. Perkins was anxiously calling to his leaders, "Wa Grobin," and "Get over Tom," when Boxer, the off-side shafter fell, and the same calamity as on the former occasion was imminent. The perilous situation of the animal being dragged under by the others perhaps excused the inhuman kick in the jaw, and the manner in which the fallen Boxer was bodily pulled out of the mud by his tail and ears. It was the more agonising to an outsider because the animal took its belting

* The term "billy" or "billy-can" is no doubt derived from the original "bouilli canister", which in early days was used for all the purposes the modern utensil is put to.

with barely a whimper or a groan. The favourite mark for the lash of the whip appears to be the ear. Next the leader, Tom, jumped round and faced the waggon. "Pull his ——— tail round," Perkins roared at Whistle. "Think he's going to swallow you?" And Tom swivelled round his forehoofs by the tagential force applied to his caudal appendage.

We reached an open, level tract of grassed country upon which numbers of wild turkeys were seen. I shot one for our tea. We camped under a shady boabab on the brink of a billabong off the May River, at a site known as the "Claypan."

As we were resting our weary limbs, a shriek of terror from Nellie, who was fetching a bucket of water, informed us that she had disturbed a snake, but before Whistle arrived it had disappeared. Perkins would have to leave in the morning to pick up the remainder of the load at the swamp. Meda Station lay about two miles further on. It was on account of those considerations I decided to walk to the station with Mr. Sanders. It was true we had had a heavy enough day without the extra stage, and the hour was already late. Nevertheless, leaving Perkins in charge of the camp, and taking nothing but our mosquito tents, we set off along the river. Soon we passed through a fence, and in the fading light of day beheld a natural park of boababs and other large trees. Here and there were some remarkably shaped anthills of fair size, but we did not stay to examine them. It was a long two miles stage; perhaps it only seemed so. There was another swamp to cross, too. At last the roof of the station loomed through a break in the trees against the sky. Stimulated by the pleasant sight, we pushed on, and before long were cordially received at the homestead by Mr. Brown. After we had dissolved the incrustation of mud from our bodies in the bathroom, we felt much refreshed, and enjoyed the hearty meal the cook had willingly prepared afresh, although the orthodox hour had long since lapsed. As we sat in the office after supper smoking and listening to the strains of the never-failing gramophone, myriads of insects, beetles, and moths came flying through the windows and doors, and striking the lamp globe fell in a heap upon the table. A representative collection was made. Several cats appeared upon the

scene and hunted the large grasshoppers which they ate with apparent relish. Mr. Brown told me that the same thing happens every night, but although they eat many of the insects, the cats seem to lose condition. There was a number of anopheles about, but, so far as we could ascertain, no fever in the district at the time.

We camped on the verandah; and the only disturbance was that, when the lights went out, the cats turned their attention to the bats encircling us in low flight.

WEDNESDAY, APRIL 5th.

Mr. Brown drove me to the "Claypan" camp to bring up some of our outfit. Perkins had left for the Swamp. There were a few blackgins about the Station who attended to the domestic duties, and watered the kitchen garden; most of the men were away at a cattle camp, about five miles up the May, known as Crocodile Camp. They are a very intelligent and well-informed people; they always ask for illustrated journals, and have been told all about the big war of the white man. When they heard that we had caught so many winged insects and moths, one of them wanted to know whether we intended making one of those mysterious flying monsters they had seen pictures of in the journals.

I had hoped to procure some horses at the Meda and a spring dray. The latter was available, but Mr. Brown was doubtful about the horses.

THURSDAY, APRIL 6th.

Mr. Brown rode over to Crocodile Camp early in the morning and returned with a stanch piebald horse named "Mick," which was the only animal the Manager (Mr. Watkins) could spare. We gratefully accepted, hoping to add to our equinal strength at Balmaningarra. Perkins arrived soon after breakfast; he had experienced no particular difficulty in carrying the items from the Swamp, and had neatly repacked the load. He continued slowly along the track while we directed our attention to the harnessing of Mick. A good, quiet horse he was; but a temporary furlough in the paddock had provoked a touch of collar-proudness. We started off with a bolt, but the old nag had soon had enough, and settled down to a steady jog-trot along the trail. Ironshot sands clothed with Pindan continued unbrokenly for

six miles; then we crossed a shallow creek, and before us lay an extensive grassy plain upon which grew, in scattered clumps, tall skimpy acacias resembling, in their outward shape, the larch fir.* As the day was oppressive, we frequently halted to give the horse a blow. In the crown of a shady tree, we were thus lingering under, several of the tiny yellowish green tits† were plaintively chirping as they rummaged the leafy tops. From the seclusion of the tall grass-stalks on the banks of the May came rustles produced by the feet of fleeing game; every now and then a bustard would rise, or the loud vibrating note of a native companion (*Mathewsia rubicunda*) give warning to his mate. We drew up at nine miles beneath the verdant cover of a spreading boabab tree opposite Emmanuel Yards. Perkins was immediately behind, and soon the nightly comforts of man and beast were being looked into.

Near the base of the massive butt of the tree we were under, several designs had been carved into the bark by native hand. Among other less obvious figures we recognised an emu (vide Plate V.), three feet high, an emu-track and a snake, five feet in length. The carvings are well-executed; the toes of the bird are shown in plan, and the head of the serpent is especially clear.

FRIDAY, APRIL 7th.

We slept little during the sweltry night, lying in the nude upon our beds, encased like a mummy in the stuffy cage of cheese cloth, and listening to the triumphant song of the mosquitoes without, that vainly sought our blood by forcing their bodies at the point of the proboscis through the larger of the meshes. Once we were startled by the boisterous behaviour of Mick who had entangled his hocks in the long plaited tether which was necessary to stop him from wandering in the direction of Crocodile Camp. Hobbles were useless, for he had learned to swing his body forwards in them with a rocking-horse motion.

The announcement of "Daylight" was received with no feeling of regret. After a pannican-bath at the billabong we breakfasted, struck camp, and moved

* Subsequently determined by Mr. J. H. Maiden to be *cacia suberosa (?)*

† North-Western Tree-Tits (*Smicrornis brevirostris*)

FIG. 1. ABORIGINAL CARVING OF AN EMU IN BOABAB-BUTT, EMMANUEL YARDS, APRIL 6th.

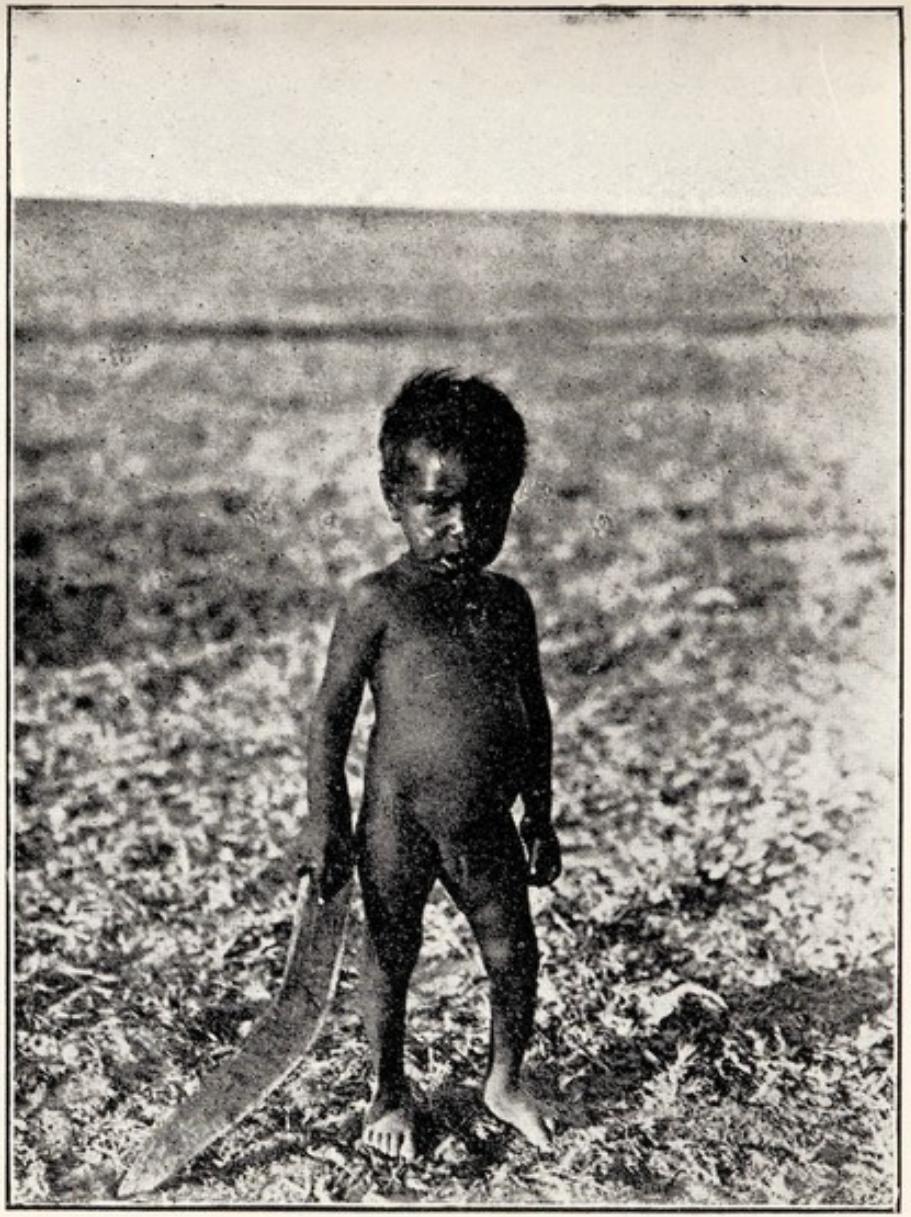
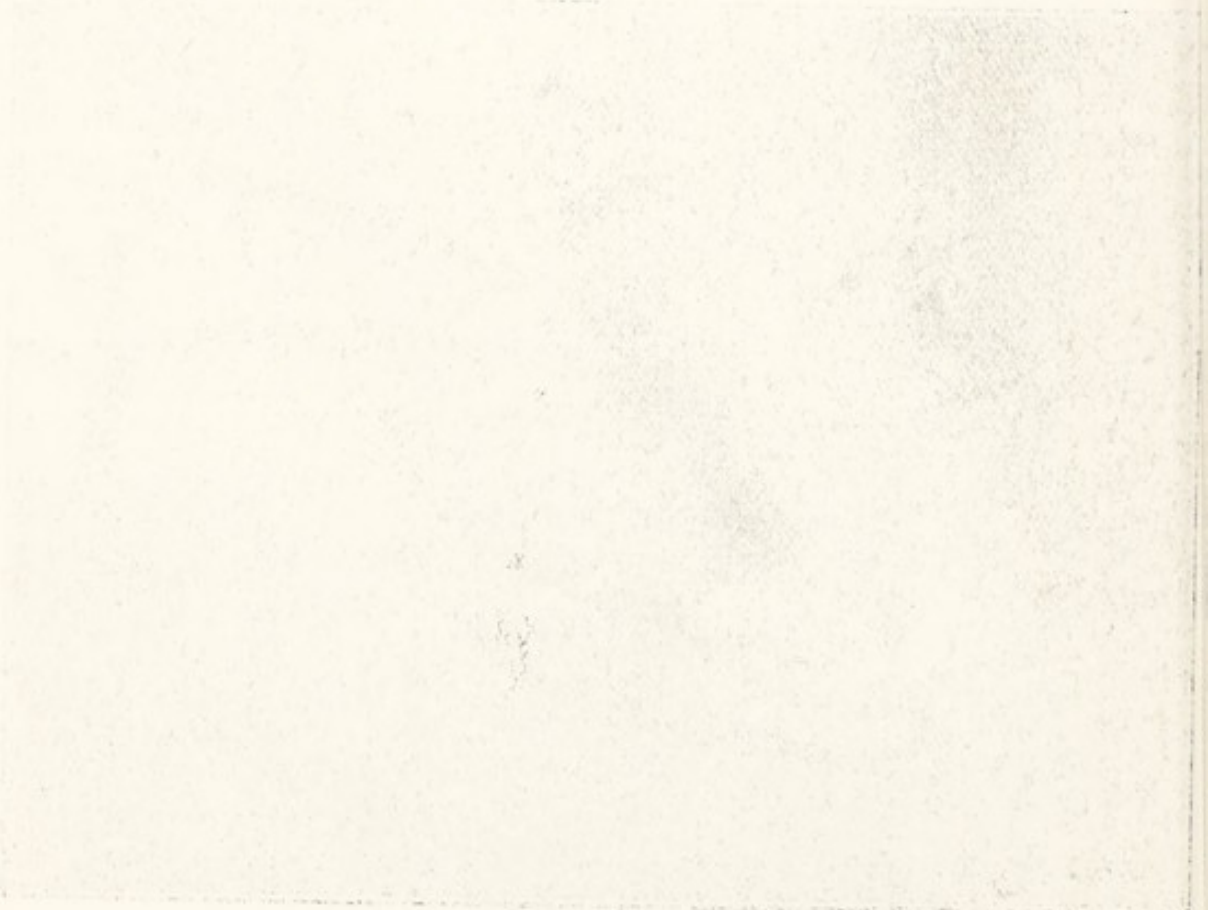


FIG. 2. ABORIGINAL CHILD CARRYING BOOMERANG, TIDAL MUD FLAT, OFF KING SOUND.



onwards, adhering more or less to the course of the May. Laterite and sandy Pindan prevailed. In the bushes numerous crimson-backed Superb Warblers (*Malurus orientatus*) were noted; invariably one cock bird, richly tinted in vivid crimson and jet black, would be accompanied by several of the dull greenish grey hens perkily swaying their tails skyward. We halted for lunch at the Corner Billabong (8 miles)). Birds were plentiful, and I shot a number for preserving. Immediately south lay a reedy swamp upon the brink of which we counted over fifty native companions (*Mathewsia rubicunda*) and other grallatores which were proudly strutting in quest of food. Perkins arrived as we were leaving. After turning the "corner", the conspicuous blue tabular form of Mount Marmion greeted us from the distance, about 10 miles off. We successfully cleared a "wash-away", and then forced the fastness of the spear-grass. A continued bombardment of the little weighted arrows awaited us, and soon the points had worked their way through the scanty clothing to our skin. The horse, too, felt them as it resolutely breasted a trail. We were buried in the tall dry grass, which stood above the level of our eyes, although we were sitting on the cart. The imprisoned air was super-heated and mixed to such an extent with dust and pollen, that the mucous membranes of our nose and throat were violently irritated, and frequent paroxisms occurred. Then a clearance came which had been made by a bush fire; the charred tussocks were still smouldering. And again we entered the wall of grass. At last the edge of the Pindan was reached, but the ground was extremely loose and sandy; and frequent rests were necessary. At 11 miles Poulton's Billabong, upon which some blue waterlilies grew, was sighted. We here met a lonesome traveller in the person of Mr. D. Fleming, and together we continued the journey across a lumpy and bumpy blue mud flat. At 16 miles gently rising and lightly timbered country led us to a ridge of Carboniferous sandstone, which we crossed. Soon we found ourselves at Kimberley Downs Headstation, opposite Mount Marmion, and were cordially received by the Manager, Mr. Davidson. It was nigh on sunset. We had covered 18 miles of country, which for a one-horse team had been "sufficient for the day."

SATURDAY, APRIL 8th—SUNDAY, APRIL 9th.

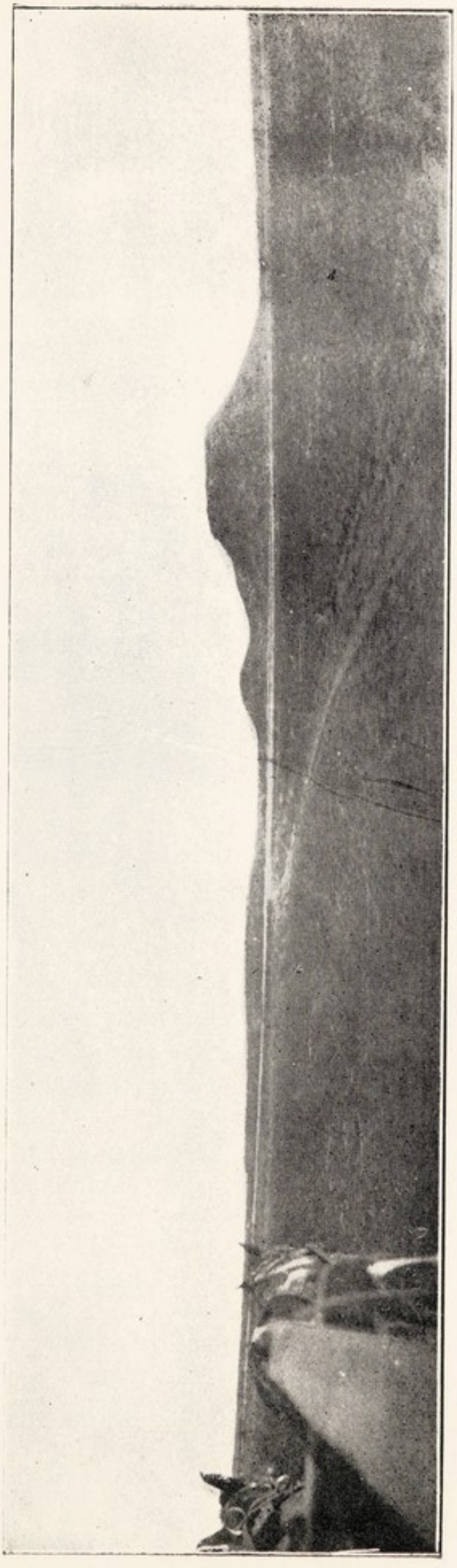
BALMANINGARRA.

The native name of Mount Marmion is Balmaningarra, which means a "big stone", a fact having reference to the isolated table-like shape of the hill—an outlier of the Carboniferous. The formation consists of basal beds of bleached, grey, fossiliferous shale, overlain successively by soft, friable, brown and yellow, fossiliferous sandstones containing nodules of limonite, micaceous shales, ferruginous grits with mammillary and rosette-like concretions of manganese oxide, and lastly, slabby ferruginous sandstones which form the surface of the hill. The lower members strike N. and S., and dip 20° E. The mount stands approximately 150 ft. above the plain; it ends in a precipitous escarpment on the north which, at some 20 feet from the top, disappears beneath the semi-conoid talus slopes; the table-surface falls slightly to the south. Porcupine grass (*Triodia sp.*), and "scented kangaroo-grass" (*Andropogon bambycinus*) are conspicuous among the stunted growth upon the slopes.

I ascended the mount and discerned the low escarpments of the sandstone ridges we had crossed on April 7th. They skirted the creek, which divided them from the Mount, along the south and south-east; the rest of the landscape was more or less open, especially in the east, with belts of Pindan. A low range (Erskine Range) lay on the horizon S. 12° E., a knoll E. 15° 30′ S. (Mount North), and a conspicuous bluff in the blue distance E. 3° N. (Mount Broome); from the latter bearing to N. 15° E. the nearer sky line was occupied by the Napier, and the farthest back ground by the King Leopold Ranges. In the foreground lay Hawkestone Peak, N. 31° E. During the wet season much of the adjacent low-lying country must be inundated.

Living under the rocks on the summit of Mount Marmion I observed a long spiny lizard (*Varanus acanthurus**) which I shot and assigned to my collecting bottle. The natives call it Innarre. And descending the slopes I added the beautiful painted finch (*Emblema picta*), which was living in limited numbers in the shade of the rocks, and, disturbed by my intrusion, fled in low rapid flight from one covert to another.

* Subsequently indentified by the Australian Museum.



MOUNT MARMION, FROM THE EAST, APRIL 8th.

The station management was busy with sheep-shearing. The official time-table recognises the following working hours:—6.30 a.m. to 8, 9 to 10.20, 10.40 to 12 noon; 1 p.m. to 2.20, 2.40 to 4, 4.30 to 5.45. During the intervals ("smoke-hos"), refreshments and tea are served Early breakfast, 6 a.m.; breakfast, 8 a.m.; tea and cake, 10.20 a.m.; lunch, noon; afternoon tea, 4 p.m.; dinner, 6 p.m.; supper, 9 p.m. It would appear, therefore, that the shearers are well looked after. A shearer is paid 22/6 per hundred sheep shorn; on an average he can shear 90 sheep a day. One day I noticed six men handle 720 sheep. It is a strenuous but well-paid work; and strictly controlled by unionism. What interested me most was to see the willing and able assistance rendered by the aboriginies; I am not referring to the shepherding and mustering so much as the work accomplished in the wool shed. Some dozen gins were employed who were expert fleece pickers, and could sort the clippings into locks, fleeces, pieces, and bellies as well as any white man. Their adept skill in throwing the fleece upon the table was creditable. Others were constantly employed sweeping the shed floor, and opening the pen doors; some boys in the yards attended to the branding. The work is performed cheerfully and conscientiously. When once a gin, somewhat nervous through our presence, blundered in the throwing of a fleece, she gave utterance to her feelings by a short sharp "A!" These women are also very clever with the needle; they do all the sewing and mending on the Station.

A big encampment behind the stockyards is indictive of a powerful local tribe, many members of which have notorious careers harking back to the pioneering days. Interesting rites are practised, including circumcison, and, at a riper age, subincision.* The two upper median incisors are also removed at an adult age. The body is decorated with cicatricial scars; the principal ornaments worn are grass necklaces (karding), fur forehead bands (wongarrima), human hair belts (tschundan), and pubic aprons of fur-strands. Light reed-spears with stone blades, kailis (boomerangs), shields, and throwing or killing sticks are the principal weapons in

* I am reserving an account of the customs, ceremonies and methods of life of the aborigines for a future publication.

use. The name for man is "womba", for woman "jander", and for water "wila."

While searching for fossils at the foot of Mount Marmion we found a paper bark parcel hidden in a cavity beneath a large tumbled rock which contained portions of the skeleton and the skull of a young female aboriginal. The parcel was tied together with fur string, and two or three large stones weighted the over-turned edges down. Several of the bones still retained strips of the mummefied skin adhering to their surface. Upon another rock near by stood a small receptacle which contained the fat of the corpse.

Although it is at least twenty-five miles to the mouth of the May River, the natives catch sharks and saw-fish in the fresh water pools at Balmaningarra. The fish work up against the flood in the rainy season, or are carried along by the spring tides, and are left behind when the water disperses; their habitat is thus changed from salt to fresh water.

There are several large anthills in this locality—from eight to ten feet high. They are more or less cylindrical or conical in shape; when a number stand together they remind one forcibly of a Hottentot kraal. The apex is usually marked by a peculiar button or nipple-shaped prominence. The sides consist of extra-ordinary bunched and bulging masses, the upper of which usually overlap the lower. The appearance resembles, on a large scale, that produced by the leakage, and successive solidification by cooling, of melted metal falling in drips from a smelter tap. The colour depends upon the subsoil; it is usually yellowish brown to red. The crevices and gaps within the structure are favourite abodes of vermin, especially snakes. In order to ascertain what the internal construction was like, we sliced a hill in a vertical plane. As we laboured, some natives were looking on in silence with a pitiful expression upon their countenances which conveyed to us their sympathy in our supposed mental affliction. When half of the "hill" went toppling and crashing down the slope, a clean section was exposed. The face looked like honey-comb, the cells of which were packed with short, thin pieces of grass stalks, about one centimeter in length. From the openings, which communi-

FIG. 1. SECTION OF TERMITE NEST, BALMANINGARRA, APRIL 8th.

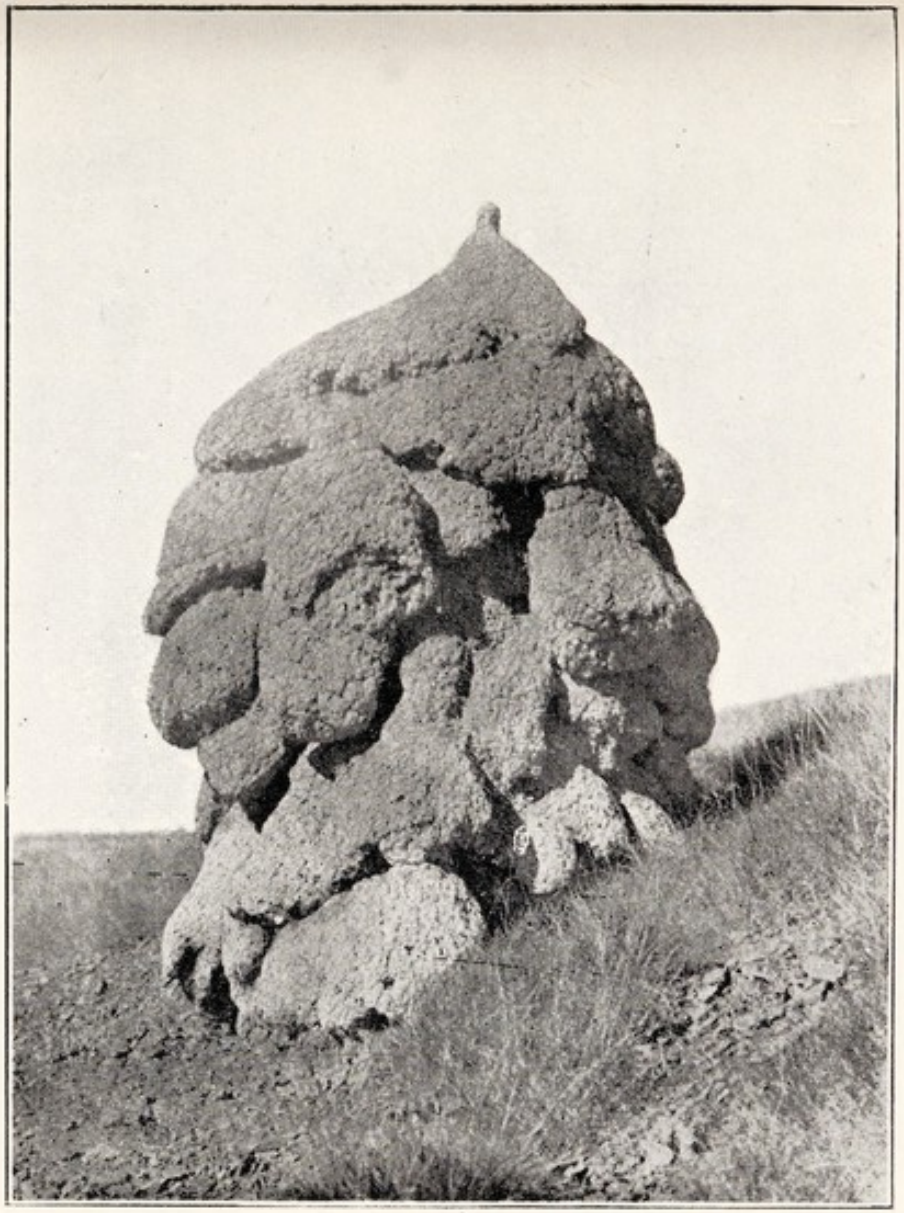


FIG. 2. TERMITE NEST ("ANT HILL"), BALMANINGARRA, APRIL 8th.

cated with an intricate system of passages behind, poured a living stream of small straw and amber coloured termites; they were confusedly, but sluggishly moving in response to the violent disturbance from outside. Among the majority of a small population were numbers of larger forms which represented the female sex. Black and brown ants of the cannibal type were rushing from all sides upon the scene, and carrying off the booty which offered little or no resistance to the ravage wrought by the enemy. Vide Plate VII.

An accident occurred on Sunday night at a creek crossing some eight miles out. A bushman was driving towards the station, when the horse bolted and threw him out of the sulky. He was brought to the Station unconscious, but soon came to again. He had escaped internal injury, but needed a few days' rest to overcome the effects of the shock.

It was disappointing to hear that there were no horses to be had at Kimberley Downs; being the busiest time of the year all animals were in constant requisition. Mr. Davidson eventually arranged for us to have the use of a big black horse named Paddy, which we would drive in the lead of Mick in the spring cart.

MONDAY, APRIL 10th.

Early in the forenoon our team stood in readiness. While the blacksmith adjusted the harness, we finalised the packing. Economy was essential, for the country ahead was heavy. The rings on Paddy's traces were hung on the hooks of the shaft, and I took the reins. A native led the way to the creek, and showed us the ford. A jib and a bound, and away we plunged into the water, then scampered up the opposite bank, bumping over ruts and stones as we flew, until we safely reached the plain above. Only a few articles had fallen, which some natives fished out of the muddy water and returned to us. Paddy kept dancing skittishly, and jerked his weight against the collar—it appears he had never had the distinction of leading a tandem before. At last he struck, and, in defiance to a sharp cut from the lash, jumped over the off-side trace and looked at us as if to argue the point. Mr. Sanders led the insurgent for a

while, and soon he settled down to a steady, honest pull. We took with us another native—old "One-eye Tom", whose tribal name was Bandignan. The ocular epithet the Station hands had given him was on account of a glaucoma which had seriously impaired his vision. Tom was a wag, his face alone betrayed that. And yet behind the acquired smile of benevolence, which his association with the whites had cultured, still flickered the benighted flame of treachery of the once reputed savage warrior. Tom was thirsting for revenge; he was looking for the man who had stolen his wife. Perhaps, he argued, fortune would favour him and bring him face to face with his rival in the Napier Ranges, the haunts of his youth, our destination. As he walked at the side of the cart he carried the sign of his hunting profession —the spear thrower—under his elbows behind his back. He chatted incessantly, and laughed to himself. Every now and then he would dodge into the tussocks in hot pursuit of a lizard or kangaroo, but, though his ardour was keen, his partial blindness was a deplorable handicap. He had a predilection of dwelling upon the advantages of the future. If one could not accomplish a purpose to-day, then there was a "nother one to-morrow" (the day after to-morrow).

We travelled slightly north of east over comparatively open and grassed Pindan. At 10 miles a magnificent specimen of the boabab was reached. Symmetrically grown, the tree stood like a dome, seventy-five feet high. The single, solid trunk was bottle-shaped, and had the enormous girth of 48 feet at six feet from the ground; higher up it was larger still. The richly foliated branches hung bended to the ground, and covered nearly a quarter acre with their shade. A fair idea of the dimensions of this stately giant will be obtained by looking at the photograph in which the horses resting in the shade serve as a reliable scale. The natives call the delightful spot Cambambarra. Vide Plate VIII.

Bandignan fetched some water from a billabong a few chains away, and we rested the horses. A bushman travelling per packhorse to Balmaningarra joined us, and seemed anxious of an opportunity to have a "pitch". Then the horses were watered, and we made along the by-waters of the Lennard River, passing many

FIG. 1. A GIANT BOABAB *(Adansonia Gregorii)*, MEASURING OVER 48 FEET AROUND THE BUTT; CAMBAMBARRA, APRIL 10th. Compare width of butt with length of horse.

FIG. 2. TSCHIMMAN CAMP, APRIL 10th.
Note large Boabab with divided butt in foreground.

picturesque pools with scores of wild fowl and water lilies floating on the surface. Several giant King-fishers (*Dacelo leachi*), with sheeny azure wings, were "laughing" in the white-trunked gums which stood about the water. Their "laugh" seemed forced and more comical than that of the Southern birds. Occasionally a kangaroo would scurry from the grass to seek protection in the bush. The mists of night were rising when we crossed an opening in the timber, upon which rank succulent grass grew in profusion, and pulled up at the edge of a billabong, at the site of a recognised aboriginal camp known as Tschimman. The day's stage was a good 18 miles. Vide Plate VIII., fig. 2.

Some baking had to be done for which a large fire was necessary. As we sat around the glow smoking, Bandignan was romancing about "milkeaters" and tomahawks. His language being so very broken we did not understand the connection, and thought he wanted a tomahawk to protect him during the night from some mysterious animal or spirit he imagined lived in the vicinity. Eventually we found out that "milkeater" stood for "mosquito", and he wanted the tomahawk to cut some pegs to suspend his new net with. Later in the night he forgot all about the "milk-eaters" and spread the net over his body like a blanket for additional warmth. To us the night seemed anything but cool, and for hours we lay awake, bathed in perspiration, listening to the quacking of the wild duck in the billabong.

TUESDAY, APRIL 11th.

The horses had strayed across the creek over night, and, being hidden by the long grass, were with difficulty located. The shelter of Tschimman Camp is afforded by a big boabab, which, unlike the forest king seen on Monday, has a divided butt. At 8.20 a.m. we continued our journey eastward for three miles through Pindan and over rough grassy flats to the old Lennard Station Well; thence we turned north and struck the Lennard River at 6½ miles. The wide sandy bed was fringed by mighty paper barks (Melaleuca), behind which stood a variety of tropical trees. Among the latter was noted the Banyan, whose limbs were propped in the sand with palisades of areal roots. Living trains of green ants (*Aecophylla smaragdina*) were rushing up and down the

stems, coming from and going to the numerous nests they had made by weaving together a number of the dark, glossy leaves, behind each of which were concealed the strength and brood of a colony unto itself. While we halted for lunch we several times felt a red hot sting in the nape from ants which had fallen off the shady green above. The Lennard was running—a small stream of fresh, clear water which chose a thin, winding channel over the absorbent bed of coarse, siliceous sand. But the extraordinary height to which drift-wood had been carried and deposited within the forks and branches of the trees taught us that it was not long since the angry waters of a banking flood had whipped the ground for chains above the normal edge. The banks had been washed away and were far too steep for crossing with the dray. We walked along hoping to espy a more favourable pass across the river farther down stream. But in vain; the banks were higher, more incoherent, and more interwoven with roots of the paper-bark, so that it would have seemed like courting disaster to have attempted driving the heavy dray across. We were obliged to return and make the best of a bad job near the Banyan we had pulled up at.

We were retracing our steps when Mr. Sanders called to me: "Here's a bit of a snake. Gone down a hole. Nearly stepped on it." I was carrying a sporting gun, and walked over to the spot indicated. Sure enough, the glistening scales of a snake could be seen at the bottom of a small circular hole about a foot from the surface. The cartridge was discharged, and, when the dust had cleared, we could see that the serpent was wriggling its last; presently it threw out a jet black head and gasped for air. I hailed Bandignan and told him to "catch him." He pinned the head to the ground with a stick, and, carefully pushing his hand by the side of it, felt for the tail. Then he began to pull; and imagine our surprise when, hand over hand, he towed just three yards of snake out of the hole! It was clear that Mr. Sanders had only seen the tail-end disappear down the hole. Bandignan held the serpent's head between his fingers, gripped like in a vice; then, to prevent further mischief, he passed it into his mouth and crushed it between his teeth. Finally he carried the spoil to camp wearing it around

FIG. 1. BLACK HEADED ROCK PYTHON (*Aspidites melanocephalus*), LENNARD RIVER, APRIL 11th.

FIG. 2. AGILE WALLABY (*Macropus agilis*), KING SOUND.

his neck like a feather boa. It was a fine specimen of the black headed rock-python (*Aspidites melanocephalus*)*. I also added to the "bag" an Australian "Koel" or Flinders' Cuckoo ((*Eudyuamis cyanocephala*)†.

Now we began the task of levelling a track down to the river-bed. The sandy banks were so loose and steep that we wondered how best to engineer a pass. We began shovelling, but progress was slow. Then the ingenuity of Bandignan came to the fore. He sat upon the slope, and working his feet as though he were mounted on a treading machine, slid large quantities of sand to lower levels with every effort. Realising how effective this method was, we soon found ourselves sitting by the side of the inventive aboriginal creating miniature landslides, which, by the aid of our feet were directed to the side of the embankment we were about to cross. Then we cut some branches and tussocks of grass and spread them over the surface to hold the sand; the track was ready. Paddy was led to the bottom and tied to a tree. Mick, shafting the cart, had to follow. While Mr. Sanders and Bandignan pulled frantically from the top of the bank upon a rope we had tied to the body of the cart to save it from toppling over, I led the horse. The vehicle slid and swung, and several times threatened to turn turtle by sinking in the newly made ground on the off-side. But we reached the river bed in safety. Thence we crossed and had to go through the same performance on the opposite side.

An outcrop of rotten, yellow, Carboniferous sandstone occurs on the northern bank, at the crossing, roughly jointed in directions N.N.W. and S.W.W.

Numerous pools left in the rock by the sinking of the stream were teeming with small fish,‡ which lay packed like sardines, forcing respiration in the luke warm water which barely covered them, and calmly awaiting the relieving hour when evaporation by the sun would have deprived them of the last drop of the oxygenating medium essential to their existence. Several gnathonic orchids were seen growing from hollows in the trunks

* Vide Proceedings Zoological Society, London, July 28th, 1864. Species kindly determined by Mr. E. R. Waite.

† Subsequently determined by the Ornithologist of the Australian Museum.

‡ *Ambassis mulleri*. Vide Appendix, page 289.

of eucalypts; apart from them there was little of botanical interest to record.

Having regained the firm ground north of the Lennard River, we followed an east course over grassy downs, the country northward being gently undulating. Camp was pitched at a small billabong, one mile east of the crossing, but we noticed too late that we had selected the haunts of a large red voracious ant which overran everything, and necessitated an early retirement behind the vermin-proof meshes of our tents.

WEDNESDAY, APRIL 12th.

The horses had wandered far, and we were late in making a start. The course was N.E., and soon the Napier Ranges were sighted through occasional breaks in the timber. The country was rough, and the tall speargrass almost impenetrable. A straight course was steered for a gap in the Ranges which was recognised as the Barker Gorge.

The cart was rumbling noisily, but, above the din, a piercing cry fell unexpectedly upon our ears. A female voice, to be sure! We had all heard it; even Bandignan was staring aghast. The note had seemed like a cry for help. But whence had it come? A white woman was out of the question, and no fresh footmarks or smoke-signals of the natives had been seen. Was the blood-stained chapter of a bush-tragedy about to unfold itself to us? Who could tell, the solitude is full of mystery. I had pulled up the horses, and we listened. Dead silence prevailed for awhile, then the voice was heard again. This time a friendly greeting came our way: "Halloa Jack!" Not a soul was visible, and we were more puzzled than before. "Halloa there!" one of us shouted with a masterly voice. The answer was given by the screeches of a dozen or more white cockatoos which fled from the sheltering crown of a neighbouring tree. We had been fooled, there was no denying it; but how this bird had learned to talk is still a mystery.

Eight miles brought us to the Barker River which bears the native name "Kaularre." A narrow stream of fresh clear water was flowing along a wide sandy course lined by paper-barks. Another mile was made

along the stream to the mouth of the gorge, where we camped at the foot of the rough, rocky slopes.

The Ranges rise abruptly from the surrounding sandy loams and have a conspicuous scarp facing the west. The country consists of a subcrystalline bluish-grey Devonian* limestone which contains very numerous crinoids, at times so plentiful that the beds are wholly composed of them. The fossils resist the atmospheric disintegration better than the matrix; consequently they stand out most clearly upon the weathered surfaces of the rock. Numerous caverns have been eroded into the beds whose surface is jaggy and covered with loose slabs. We ascended the slope in order to obtain our bearings. Across the verdant belt of timber in the gorge lay Narlarla, the site of the reported occurrence of the mineral scheelite. The hills immediately south are known as Tarmonginnan. A gully was observed which would allow of a somewhat steep ascent to the tableland in which the mineral was said to occur. We returned to camp, and, taking a few necessary implements, at once set out again for our goal. The gully on the opposite side of the Barker was indeed steep. Upon our right rose a high and rugged face of bedded Devonian sandstone. Vide Plate XI. Away up near the summit the bleached skull of an aboriginal could be seen, which grinned upon us from the last earthly resting place it had been assigned to by the mourners. We scrambled and tumbled over rocks, rubble, and porcupine grass until at length the steepness grew less, and we could walk on to the table top without further difficulty. The surface was bestrewn with stones. The scanty soil bore bush, Triodia, and weakly trees of eucalyptus and boabab. There, too, stood the Narlarla Outcrop. As the hour was late, we made but a hasty examination, and returned to camp, relieved to know that the lode had been located. The morrow would decide whether the mineral our Government and Nation required was there in bulk or not! Were the gentlemen in Adelaide, whose loyal contributions had enabled the equipment of our expedition, to be rewarded or forsaken by Dame Fortune? Thus reflecting we watched the camp fire invest its glowing

* Vide Geological Synopsis, page 247.

embers with a shroud of white. Was it an omen? Was the fire of hope destined to be dimmed by the cloak of disappointment?

"Me camp long-a you to-night?" asked Bandignan, as he turned his opaque eye towards me. "What for?" I replied. "Plenty fella Devil Devil, bad, sit down long-a hole all-about dat way (looking in the direction of the ranges). Him no more come long-a white fella Doctor." Seeing that the poor old fellow had the same faith in the mystic powers of a "white medicine man" as they believe are possessed by a few among themselves, I consented. He wrapped himself up in his blanket, cuddled practically against the legs of my bunk like a dog, and drew a covering over his face. He did not like the numerous weird noises which came from all directions, and were no doubt produced by owls, pigeons, and other birds. Bandignan maintained that one hoarse hooting note was emitted by a big snake, but this, of course I could not verify.

Once during the night we were disturbed by a visitor who came right among our mosquito tents. The station people had cautioned us to beware of the kleptomaniac habits of the "bush niggers" who occasionally visit these ranges, and we naturally thought such a native had been caught in the act. But the thief was an "old-man kangaroo" which was feeding upon the crusts of our damper, and, when we investigated, it bounded behind the shades which were cast by the first lunar quarter.

THURSDAY, APRIL 13th.

Leaving our dew-drenched bedding to dry in the sun, we revisited Narlarla. Two outcrops occur at points about ¼ mile apart. The southern outcrop measures some twenty-five paces in N.W. length by sixteen in S.W. width; the northern, which bears N. 47° 30′ from the former is slightly larger. The ore-bodies are, to use a miners' term, two small "blows", produced by a local segregation of mineral in the limestone. They consist of the mixed carbonates of lead, copper, and calcium, together with siliceous gossan, magnetite, manganesian iron-ore and pyrite. The cavities within the rock are coated or filled with calcite crystals and drusy quartz.

FIG. 1. THE NARLARLA OUTCROP, NAPIER RANGE, APRIL 13th.

FIG. 2. BLUE WATER LILY (*Nymphaea stellata*) BILLABONG, BARKER RIVER GORGE, APRIL 13th.

Among the spoil heaps on the surface we discovered traces of the sulphides of zinc and lead. Although the lode stands upon the summit of the tableland, high above the level of the river, water was struck at the bottom of a shaft not many feet from the surface. Hard as we tried, we could find no scheelite; it is possible that the mineral ankerite was mistaken for it by the discoverer. Vide Plate X.

Alas, it was true! The necromancy of our camp fire had proved correct—the glow of hope had disappeared beneath the frigid garb of grim reality.

I ascended the steep northern face of Tarmonginnan Hill, which lies immediately S.E. of the southern Narlarla Blow. The bedding planes of the limestone shelve into the heart of the hill, and, having suffered to different degrees in different layers from denudation, afford many ready shelters to the casual visitors of the local tribe. A number had recently halted here; they had covered the floors with large strips of paper bark, upon which they had slept. From the top of the hill I obtained a limited view of the surroundings; the tilted slabs of limestone projecting skywards hid much of the scene. Mount Marmion lay on the magnetic bearing W. 17° 30′ S., and a dark coloured knoll (Mount North), S. 17° 30′ E.

When I left the stony ramp of Tarmonginnan and alighted upon the tableland, I came upon a structure interesting in a twofold sense. What had once been a massive block of limestone stood on the brink of the plain, but the wear and tear of ages had completely dislodged its original inner texture so that now only an empty shell remained which had the shape of a dome. There was but one entrance which faced the north. The room inside was quite eight feet in diameter on the ground, and six feet high. To all intents and purposes it was a natural stone hut. And as such the natives had made frequent use of it. The floor was carefully lined and padded with paper bark and grass, and many a fire had been burned near the entrance.

On our way home to camp, I decided to climb to the lofty vault from which the white, bleached skull had greeted us the day before. I instructed Bandignan to accompany me. He turned his eye searchingly towards the object, sniggled, and whispered "Devil-Devil! You

wantem?" Then, with an artificial resoluteness, he scuttled along the rocks ahead of me. It was necessary to make a detour around the head of the steep gully; thence we doubled back along a tunnel at the end of which we had the precipice beneath us. Antelopes, goats, and the barefooted aboriginal may have been in their element, but to the white man wearing heavily clogged boots the situation was far from reassuring. Bandignan was excited, and the obdurate desire for devilment had kindled afresh within his senile frame. He climbed along the ledge with his face towards the cliff and I followed. The path led to behind a partially severed slice of rock which was threatening to roll like an avalanche into the valley below. The dividing cleft between the rock was filled to the height of the ledge with brecciated mullock. I waited here while Bandignan skilfully clambered up the cliff to where the cranium had been planted. Without any sign of repugnance he handed it to me. "More fella want 'em," he queried. And without awaiting reply he passed me down a cylindrical parcel of paper bark tied together with string, and yet another similar packet. They had both lain at the side of the skull, and were weighted down with slabs of rock; their contents consisted of diverse other bones. "Finish 'em" came the message from above, and in a moment my dusky companion stood beside me beaming with self-satisfaction. "Tommy good fella. By and by catch 'em bacca?" I assented, took the skull and started the return journey. Bandignan collected the other parcels and followed. Again we performed the balancing act across the ledge, and before long found Mr. Sanders, who had been watching our manoeuvres from across the gully.*

In the afternoon we walked to the river and indulged in a refreshing bath; there was some washing to do also. Birds were plentiful about the trees. As I followed one into a jungly patch endeavouring to obtain a clear sight for a shot, Mr. Sanders' warning cry informed me of approaching danger. "Back out quietly," he whispered, "there's a snake coming at you from above." I obeyed and cast my eyes in the direction given. A long green and yellow serpent lay along a branch, with some two feet of its head-end swaying in the air to gain a

* The skull and parcels of bones have since been placed in the Australian Museum, Sydney.

holding. Mr. Sanders explained that when he noticed it first, it was in the act of coiling around the crown of my pith hat. Bandignan was a short distance in the rear. We hailed him. And when we looked again the snake had gone, mysteriously disappeared in the flash of a second. I regretted this because it was a good specimen for the bottle. Our "boy" searched high and wide for the absconder, even placed his only eye before the openings of any hollow limbs, but all in vain. It was now clear to me why the bird I was after had behaved so strangely; it had remained glued to the perch in a dazed condition, and did not seem to notice my approach. The snake and I were after the same game; and the former had forestalled me, because the bird was certainly under the mesmeric influence of the approaching green peril.

The following specimens were added to the ornithological section:—Dollar Bird (*Eurystomus australis*), Gouldian Finch (*Poephila gouldiae*), Black and White Fantail (*Sauloprocta melaleuca*), Yellow-tinted Honey-eater (*Ptilotis flavescens*), Uniform-coloured Honey-eater (*P. unicolor*), Northern Fantail (*Rhipidura isura*), Buff-sided Robin (*Poecilodryas cerviniventris*), Grey-breasted Woodswallow (*Artamus cinereus*).*

A few chains towards the River from our camp, a fair sized billabong occurred, the surface of which was decked with the leaves and bloom of the blue waterlily (*Nymphaea stellata*). Vide Plate X.

FRIDAY, APRIL 14th.

We struck camp and left on a N.W. course. At a distance of three miles the ground turned very boggy, so much so that the horses became uneasy. All of a sudden the leader, Paddy, sank over the hocks. He managed to extricate himself with a desperate bound forwards; but, as he did so, the traces snapped. We wheeled the cart around, and after a deal of "feeling" found a fairly firm patch on which the damage could be repaired. While Mr. Sanders attended to the work, I scouted the district for a better course. This was found nearer the Ranges, along the foot of which we managed

* All species subsequently determined by the Ornithologist of the Australian Museum, Sydney

fairly well. The dark blue scarp lay on our right, intensely sculptured by Nature's hand. The long continued solvent action of the atmospheric waters upon the Devonian limestone had eaten mercilessly into the precipitous face which had once been plane but now presented an armament of spikes, candles and columns —a natural *cheval de frise*—toward the sky. Far fetched though the analogy seemed, one was reminded of the grand array of turrets and pinnacles on the Cathedral of Milan. When seven miles on our way, we were overtaken by two mounted "blacktrackers", one of whom handed me a letter from the Manager of Napier Downs Station (Mr. Sherwin), in which regret was expressed that we had lost our food supplies, and that the Station would be pleased to replenish any deficiencies. Amazing news! We had more than enough of everything. An unfounded rumour had been started somewhere, and had spread like wild-fire through the bush.

We shared the task of driving—one with Bandignan would walk through the tall grass selecting the path, while the other would break a track with the team. Once a large "goana" or monitor was put up which made for a mouldy tree trunk. Bandignan followed it with a sportsman's intention to kill. He carried a short improvised club he had picked up from the ground as he ran. With a mighty swing he wielded his weapon which surely would have pulped the hardest bone extant. The aim was good, but the judgment of perspective poor. His waddy crashed into a branch above him, and sent the splinters flying everywhere. The prey decamped with a curse from the would-be captor flung *gratis* behind it.

After covering ten miles of heavy country we stood before Napier Downs Station, once a camp of a constabulary outpost to check the raiding aborigines, now a cattle and horse run. In the temporary absence of the Manager, the Chinese cook, Tok Ting Joo, generally known as Joe, plied the hospitable care, amidst the cheerful strains of a gramophone accompaniment. Joe is a character well-known throughout the settled areas in the Kimberley district; a little too fond of the opiate, he is nevertheless an excellent cook and gardener. He is ably assisted in both departments by a body of

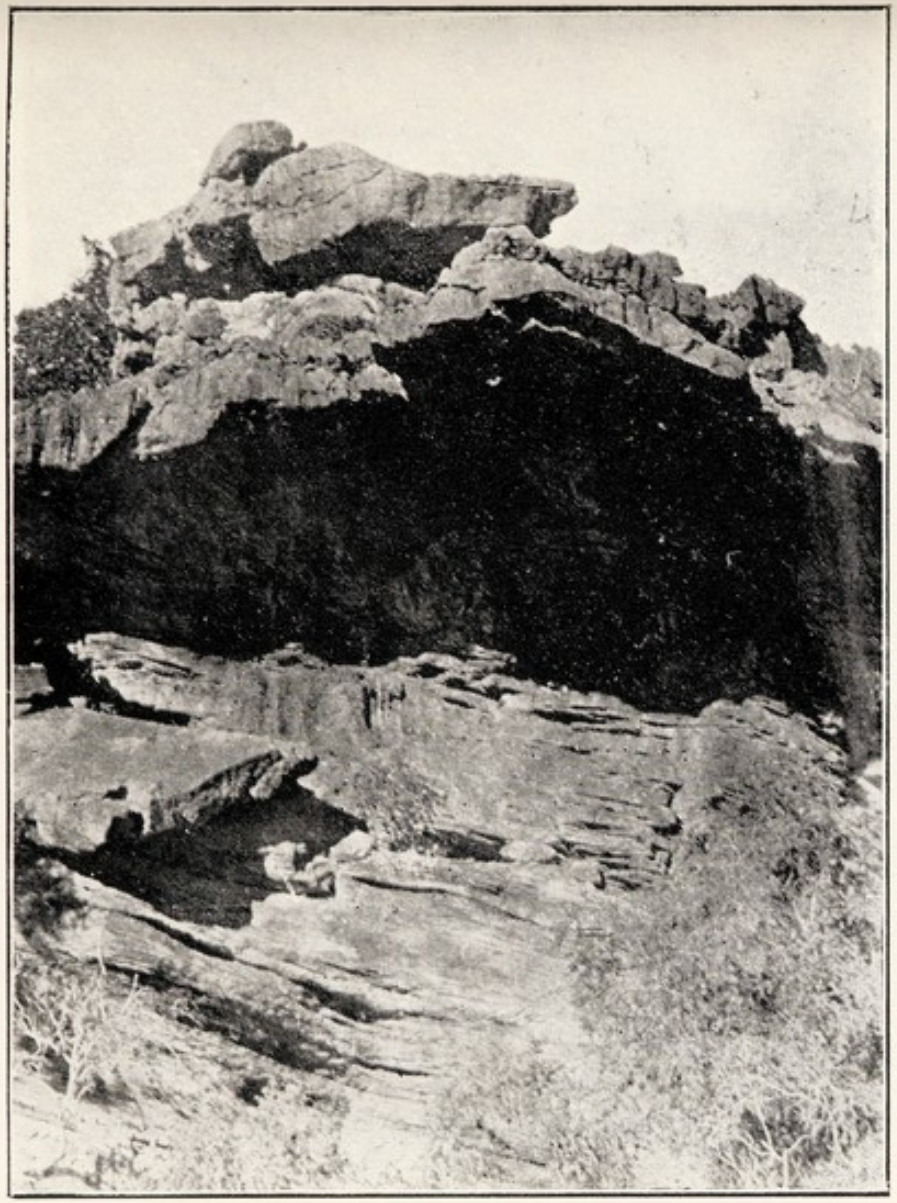


FIG. 1. HIGH CLIFFS OF DEVONIAN SANDSTONE, BARKER GORGE, APRIL 13th. Parcels of an aboriginal's bones and skull were found reposited upon the ledge immediately beneath the black shadow.

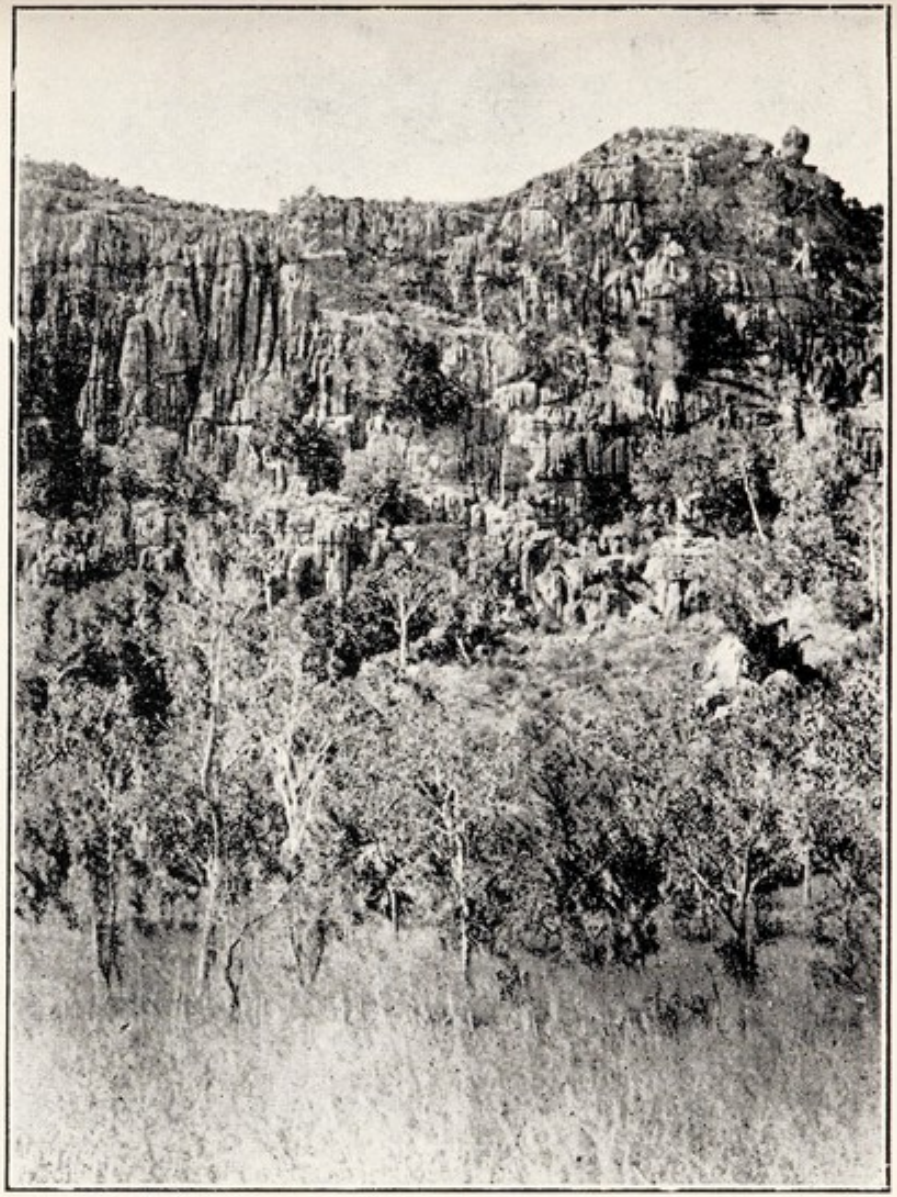


FIG. 2. WEATHERED ESCARPMENT OF DEVONIAN LIMESTONE, NAPIER RANGE, APRIL 14th.

gins who, as we arrived, were busy watering the kitchen garden. A pretty picture it was to see the graceful forms, lightly clad in blue and red Holland frocks, balancing the cannisters upon their heads as they moved among the dark green foliage of the "cabbage patch." A few banana and paw-paw trees also graced the scene, while in the rear clumps of the cork-screw palm or pandanus indicated the sites of numerous deep clear pools which supplied the necessary fluid for the irrigation of the garden. Through the gaps in the timber in the east peered the blue-black front of the Napier Range.

Strolling about the near surroundings of the Station, I found, at a deserted aboriginal camping ground a stone pounder which had been used for cracking nuts and grinding seeds. The implement was more or less spherical, about the size of a man's fist, and consisted of igneous rock foreign to the district. It was evident that the natives had either carried it from afar or obtained it by barter from neighbouring tribes on the east. Napier Downs has the native name of Winji Inga.

At dusk Mr. Sherwin arrived and, to be strictly in conformity with the practices of the land, we all sat on the ground in front of the store and smoked and chatted till late at night. Once there was a disturbance in the kennel; a virtual pandemonium defiled the silence of the air. Mr. Sherwin investigated the cause and found that the line of his well-schooled dogs of pedigree had been invaded by a sneaking thieving mongrel from the natives' camp. Was it a wonder that the intruder narrowly escaped being torn to pieces by the indignant aristocracy?

SATURDAY, APRIL 15th.

We left early to examine portion of the Napier Range lying to the north of the Station. Mr. Sherwin accompanied us. My friends were riding horses, and I a nuggety mule. We took a north westerly course. At six miles a peculiar limestone boss was seen on our right which rested on the southern flank of a transverse depression in the Range. It had been so affected by atmospheric erosion that two holes allowed the skylight to enter from the opposite side. These looked like the loop holes of a bastion from which some cannons might have commanded the plain. Soon we lost the view of

the outside world as we wrested a passage through the spear grass which stood quite fourteen feet in height. At eight miles a small, but picturesque, gorge was reached. Near the entrance stood an arch, eroded into the limestone wall on the left, the columns of which carried an entablature of weather-riven blocks, whose wrinkled surfaces bore testimony of long ages of exposure. A spring exists in this rocky gorge, not many chains from the mouth, and is known as Barnett Spring. The water is overhung by the dark green branches of trees and cork-screw palms. Gliding astutely over the surface of the latter we discerned several long, thin snakes which were green along the back, white underneath, and possessed a comparatively small head. We pelted one with stones to bring it down. When hit, it bounced into the air like a rocket, struck the ground with its tail, and shot across the bed in a half erect attitude, finally diving into the sheltering grass beyond. These green tree snakes belong to the genus *Dendrophis*, this particular species was probably *D. calligaster*.

When our animals had watered we retraced our steps and followed the brink of the range around in a N.N.E. direction. A short three-quarter mile brought us to the opening of a cave. Even from a distance numerous pink and white stalactites could be seen against the dark interior, and, when we entered the vestibule, pleasing was the sight that met our enquiring eyes. Pendant columns, candles, and curtains of delicate semi-translucent colour covered the roof and floor. We could not help finding likenesses and similarities between the grotesque formations and other earthly objects; and the subdued illumination added to the weird effect. Several bats fluttered anxiously about the space, blessing those who had so unkindly disturbed the dreams of their diurnal repose. From the principal cave, we stood in, several passages opened out into dark subsidiary chambers. At one point a coolish upward draught directed the attention to a long, almost cylindrical tunnel which led, like a ventilator, from the ceiling to the top of the range; a speck of blue from the sky could be seen at the distant end which diffused a mellow beam upon the obscurity of this earthly shrine. An air of sanctity hung about the scene, and even our voices were reduced to respectful insignificance by the

FIG. 1. PAPER-BARK PARCELS OF ABORIGINAL'S BONES AND SKULL, BARKER GORGE, APRIL 13th. Vide plate xi.

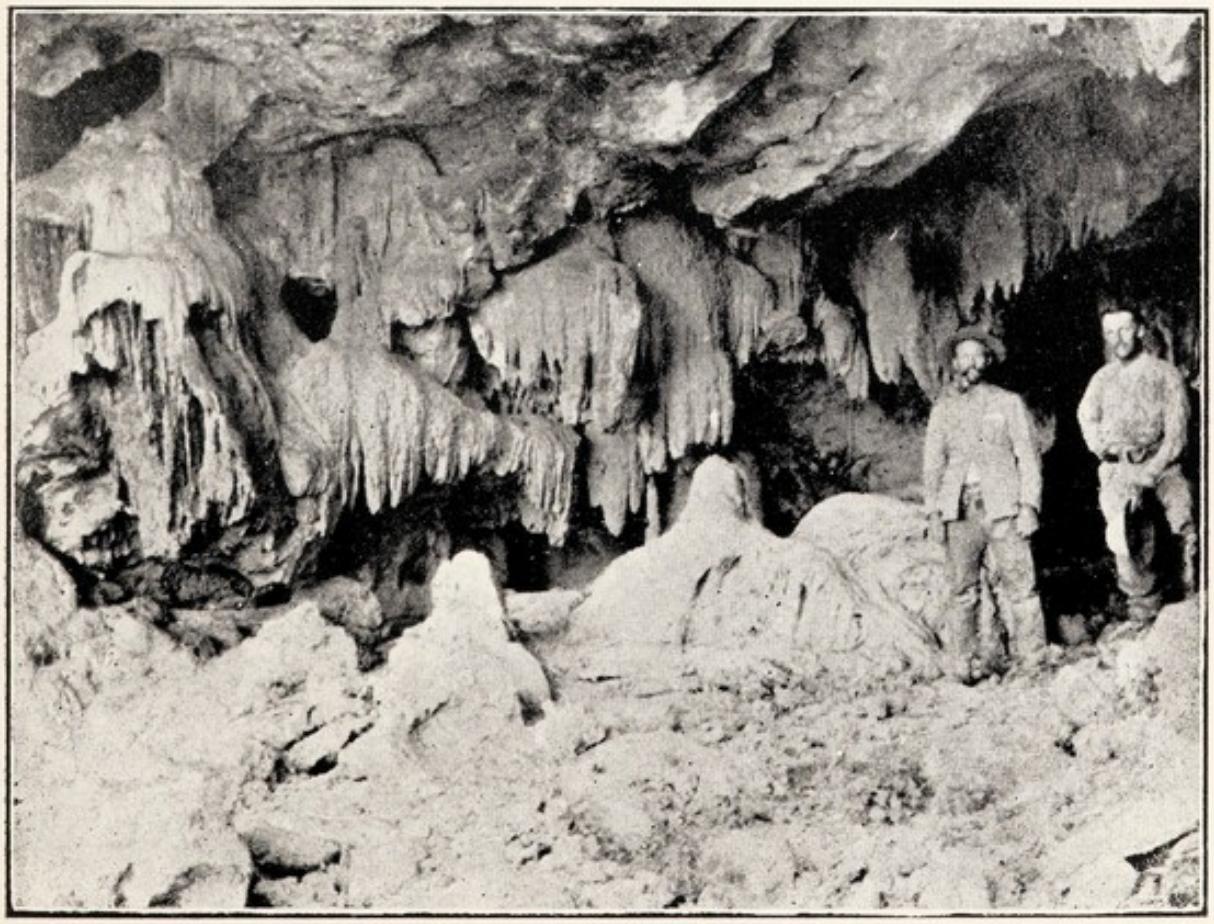
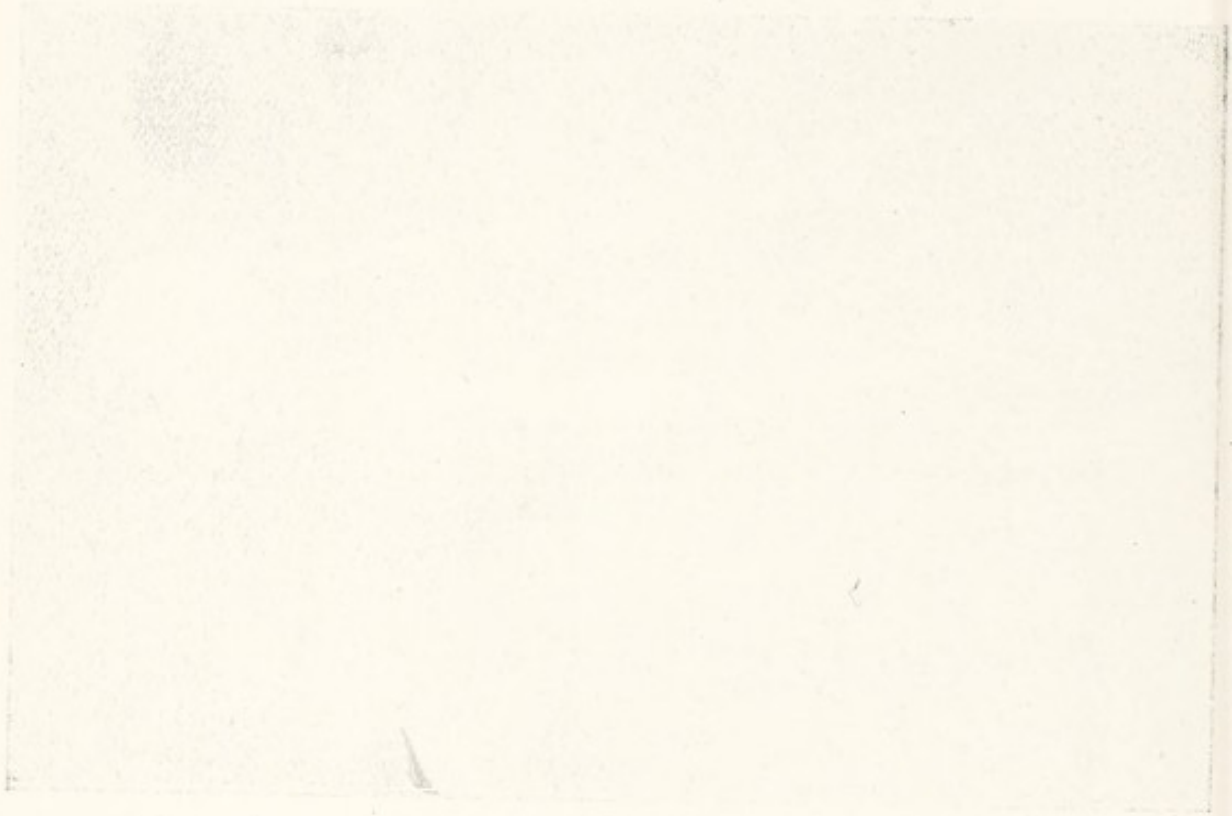


FIG. 2. ENTRANCE TO WANGALINNYA CAVES, JOHN LEWIS GLEN, NAPIER RANGE, APRIL 15th. Messrs. Sherwin and Sanders.



resonant echo which seemed to be vibrating from every column like the notes from the big pipes of an organ. How small man feels when the grandeur of a mystic unknown surrounds him. Were these the haunts of spirits? Were the strange feelings that had come over us invoked by resentment which somehow made itself felt? Was the inquisition of a humble mortal from the world of light perhaps the cause of it all? Our eyes had accustomed themselves to the dimness. There, right in our face, stood the symbol of death—the long femoral bones of a dead man's skeleton, lying upon a table of rock, covered with a pure white cloth of fine grained calcite. It was, indeed, like the cross upon an altar. Here, then was an aboriginal crypt. We thought. Could any place have been more befittingly chosen to respect the dead? Could any artificial vault have been more beautiful? Here heroes could rest without demur for God's own hand had carved the tomb and placed it in this cloistered spot.

We wended our steps towards the light of day and found our track through the thorny undergrowth to our beasts or burden. Jequirity (*Arbrus precatorius*) grew in abundance, and among its vetch-like leaves, the clusters of open ripe pods displayed the rows of jet and scarlet beans.

We had not proceeded far ere we reached another cave. The growth around the site was thick, and some tall spreading trees practically hid the entrance from the plain. The opening was hemispherical, and might well have been a natural stage depicting Fairyland. The arch in front was quite fifty feet high, and about 115 in length. From its centre pended a knotted group of stalactites like the keystone of a vault, or a regal coat of arms over the portal of a hall. Water was dripping from the points of this centre piece, and was attracting numerous gorgeously painted finches which were fluttering stationarily as they caught the drops, or were clinging to the stone in an inverted position as they sipped the fluid oozing from above. The ceiling was supported in the centre by a septum of columnar structures resembling Roman architecture. Light had free access to this cave and in consequence the effect exceeded that of the previous one. Stalactites adorned the surface wherever one looked. Some were massive, others slender

and frail, and many simulative forms could be deciphered. It seemed as though Nature in a playful moment had tried to reproduce in stone replicas, often more or less caricaturised, of certain picked subjects of her glorious creation. Right in front was the model of a dinotherium head from the mossy whiskers of which moisture was bubbling like foam to the ground. In a secluded niche on the right sat a grinning Joss, by his side a diminutive sphinx; the environment in itself lent a fantasy which made the stone alive with form. To the left of the septum, the grotto contained a series of shallow circular basins, one above the other, and each surrounded by a collar of pink calcareous sinter. The water which was trickling over the sides to find the lower levels, was replenished by the ringing drip from the pendant points above. Overhead the intersections of the precipitated bands of rock groined the roof which was delicately marbled in shades of green and blue; in places the organic staining was more intense, and lay as an inset of verde antique across the marmorean base. Some of the columns were garlanded with a leak green lichen—wreaths of welcome by an unseen hand. On either side subsidiary caves opened out into the heart of the range. Butterflies and iridescent blue insects flitted and buzzed about the space. But not the least attractive was the sloping floor, for it was laid with a carpet of green and blue. The green was rendered by the fronds of a small fern, the blue by the bloom of a plant whose perfume hung thick in the air.*

The rocky walls which stood on either side of the cave were honeycombed with pits and cavities, which all contained a number of heliform land-snails. The pits had no doubt been largely formed by the solvent action upon the limestone of the acid secretions of the molluscs. Another species with spiral markings down the whorls favoured the trunks of the trees, while yet another whitish form preferred the tussocks of the porcupine grass on the plain, in which it clustered by the score.†

Having disturbed several Kangaroo (*Macropus rufus*) which were resting in the cool of the vaults, I resolved

* The fern was subsequently identified by Mr. Whitelegge as *Adiantum capillus veneris*, the other species by Mr. J. H. Maiden as *Biblis linifora*.

† Vide Appendix, Page 281.

to assign to these caves the local name of the marsupial, viz. Wangalinnya.

When we had completed the exploitation of the cave and its surroundings, the sun stood not far above the horizon. We took a roundabout course homeward to avoid the troublesome grass.

SUNDAY, APRIL 16th.

Mr. Sanders and I rode over to the foot of the Ranges N.E.N. from the station, and made a collection of crinoid fossils. The strike of the weather-beaten limestone beds is W. 20° N., the dip 15° southerly. Hawkestone Peak was sighted; a conspicuous table-shaped landmark lying S.W.W. We returned to head-quarters before noon.

The scalpel had latterly been in frequent requisition in removing the points of spear grass which had penetrated deep into the skin in various parts of our bodies, and thereby caused slight processes of inflammation and suppuration.

The Chinese cook roasted a couple of cockerels for our Sunday dinner. The method he adopted to "pot" these semi-wild birds was peculiar. He chased the fowls around the place for quite an hour with a Winchester rifle, aiming every now and then at a fleeing cackler's head. This he did to save the meat! The result was that in his excitement, he missed the mark repeatedly. When at last, completely exhausted, he brought down one of the birds, he commissioned a "blackboy" to chase and despatch another with a boomerang. That was soon accomplished.

MONDAY, APRIL 17th.

We left at daylight—Sanders, Sherwin, a black-boy, and I. The means of transport were the Station coach and a team of five fleet mules. We drove to Barnett Spring, thence followed a wide, open gap northerly. On our right stood a row of grotesquely weathered groups of limestone which bore striking resemblance to statuary, while along the mountain scarp lay evidence of very considerable slides of rock. The steep banks of Jalmanda* Creek were reached at 12

* Jalmanda is the native name for a tree orchid.

miles, and, in order to obtain the necessary momentum to take us up the opposite side the crossing had to be affected with a rush. The sensation of dropping into the bed and flying up the other side after the willing mules reminded one of tobogganing. Soon we passed through the Ranges on a course E. 10° N. This is an easy pass, deserving of a name in the plans; I have christened it John Lewis Glen.* There is said to be another gap in the Range eleven miles north-west; thence the broken limestone continues interruptedly for another three and disappears from view.

When we reached the other side of the Range, the physical features of the country altered entirely—the roughly scarped blue limestone plateau gave way to smoothly rounded reddish hills and "hog-backs" characteristic of granitic areas. This tract of hills is known as the Paterson Ranges. At 15 miles an outcrop of schist was found striking N. 20° W., and dipping 45° W. We turned east along a fertile glen in which stalwart gums and bloodwoods grew; epiphytic orchids clung in numbers to the trunks. Another spur of schist was reached in which several well-defined quartz reefs occurred. The slopes and creek-bed were locally covered with garnets which had been washed out of the disintegrated schistose matrix. Beyond this spur, another open flat was crossed upon which tea-tree was growing. We turned north at 17 miles, and picked our way through granite hills to the foot of a steep slope upon which some dilapidated workings could be seen. This was the old King Sound Tin Mine.

We camped and watered the mules at a small clayey billabong; the day's stage had been eighteen miles. This locality is known as Tcherrekau. The hill, upon which a little prospecting had been undertaken prior to our arrival, consists of phyllite, clayslate and fissile quartz schist; the beds strike W. 10° N., and dip 10° S. The rock is weathered, and its planes stained and coated with oxide of iron near the surface. Quartz outcrops were seen along the centre of the hill, trending E. and W. The "lode" consists of a number of small veins and "stringers" of a white quartzose matrix. The footwall

* In honour of the Hon. John Lewis, M.L.C., Hon. President of the Royal Geographical Society of Australasia (South Australian Branch).

dips 80° S.; the hanging wall is talcose, and covered with secondary mineral, principally sericite. The useful minerals are more or less concentrated along the hanging wall, and consist of tinstone and wolfram. They are scarce, but a green arsenate of iron (scorodite) is rather common throughout the quartz.

The district for some distance north, south and east consists of groups and chains of low rounded hills, which, for the most part are composed of metamorphic rocks. In places the slates and schists overlie granite, in others they are intruded by diorite. The age of the former series is in all probability Pre-Cambrian or Cambrian. The unconformity with the Devonian beds of the Napier Ranges in the west is very apparent when viewed from any of the schistose hills.

TUESDAY, APRIL 18th.

We returned to Napier Downs, and continued in the afternoon per cart and tandem to Hawkestone Peak, a distance of twelve miles. Travelling was easy over level Pindan. We camped some time after nightfall at a well a little beyond the tabletop (Hawkestone Peak), which is known to the natives as Tcharremongai. We were tired, for about thirty miles had been covered during the day. Nevertheless some cooking had to be done for the folowing day. Bandignan was told to bank the fire, which he did with pleasing willingness. He was more than usually "wound up", and gibbered incessantly. He had, it appeared, been to Derby, and had seen many things there which he thought were "good fella." In one narration he was particularly expletive. Two sticks were produced, one longer than the other, and held vertically side by side. To the top of the longer his index finger was directed whilst he made some peculiar hissing noises; then pointing to the shorter he produced a shrill note. The explanation had reference to the funnel and steam-whistle of a boat he had seen lying at the Port.

WEDNESDAY, APRIL 19th.

The outlying outcrops in this locality consist of reddish and white sandstone of Upper Carboniferous age.

Ere the sun had risen, we were on our way, over Pindan and open flats. Then followed a grassy swamp

at four miles, at the further end of which a creek had to be crossed. This operation presented some little difficulty owing to the steepness of the banks; but we succeeded without a capsize. The back bearing to Hawkestone Peak was N. 27° E. As I scouted the creek-bed to find the most convenient spot for taking the cart over, I saw a huge "goana," over six feet in length, lapping the water in a pool. It made no pretence to move as I approached, but merely turned its head and defiantly stared at me. As I carried no weapon with me, I thought it best not to argue the right of the way with the reptile, and moved on. There were very numerous green-blue flies (*Lucilia sp.*) in this locality which I have since found out were a dreaded sheep pest of the Kimberleys. At ten miles we crossed the Lennard River; the northern bank was low and sandy, the opposite steep. A fair volume was flowing. We managed to cross, with but a tear of a breeching strap; and whilst cleaning the track Mr. Sanders was stung by a hornet. Soon Mount Marmion was sighted, and we reached Balmaningarra after eighteen miles' travelling.

THURSDAY, APRIL 20th—GOOD FRIDAY, APRIL 21st.

We attended to the packing of specimens in the Natural History Department. Three cases were filled, which later were carted to Derby by a bullock waggon. The fossiliferous beds were also revisited, and the collections augmented.

The local tribe brought me a number of useful things in exchange for which I distributed tobacco, beads, coloured kerchiefs, and pocket knives among them.

SATURDAY, APRIL 22nd.

Leaving the black horse at Balmaningarra, we returned via our outward track to Emmanuel Yards. Numerous kangaroo, including the Karrabel or nail-tailed variety (*Onychogale unguifera*), and an inquisitive emu were seen in the last named locality. The emu followed us for some distance. A waterworn quartzite pebble was found three miles east of camp, which had been used as a pounding stone by the natives. The night was intensely hot and muggy. The crickets were more than usually lively, and serenaded us with a united, stri-

dent chirrup, the monotony of which was anything but conducive to sleep.

EASTER SUNDAY, APRIL 23rd.

Ten miles of sand, heat and flies, brought us to the Meda at about 11 a.m. Mr. Watkins, the Manager of the run, looked in in the afternoon. He was on the trail of an aboriginal thief. It appeared the boy had been sent to the Station from Crocodile Camp to fetch some cartridges. He obtained the cartridges, but was not seen again. Mr. Brown had taken the precaution, too, of adding a letter to the parcel, for there is a mystic charm about a white man's letter, in the estimation of an aboriginal. It is not looked upon as the mere means of conveying a message, but is supposed, also, to possess the power of being able to impart to the receiver anything the carrier might have done in the interim. In other words a letter or "paper-yabber" is a "tell-tale" which keeps watch over the aboriginal. For this reason the carrier has often been known to bury the letter if he wished to do anything he did not want his master to know of.

The Station gins went out fishing in the afternoon. They returned with a barramundi (*Osteoglossum leichardti*)* weighing just under twenty pounds; of this the new Japanese cook placed some tasty cutlets before us at supper time.

A refreshing N.W. wind sprang up in the afternoon. The climate had been very trying for the last few days, and heavy thunder clouds had been much in evidence.

The local natives had shifted their camp. Since we were here last an old man had died, and for that reason, to be in conformity with the custom of the land, all others had to leave, and select a new camping ground. The belief is that the defunct returns and has need for his humpy. His operations are such as necessitate the utmost secrecy, and it is considered tribal etiquette that the dead man's beat should be respectfully avoided. Everybody knows why the removal took place, and nobody asks any questions. The curt answer given to the curious white man is tendered in much the same spirit

* Vide Gunther: Ann. Mag. Nat. Hist., Ser. 3, xiv., 1864, p. 195, Plate vii.

as when one evades a pointed question from a child. The stranger, if he receive any reply at all from the mouth of a mourner, might, with feigned sincerity, be assured that it was necessary to leave in a hurry because "Devil Devil been come that way." The secret visitations are believed to be made in the absence of the tribe, and during the hours of darkness.

The nuts of the boabab were ripening. From the verandah of the bungalow we watched the children shying toy boomerangs and pieces of bark at the large seeds pending from the branches like so many gourds. The nuts are embedded in a mucilaginous mass, the whole being contained in a hardish shell. All the contents are edible, either raw or roasted, preferably the latter. Bushmen often add some of the mucilaginous pulp to the flour when making damper; it is said to be a good substitute for baking powder. We could not help admiring the wonderful precision with which some of the youngsters could throw; and loud were the honest shrieks of joy when a missile brought the desired object to the ground.

The station houses are built upon a solid foundation of laterite; several dark-brown outcrops of the pisolitic rock occur in the immediate surroundings.

EASTER MONDAY, APRIL 24th.

Early in the morning I attended to a levee of gins who were anxious to do business by exchanging their throwing sticks and boomerangs (kailis) for pocket knives and tobacco.

As a bad stretch of country lay before us, we decided to leave all our heavy gear behind to be subsequently forwarded by bullock team.

Soon we were jolting down the rocky slope, and passed through the panels which had been opened by a haggard, but dignified, old "blackgin." Mr. Brown waved a "good-bye" from the verandah, and then we disappeared behind the timber. Upon the plain we espied the canvas fly of a white man's camp. Poor fellow. As we drew near, we could see him kneeling over the edge of a billabong endeavouring to cool his burning eyes with water. He was a typical sundowner. Long and neglectful exposure to heat, perspiration, sand, and flies

FIG. 1 BOABAB MARKED BY CAPTAIN LORT STOKES' PARTY IN 1838, MAY RIVER, OFF STOKES BAY, APRIL 24th.

FIG. 2. TERMITE NEST ("ANT HILL"), OFF MAY RIVER, STOKES BAY, APRIL 24th.

had severely revenged itself upon his eyes, the raw, red inflammation of which provoked a sympathetic ache within our own when we but looked at him. The lids were granulated with what he termed the "sandy blight." And as he spoke, flies kept moving to and from the infected lids, leaving more dirt and more poison to further irritate the tender tissues. Little do town-residents, enjoying the comforts and conveniences of modern life, realise what suffering, and what fortitude in endurance, are hidden behind the curtains of solitude in the Australian bush.

At a short two miles we halted beside the anthills and the boabab forest observed during our outward walk in the evening of April 4th. The former were indeed grotesquely shaped. From eight to ten feet high, and as much in diameter, they were as a whole, conoid; but yet in detail each consisted of a number of short turrets fused to the warty central body they surrounded. Others were more simply constructed, and, to a casual glance, might have passed for kilns or aboriginal huts.

When conducting a closer examination of the clump of boababs, that stood nearby, it was my good fortune to make a discovery which is of both historical and geographical interest. The smooth trunk of a straight tall tree on the eastern verge of the clump bore the name "STOKES", carved in capitals deeply into its bark. The edges of the letters were swollen with age, and it was certain the name could refer to none other than to that distinguished navigator Commander J. Lort Stokes, R.N., who in 1838 visited King Sound, and named the Fitzroy River. Stokes in his Journal* writes that two of his officers (Messrs. Helpman and Keys) explored the opening which Captain Wickham subsequently named Stokes Bay, and in their surveys found inlets in the north and south corners of the depths of this Bay. It is very probable that during the examination of the southern inlet, the party undertook an inland excursion and marked the tree herein referred to. I trust that steps will be taken to preserve this historic relic of early Australian exploration.

We had not covered three miles before we were again bogged. The horse rapidly sank up to its belly,

* Discoveries in Australia, London, 1846, Vol. I., p. 154.

and there it was anchored in the mud in a helpless condition. Several pieces of the harness, including the girth, had been torn, and it was no easy matter to extricate the fallen animal from the tangle. Fortunately the cart stood on some firmer ground whence we ultimately succeeded in moving it to the dry. This little by-play had, nevertheless, robbed us of a valuable hour, and with it, perhaps, went some of our cheer.

The acacias, which were now in their bloom, incensed the air with a sweetly fragrance; and, as we brushed the stems in passing by, a golden rain of pollen showered incessantly upon us.

When we were reckoning a good ten miles, the hoarse bray of an ass announced that Native Well lay not far ahead. It was a welcome signal, for the swamp episode had so completely knocked up our willing horse that its head hung low, and it barely had enough energy left to drag its limbs as the wheels cut deeply through the heavy sand.

Native Well presented a busy scene. A donkey waggon from Balmaningarra was bogged, and frantic efforts were being made to dislodge it when we arrived. Another team of donkeys and mules was assisting. The latter was owned by a man who was returning from Derby whence he had taken sheep for shipment to Singapore. About a dozen native attendants were with the parties. The combined pulling of the two teams ultimately succeeded in dislodging the waggon, and the travellers camped in little groups around the boababs.

Our horse was taken to the well and soused with water. The afternoon had been exceptionally close. The customary vault of blue was masked with a misty nimbus, and here and there, dark inky blotches suggested a likely thunderstorm.

All of a sudden the bastard neigh of a mule broke through the air with an alarming shrillness. With its tail and mane standing erect with fear, it bolted; and then a stampede occurred—horses, mules and donkeys alike, away they tore like the wild chase of Lutzow. "Up boys and after them" bellowed a teamster, "the camels are coming. Turn them into the bush." And away dashed a couple, who had not removed the bridles from their animals, to obey orders. A string of camels

was, indeed, coming towards us from the west; two Afghans were in charge. When the latter noticed the confused condition of our livestock, they immediately turned aside and took a circuitous course under cover of the Pindan. One of the men came over to me, and placing his hand to his turban, asked me concerning the track. It appeared these men were on their way to Hall's Creek whence they intended travelling their caravan to Wyndham. When the last of the string was out of sight, the boys were told to round up the escapees, but it took some time before order could be re-established.

One of the natives, a Balmaningarra man, named Urukmallu, had abnormally curly hair for a full-blooded Australian; his gin was an expert cook, and officiated in that capacity to the teamster.

The night was most unpleasant. Soon after sundown foul-smelling vapours collected over the swamp, and with them came hordes of hungry mosquitoes. Later in the night we were assailed by a veritable army of frogs. They were jumping everywhere, and quite took possession of our encampment. The cart, the bunks, the mosquito nets, the kitchen utensils, wherever one looked, the slimy creatures sat and turned their large black eyes towards us. Some were more daring still, and alighted upon our bodies. There was no choice in the matter, the frogs and the mosquitoes forced us to retire beneath our nets. The atmosphere was sickening, and we spent a miserable night, bathed in perspiration.

Once we were aroused by the hoof sounds of a galloping horse, which rapidly drew near. Suspecting a traveller on an urgent errand, we shouted to him to look out for the tents and sleeping men. But he heeded not; in his hallucinatory frenzy he spurred his horse to even greater speed, dashing blindly into the darkness of the camp. He owes his life, and some of us perhaps ours, to his faithful steed, which despite its cruel plight, instinctively averted what had seemed inevitable. It was a miraculous escape for both horse and rider, and for that matter for all concerned. A fascinating orgy had no doubt detained this fellow beyond his time, and he was attempting to make it good by dashing the rowels cold-bloodedly into the flanks of his terrified animal.

TUESDAY, APRIL, 25th.

Welcome was the hour which ended our confinement in the nets. The mosquitoes had vanished, but our ranine aggressors were keener than ever. The mists had soaked our bedding, and a pool of water weighted the calico roof of our cheese-cloth enclosure from which the fluid was dripping in quick succession. This free wetting had chilled our bodies, and we sought the fire until the dawn marshalled the golden cohorts of day which speedily dispersed the objectionable vapours. With the first modest notes from the waking feathered tribe in the steel grey line of timber opposite, all stood in readiness.

We crossed the treacherous-looking patch of swamp without serious mishap; the recent sinking of the donkey waggon had been anything but reassuring that we would escape a similar fate. The site of our former bivouac (April 1st—3rd) lay on our left as we entered the Pindan. Seven miles of heavy sandy country lay ahead. We walked, but even then the poor old nag hopelessly fagged when we had covered but half that distance. We halted in the shade off Deep Well, and splashed its heated body with water, which seemed to revive it somewhat. We, too, were glad of a rest, for the difficult walking and the forced driving of the horse had in no way tended to reduce the effects of the clammy heat. Some watermelons grew near the well, of which we greedily ate to still the dryness of our throats. Then we pushed on. Poor brute. It pulled for a chain or two when it automatically stayed for a blow. Under the circumstances progress was painfully slow. There was a very light load in the cart, but we discovered that the axle had bent, and one of the wheels was ploughing at an angle across the track. What a relief when eventually the seven miles had been covered, and we found ourselves on a hard laterite track. A slight breeze was now fanning us, and no further obstacle was encountered. Gooda Gooda Well was reached early in the afternoon. A prolonged rest was necessary, during which we again bathed the horse. Then we made across the big tidal mud flat.

The sun stood against us and reflected a heated ray of snowy white from the saline crystal-scum which covered the mud. The marks of a recent flood lay like

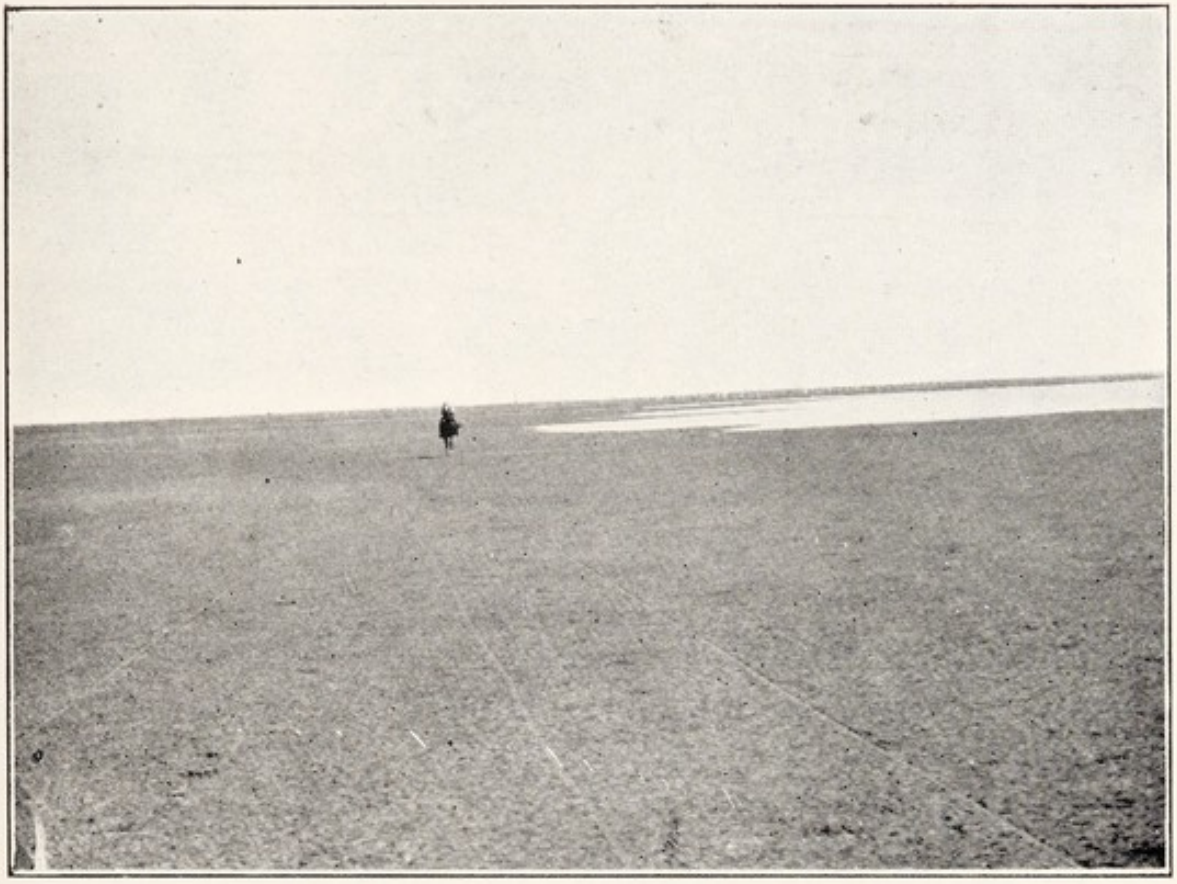


FIG 1. THE GREAT TIDAL MUD FLAT OFF KING SOUND, APRIL 25th.
(Note scum of crystallised salt left by a recent tide.)

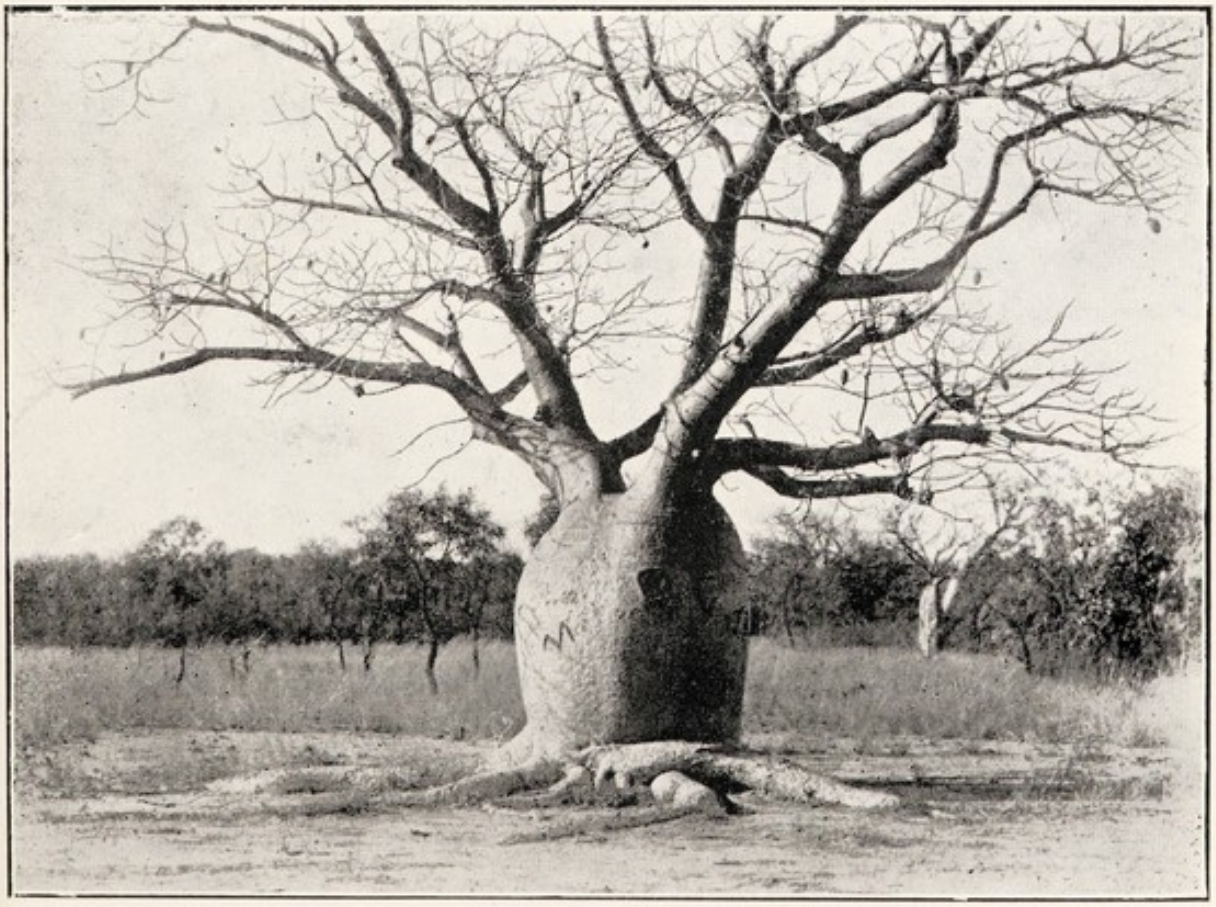


FIG. 2. A BOABAB WHICH HAS SHED ITS LEAVES, KING SOUND.
Vide Page 155.

a frozen surf on the right, and beyond its distant sheen, the dingy coloured Pindan allured with tantalizing coolness. Vide Plate XIV.

When at length the solid ground was reached, a bullock team was seen toiling towards the township. As we drew near, the driver emerged from the trail of brown-red dust and spoke to me. Polite, polished, and eloquent — and yet a bullock driver! What an enigma! I stared at the gentleman in front of me and almost forgot to answer. He thanked me and returned to his duty. Tempted as I was to call the stranger back and ask him to explain, I thought it wise to be discreet, and drove on. Later, the townspeople in Derby informed us that this was, indeed, an English gentleman who, they maintained, was a university man, but had been baffled by drought, disappointment, and bereavement. Now he was making a dearly earned living by bullock driving, and at the same time, was in his leisure hours exercising his literary attainments by writing a book.

Derby was reached as the sun was about to set.

DERBY, MAYHALL'S WELL, AND POINT TORMENT.

For a few days Derby kept us busy. A pile of correspondence and telegrams required immediate attention, and an advance report was requested of me from Adelaide. The continuation of our explorations was to date from May 4th, and that needed some consideration. Moreover, during his contemplated temporary absence from Derby with the State Minister of Agriculture and Mines, the Resident Medical Magistrate (Dr. F. J. Elliot), had arranged through the Colonial Secretary's Office for me to act as his *locum tenens*. This appointment tied me to the township, although, when the time arrived, the Minister found it impossible to appear, and the scheme did not materialise. The doctor consulted with me in several interesting cases of his private practice, and on several visits to the hospital and prison, I was enabled to examine and study the effects of venereal and tropical diseases upon the aborigines. Among the latter, several newly arrived cases of the yaws displayed the fearful ravages of that curse in all its phases.

One afternoon as we were discussing a "chronic" in the shade of a bungalow verandah, an accident occurred before our very eyes. A dipsomaniac was thrown from a restless horse. He fell flat upon his back, and lay motionless. His "blackboy" was immediately kneeling by his side, stooping over him and concernedly watching the pallid face. He felt for the heart; then he raised an arm, allowed it to drop lifelessly upon the fellow's chest, and looked at us beseechingly. "By jove, he's dead," said Dr. Elliot as we arrived. But the stethoscope said no; the man lay in a death-like coma. We sent for a conveyance to take him to the hospital. "This is a peculiarly complicated medico-legal case," explained the doctor. "If the police prosecute, I (as a witness) will have to give evidence before myself (as the magistrate), and if he succumbs, I (as the coroner) will order myself (as the medical officer) to make the autopsy."

Among other places of interest, we visited Mayhall's Well. This is a favourite camping ground for travelling stockmen, and when we were there a mob of bullocks was grazing on the flat awaiting shipment to the Southern market. In the original well good fresh water was found at about 25 feet below the surface. A bore has been sunk, and artesian water struck at 218 feet. The bore was continued to a depth of 1,057 feet, and the flow increased to 69,400 gallons per diem. The water-bearing beds consist of Carboniferous sandstones and shales*

Near this water stands a most remarkable boabab tree. It is neither very high nor prolific in its growth, but the circumference of its bottle-shaped butt is considerable. The most striking feature is, however, that the entire interior of the trunk has disappeared. In other words, the butt of the tree is represented by a shell of bark enclosing an empty space. There is only one entrance to this space, which is by way of an oblong slit in the bark. The natives have long been in the habit of making use of this *lusus naturae* as a habitation; it is indeed a dry and comfortable hut. Some bleached human bones were lying upon the floor, which suggested that the tribe had also made use of the tree for disposing of the dead. A frontal bone of a skull clearly bore evidence that the individual had fallen a

* Vide Report Interstate Conference Artesian Water, Sydney, 1912, page 132.

FIG. 1. A FLOWER AND LEAVES OF THE BOABAB *(Adansonia Gregorii)*
Vide Page 155.

FIG. 2. THE HOLLOW TRUNK OF A LIVE BOABAB USED BY THE ABORIGINES BOTH AS A HUT AND BURIAL PLACE, MAYHALL'S WELL, KING SOUND. Vide Page 154.

victim to the bullet of a rifle. Did then the perpetrator of the deed seek the seclusion of this tree to plant the corpse and hide his sinful act?

The boababs were by this time beginning, here and there, to lose their leaves. Several stood near the edge of the great tidal mud flat which had dropped them all. Yet others were not only still covered with the green, but also carried flowers, which diffused a nectareous fragrance for some distance around. Vide Plates XIV. and XV.

A three-days excursion was undertaken to Point Torment. Accompanied by Mr. Fleming, who was riding, Mr. Sanders and I left Derby per horse and cart. We crossed the tidal flat and reached a well named Bungle Gooda; thence the eastern, mangrove-lined shore of King Sound was hugged as we made northward. The numerous inlets cutting into the Pindan which had either to be crossed or avoided, prolonged the drive, and we camped the first night under a huge boabab near a water known as Middle Well. This is the old original well shown on the Government charts. It was dug in the pioneering days when there was no Port of Derby, but all goods were landed near Point Torment and carted round King Sound to their destination. Pindan, mud flats, and the mangrove lining continued to be the order for the next half-day. Then the mangroves broke, and we for the first time beheld the muddy rip of King Sound. It was low water, and a brown-looking reef which was cut by numerous passages, could be seen extending far out to sea.* Slimy mud flats lay between and before the rocks, while in the foreground a narrow strip of sandy beach stretched northwards. The reef was completely flooded at high water. Upon a sandy shelf bordering the beach on the landward side stood a sentry of two large boababs, which against the low-lying hinterland form prominent landmarks; they are in fact of considerable value to mariners. The trees are no doubt those discovered by Stokes† in 1838, when he named the new territory Point Torment on account of the "incessant and vindictive attacks of swarms of mosquitos." We camped beneath the trees. The aborigines call the place Madinganarre, and the numerous ash

* This reef is called the Black Rock.

† Discoveries in Australia, London, 1846, Vol. I., p. 128.

heaps in the vicinity would suggest that it is a favourite feasting ground. The reefs abound in small but tasty oysters, and among the roots of the mangroves large crabs are caught with ease. Fish, too, are plentiful. The crowns of the mangroves conceal a diminutive species of ringtail opossum which frolics at night, but spends the day sleeping in neatly constructed nests. There is, however, no good water available on the spot. About a mile inland a billabong and well exist which yield an abundant supply of water. The well is dug into a yellowish argillaceous sandstone containing numerous imprints of Mesozoic ferns.

The Point Torment Peninsula separates King Sound from Stokes Bay, and is a low and flat land decked with timber. Birds were seen in numbers, especially near the billabong. Among the most common, and at the same time most beautiful, were the Australian grass finch, the black bib (*Poephila acuticauda*), the blue mountain (*Trichoglossus rubritorquis*), and the bloodwing (*Aprosmictus erythropterus*). The grass finch usually appeared in pairs, the black bib in flocks of several scores; water seemed their main concern. The blue mountain and blood-wing parrakeets favoured the blossom of the eucalyptus, from which they sipped the honey. On the beach we found a variety of molluscs, corals, and semi-fossilized crabs and Teredo tubes.*

As we were driving across country to the billabong, a wheel of our cart was suddenly jerked high by a flexible sapling. Mr. Fleming was ejected with some force on to the ground, but luckily no harm resulted from the fall. At the billabong we shot a brace or two of black duck, and then retraced the wheel rut to the beach.

During the night a steamship was sighted making up the Sound with the tide towards Derby.

On our return journey, we met with several semi-civilized natives on a hunting excursion. They had been blessed with a bounteous bag of fish and crustaceans, the former strung to a spear which the hunter balanced over his shoulder. After a short parley, we exchanged some tobacco and tea for a dish of crabs'

* Subsequently determined by Mr. R. Ethridge to be *Kuphus manni*. See also page 236.

claws. They had also been searching the boababs for the large nuts. To ascend the tall, smooth trunks, they made use of the following method. Several short pegs having been cut, the climber faced the tree and drove them into the bark on either side of him, alternately increasing the height as he stepped upwards. Such ladders were noticed on a number of the trees; they had, perhaps, been left to serve the purpose in coming seasons.

Many of the large, knotty boababs make excellent reservoirs for atmospheric water. The limbs surround the top of the trunk like the tentacles of a hydra, leaving a depressed cavernous area in the centre, some twelve to fifteen feet above the ground. Within the latter the catchment from the branches collects, and is available for some considerable time after the lapse of the wet season. The aborigines frequent such waters when scouring the bush, and it is well for the European traveller to remember these possibilities when other supplies are absent. The presence of the "tree holes" is often suggested by the numerous birds and swarms of insects flying to and fro.

We again camped at Middle Well, and in the evening saw a mysterious light peering through the thicket of mangroves in the west. First we thought of a will-o'-the-wisp, but later decided that it must have been the reflector of the vessel we had seen the night before, which was supplying the light during the unloading of cargo at the Derby jetty.

At Bungle Gooda a white man and a "blackboy" were working at the well. The heat must have been very trying in the hole, and on that account the former was stripped to the waist. The flies, too, were very troublesome; the man could barely see from under the lids which were badly swollen from the stings. We pitied the poor fellow and offered him a bottle of ale to quench his thirst. He declined the gift with the words: "I don't touch it unless I can get plenty of it."

At the opposite side of the mud flat a wayside consultation was awaiting me. A hypochondriac had travelled over two hundred miles, on the strength of the rumour that there was "a new doctor" at Derby, to chat over his troubles with him. Finding me out of town, the man had camped on the road, anticipating our early return.

FROM DERBY TO PORT GEORGE IV. AND RETURN.

THURSDAY, MAY 4th.

The Government had chartered and placed at our disposal the Cutter "Rita", a vessel of twelve tons burden, owned by the Proprietor of the Sunday Island Mission, Mr. S. Hadley. The tide would turn shortly after 4 p.m.; this left the better part of the day to attend to the shipment of our impedimenta.

Wharfinger Moore arranged for a special car to run our party to the pier, and we were escorted by the Resident Magistrate.

Punctually at half past four the moorings were left, and amidst a hearty "Bon Voyage" from our friends, we drifted up the sound. Soon we caught a light breeze from the eastward, and made good headway.

At about 11 p.m. we stood opposite Point Torment. The breeze had freshened into a south-easterly, and as we rounded into Stokes Bay an angry sea awaited us. We had until then sailed in the lee of the Point Torment Peninsula, but now we suddenly received the full force of a squall. The boat was heavily laden with fencing wire and horsefeed, which we had aboard for Obagooma Station, and thus she did not ride the waves too well, but plunged her bows beneath the water. She pitched relentlessly, and the volumes of water shipped necessitated the pump to be in operation all the night. Sleep we had none, but the discomforts of *mal de mer* made themselves all the more apparent. As we drew near to the eastern shore, opposing tides and the conflicting currents from the mouths of several large rivers by no means tended to lessen the raging surf. The skipper had lowered the fore and reefed the main sail, but yet the craft was lashing the waves with a vehemence that seemed to defy the wrathful elements.

At 3 a.m. we had run out of the storm and entered the mouth of the Robinson River. Here the protected waters allowed of an anchorage, and soon all hands enjoyed that blissful sleep their bruised bodies had been aching for.

FRIDAY, MAY 5th.

We did not wake until the rattle of the anchor chain announced that the boat was swinging in response to the

turn of the tide; it was 11 a.m. The anchor was heaved and we made for the channel, which hugs the southern bank of the Robinson. Tall mangroves fringed the course; to the north the Kimbolton Ranges lay as a blue barrier trending north-west. Progress was slow, for the wind had died away. The flood stream carried the "Rita" along a tortuous way, and occasionally the paddles were necessary to keep her nose ahead. At twelve miles, a low rugged range of quartzite lay abreast, which passed right to the water's edge, and was sparsely timbered. Some excitement was experienced in turning round this spur, for the tidal swirl took complete control. The craft made two revolutions, and, with the second, narrowly escaped smashing her bowsprit on the rocks. The oars had no effect upon her way. Then a puff of wind filled the sheets, and once again we found the channel. Robinson's (Obagooma) Landing was reached at 3.30 p.m., and anchor cast opposite a low precipitous face of earth beyond which a grassy plain extended.

I beckoned to three of our aboriginal crew to row Mr. Sanders and myself ashore, and to accompany us on an inland excursion. We made across the grassy flat to a spur of sugary-white quartzite about half a mile due north. The rock is intensely compacted and crystalline, in parts semi-translucent. The beds strike W. 15° S., dip from 40° to 45° south westerly, and are jointed S. 15° E with a dip of half a right angle north easterly; another plane strikes N.E., and is vertical. The formation reminded me much of the "Ordovician" of Central Australia, and also of the quartzite ranges along the Fitzmaurice River and elsewhere in the Northern Territory. The absence of table-tops was noteworthy. The beds upon weathering assume a granite appearance; the slopes are covered with coarse fragments and bear scanty timber. The eastern foot is fringed with a line of paper barks, which are so regularly spaced that, had they been elsewhere, artificial planting might have been suspected. Several boababs grew upon the adjoining plain. Our boys found a valuable species of acacia called Irrigilli, from which they eagerly cut a supply of raw material to be fashioned subsequently into boomerangs. One of the fellows is an adept thrower; he can project the missile with such skill and force that it will

make two complete circles in the air, and then hit the earth in front of him.

A tidal inlet exists along the spur, in the muddy bottom of which a fragile bivalve (*Glauconomya chinensis**) is very common. The flies and mosquitoes were troublesome beyond reason this afternoon; the latter seemed to have mistaken the hour, for, although hidden by the hill, the sun still stood above the horizon.

When we returned, the tide had ebbed, and the "Rita" lay high and dry, with her keel buried in the mud. To reach her, we were obliged to wade knee-deep in the slush. The salt water arms of the river were stocked with myriads of the small grey mullet, which were swimming with their snouts above the level, and every now and then splashing the shallows when something perturbed them. The inexhaustible numbers of these small fish along the north coast of Australia should eventually destine them to be put to economic use. Among the small appeared also a huge stingray. As it drew near to the bank, the well-aimed blow from the tomahawk of one of our "boys" promptly dispatched it.

Not having quite recuperated from the terrific shaking our systems had suffered during the previous night, we all sought our bunks soon after dusk, and had a peaceful sleep.

SATURDAY, MAY 6th.

The skipper and the "boys" were out early carrying the stores across the mud.

The panorama, as seen from the landing, was briefly as follows. From the quartzite range, due north, the grassed flat, broken here and there by scanty timber, extended to about S.E. From N. 17° E. to E. 35° S., a series of comparatively low quartzite ranges occupied the foreground; the hinterland was loftier and stood against the sky from N.N.W. to N.W. A long blue chain was also observed in the far distance, N.N.E. The confluence with the Robinson, of the tributary known as the Stuart, lay W. 128 S. Vide Plate XVI.

Whilst at work, the "boys" caught a sea eel, which had left the water and was wriggling in the mud. One of them

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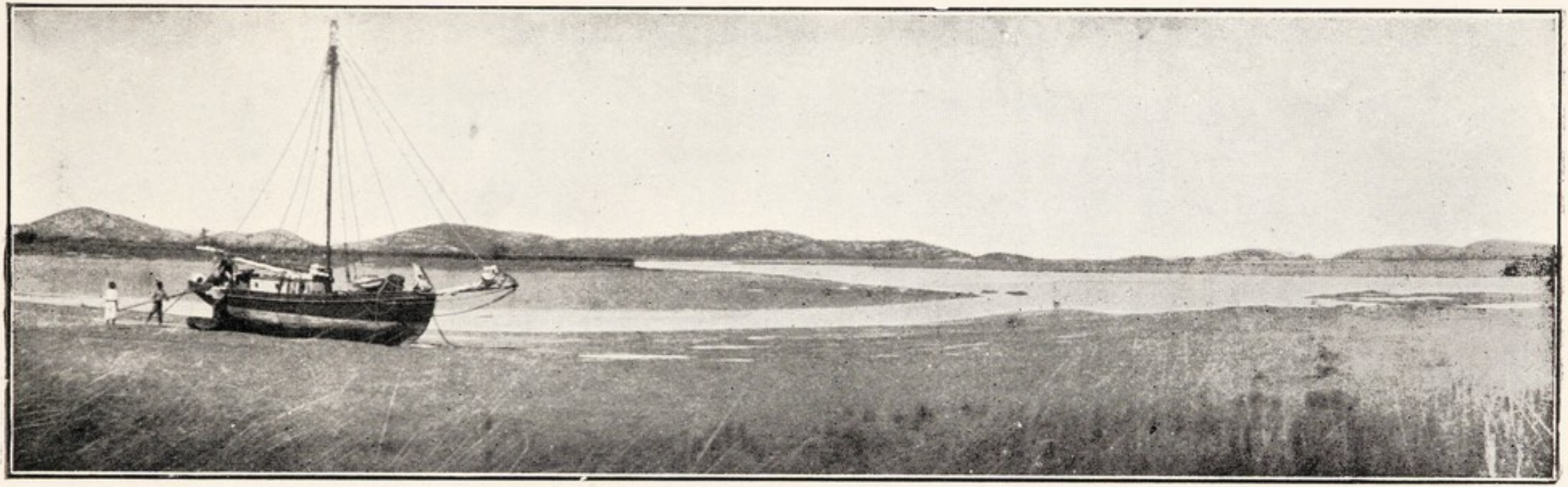
* Vide Appendix, page 268.



LOW TIDE AT OBAGOOMA LANDING, ROBINSON RIVER, MAY 6th. The "Rita" lying on a mud bank.

cautiously handed it to me and said: "This one name Kulingell, him no more sulky bugger." I did not altogether grasp the latter part of his statement, but upon investigation ascertained that he meant the eel was non-venomous. When I placed the captive in a bottle it became very wild and attempted to bite. It was subsequently determined by the Australian Museum Zoologist to be *Gymnothorax woodwardi.*

The Obagooma Copper Show is some thirty miles from the landing. A few heaps of low-grade siliceous ore lay upon the bank, being evidently too poor for shipment. A small jetty once stood at this spot, but it is now far too dilapidated to be of any use. Its piles had been driven into a sintery and nodular marl, which underlies the mud.

Full tide was announced at 4 p.m. We managed to tow the "Rita" into the channel by dropping the anchor from the dinghy at full chain and winding up the windlass. Having discharged the bulk of our heavy cargo, we were in light trim. With a fresh north-westerly we tacked to the bend, thence "led" down the river. Before we reached the mouth, however, we stranded on a sand bank, and that meant waiting for the next flood to carry us off.

SUNDAY, MAY 7th.

The incoming tide lifted us well above the bank, and with its turn we drifted down stream. An uncomfortable little sea awaited us. There was little or no wind; the few puffs that occasionally came were adverse to our progress. For the whole day we lay opposite the Kimbolton Ranges tossed and thrown about by the choppy waves, and no headway was made. Seen through the field glasses the ranges appeared to be composed of pinkish-grey quartzites, and metamorphic rocks, barren, bare, and riven on the surface, with their planes standing vertically above the water's edge. Presently we were espied by a hunting tribe of natives who immediately sent a signal of smoke to the sky, hailing us to come ashore. But owing to the weather this was, of course, impossible.

Late in the afternoon a favourable breeze and tide carried us in the direction of Sunday Island. We left

the boat in the hands of the "blackboys" entirely. The local islands being their home, they possess a really wonderful knowledge of the reefs, rocks, and currents. They navigated the hidden dangers with amazing confidence and precision, although the night was dark. We stood off Sunday Island at about 1 a.m. and cast anchor.

MONDAY, MAY 8th.

The sea had become calm overnight, and there was not a breath of wind to catch our sails. I decided to row ashore with Mr. Sanders and walk to a Mission Station, which lay about two miles north-east. One of the boys accompanied us. The shore-line was rugged, and some rough ridges of coarsely crystalline quartzite had to be crossed ere we reached the settlement. We passed several black gins on the way who were collecting wood and food for their camp. They were visibly frightened, and preferred to dodge behind the rocks and bushes until we, the strangers, were well out of sight. Many would query our boy, and when he had explained, seemed more at ease. We both felt seedy after the repeated rough treatment our bodies had had while suffering the agonies of seasickness. It was no wonder that the walk seemed long, and that it took an hour to cover the two miles. Great, therefore, was our joy when we came upon the brow of a ridge and beheld the Station in a valley beneath us. Surrounded by rocky slopes, the white-washed houses, amidst some palms and dark green trees made an imposing and homely picture. We were received by Mr. and Mrs. Alcorn, who were busy instructing the children.

Sunday Island Mission Station was started some seventeen years ago by Mr. S. Hadley. Eight thousand acres were leased from the Government for the purpose, and the Missionary receives a substantial subsidy to conduct the affairs of the establishment. About two hundred natives belong to the island, a comparatively healthy and intelligent people. They are employed immediately about the station, and also in collecting Trochus* shell along the rocky beaches of the numerous islands in the neighbourhood. The shell is exported to the Old World, where it finds a ready market.

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* T. niloticus; species identified by Mr. C. Hedley.

Besides the Missionary's house, the station comprises a store, a workshop, a kitchen and baking house, a matrons' and girls' home, boys' and girls' schools, a chapel, and a dormitory for boys. Although the whole of the working community receive their rations at the kitchen, special attention from an educational point of view is only given to the rising generation. The old folks live in an encampment of bush humpies, some ten chains from the headquarters. The livestock of the settlement consists of a large herd of goats and a few head of cattle; the stud bull has been thoroughly domesticated, and is used for carrying water from the well to the kitchen and homestead. Fowls do not seem to thrive on the island. A small kitchen garden supplies the immediate needs of the white residents' table. Some stately cocoanut and date palms grow near the water, and it was particularly interesting to find the Leichhardt pine and the para-rubber established on the spot.

Mr. Hadley brought the "Rita" to the landing in the afternoon, when a gentle wind blew from the sea. She was to be thoroughly overhauled at low tide, and the holds cleaned out. We had noticed numerous unwelcome associates aboard, the largest of which were rats and cockroaches, the smallest included the so-called "Singapore ant," whose tiny dimensions were by no means in proportion to their voracity. I bought a goat at the Station which was in the meantime butchered and hung on board.

In the evening the young folks were summoned and entertained with gramophone music. Whenever a record of a popular air was "put on", the youngsters would join in the chorus. And it was gratifying to listen to the sweetness of some of the voices which verily could not be considered inferior to European production. We rested under the verandah of the Missionary's house for the night, but, weary as we were, there was not much sleep to be had on account of the numbers of black rats which ravaged the place in the night.

TUESDAY, MAY 9th.

The morning was spent quietly in making observations and taking photographs. In the afternoon our gear was carried to the landing by many willing hands,

and towed aboard in the dinghy. We followed immediately. A number of little girls and boys were swimming around the "Rita," diving and frolicking like fish in the tepid waters which lay over the heated mud. Every now and again they would climb on to a partially submerged mangrove stump to rest, unconsciously posing as a human pyramid, while their glistening skin of handsome dingy hue was drying in the sun. Vide Plate XVII.

Besides Mr. Sanders and myself, our little party consisted of Mr. S. Hadley and five "boys" from Sunday Island. Mr. Hadley, prior to his career as a Missionary, was one of the original identities in the pioneering days of the North-West. Hailing from a good old English family he enjoyed the benefits of a sound education, both at Home and abroad. But a desire for adventure early took possession of the youthful mind, and Hadley sailed for Australia. There the dreams of his imagination were more than realised; his name is intimately connected with the early days of mining and pearling, and many are the experiences he made among the aboriginal tribes by one of which, at any rate, he is regarded a fully qualified "old man." Our aboriginal personnel included three Sunday Islanders (Ikey, Alec, and Teddy), and two mainlanders (Jacky and Jim Crow). The last named came from the Collier Bay district, and, although he had not been long with white men, his knowledge of the country was considered valuable. Jim Crow's tribal name was Mengarngne. His physiognomy and his manners were decidedly low, but his merry laugh would have toned the most despondent heart. Ikey was the senior of the crew, his clean shaven features were a blending of classics and inborn trickery. He had been a warrior in his time, and was proud of a V-shaped deficiency in the lobe of his right ear, which had been carried away by a boomerang in honest fight. He had been with Mr. Hadley for many years, and few were the dangers of the local seas that were not known to him. The other boys were all born sailors, quite as at home in the water as out of it. They, especially Alec, were also experienced bush cooks, and relieved us of much of the "dirty work" connected with the kitchen.

When at length the signal was given for departure, we received an ovation of "good-byes" from the gins and

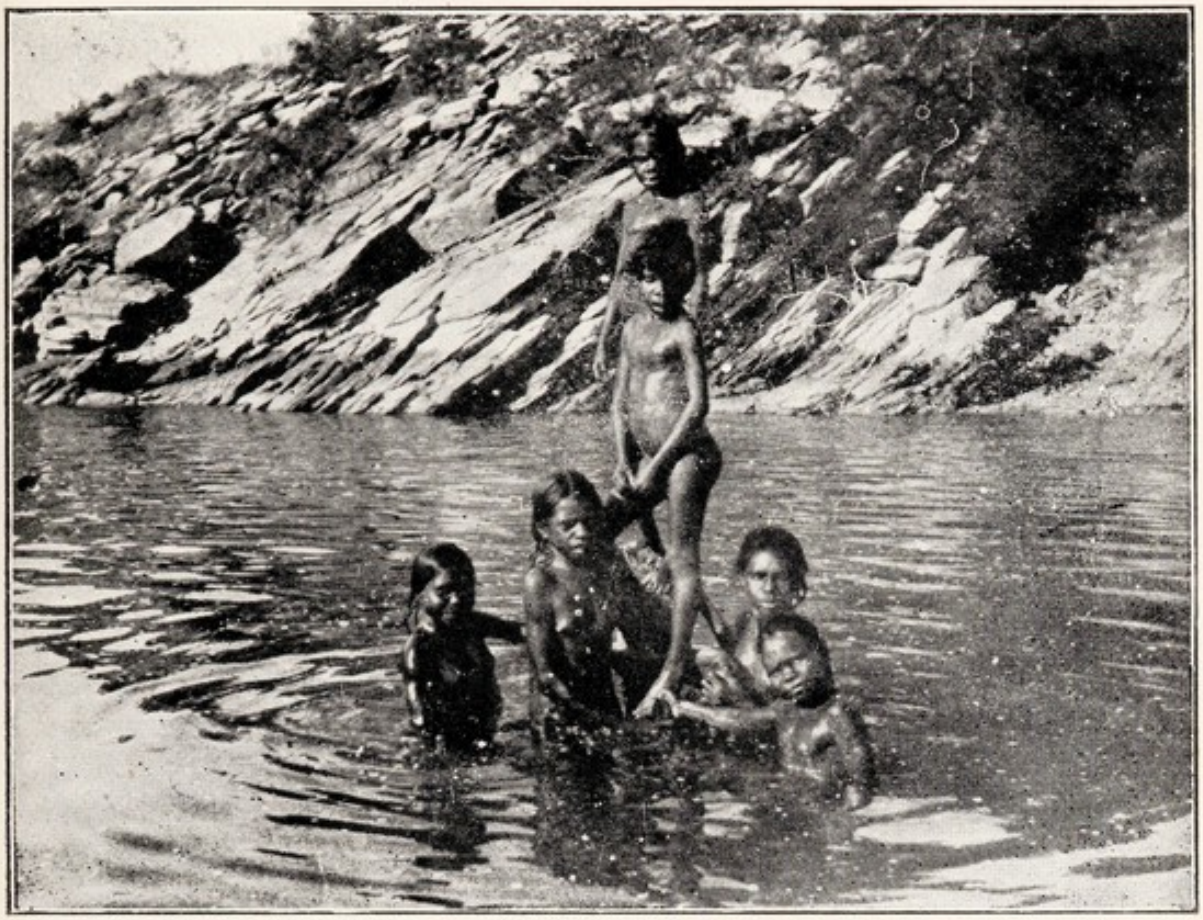


FIG 1. ABORIGINAL CHILDREN BATHING, SUNDAY ISLAND, MAY 9th.

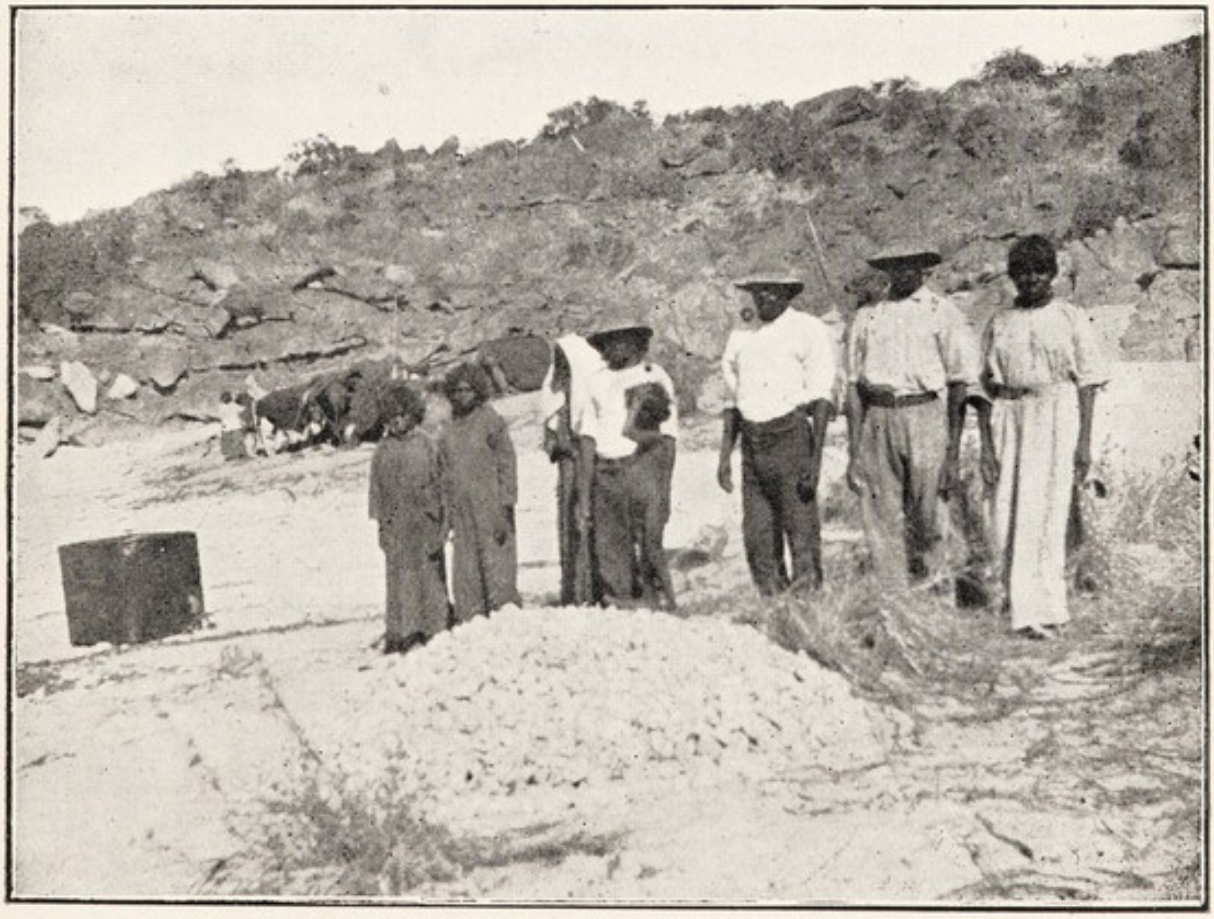
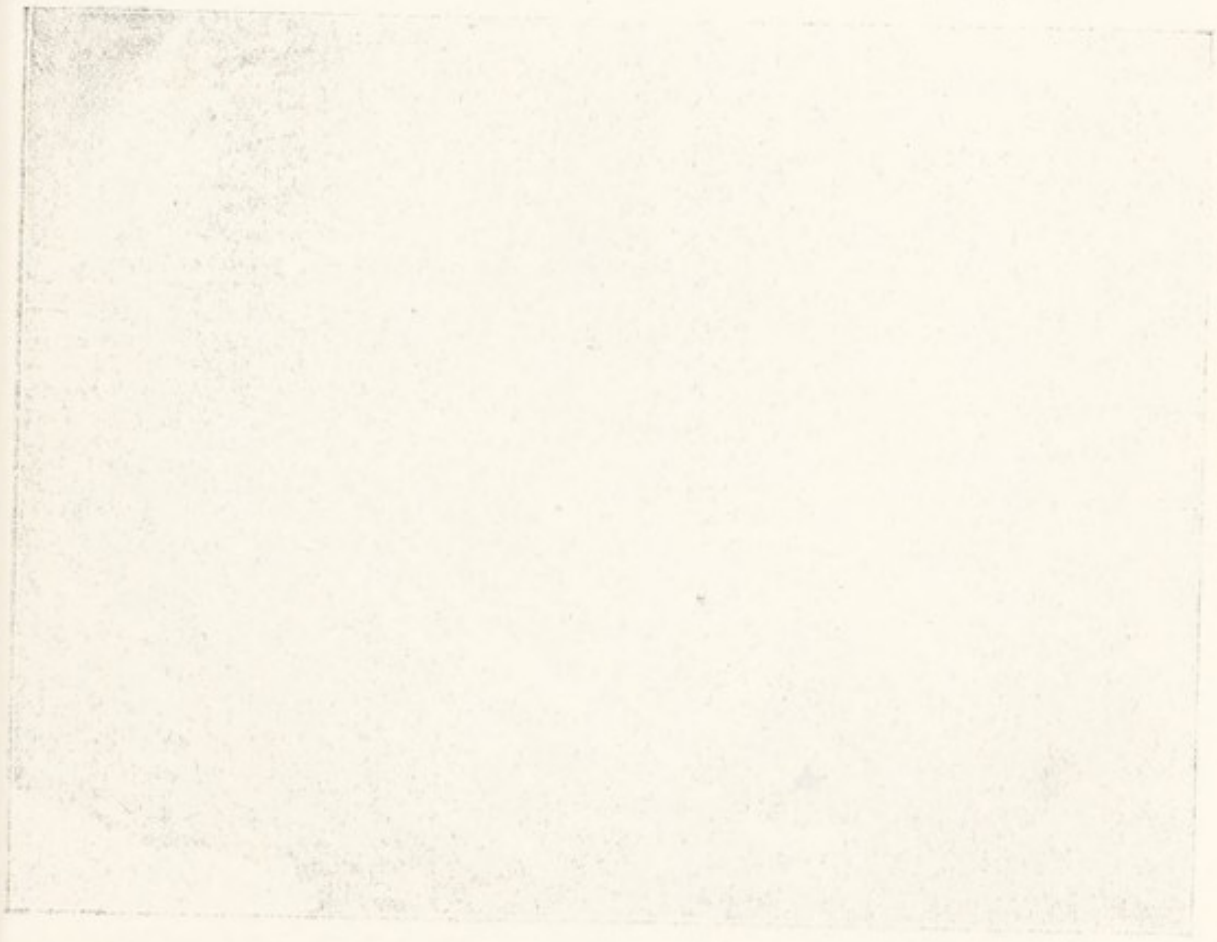


FIG. 2. ABORIGINAL TROCHUS-FISHERS, LIERON BAY, SUNDAY ISLAND, MAY 9th. Note heap of shell in foreground.



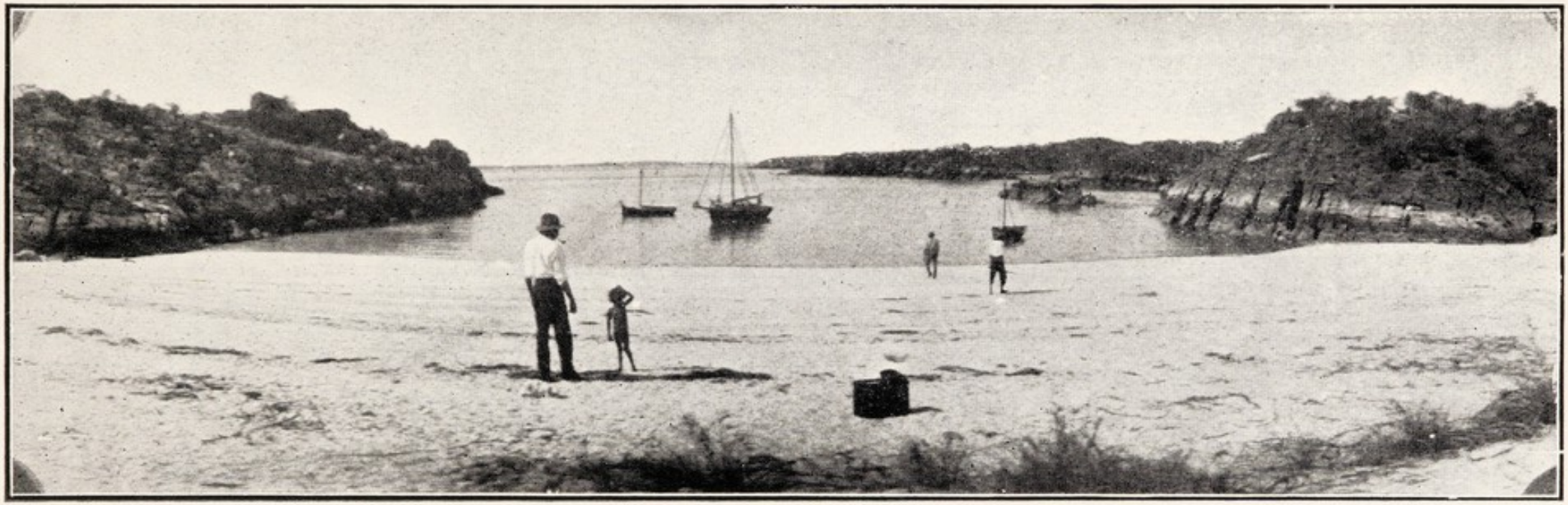
children on the shore. Others had until then hidden behind bushes and rocks on the slopes, but now as we were gliding down the arm came forward and took part in the hearty send-off we were receiving. The "Rita" drifted along the massive face of coarsely crystalline quartzitic rock, the beds or "banks" of which are bent and tilted, at times rising vertically out of the water.

After drifting a mile, we passed an inlet, the mouth of a creek, known as Liering. Then a mild breeze filled our sails, and we turned northwards through a narrow passage separating the rocky point from a gull-rock. Travelling as we were across the trend of the country, the beds at the point stood in a series of serrations and slices like the teeth of a comb, skyward. We skirted the rugged slopes of the island, and as we gazed upon the fantastic display of the rust-coloured rocks, the boys were explaining the qualities of the different points, largely dwelling upon the productivity from a hunter's point of view, but also touching upon the legends. Thus we passed, at two miles, a small beach (at the back of which water is said to be obtained in a rockhole) known as Numanbu, also, at two and a half miles, a small inlet called Kunangung, and yet another at three miles, known as Tumbelgung. At the last mentioned site a soakage is said to occur a short distance up a creek which enters the sea there. The breeze had practically died away, progress was slow, and the sky was already showing the ruddy glow of evening. But with a little perseverance, and with a determined pull at the oars by the wiry musculature of our boys we reached, at five miles, a picturesque little bay the aborigines call Lieron. This inlet is oblong in shape, with a firm sloping beach on the south-western end, and a clean sandy floor. The metamorphic rocks skirting the two longer sides of the bay are superficially coloured in three horizontal bands, the lowest being black, and encrusted with oysters, the central bleached and grey, the topmost reddish. At the western corner, as we entered, stood a remarkable structure resembling a cromlech or a giant throne of stone. Two small cutters belonging to the Sunday Island Mission lay at anchor in the bay, and we could see several camp fires and groups of natives across the beach. Lieron is a depot from which fishing and beach-combing expeditions are undertaken by the

natives. We dropped anchor not many chains from the shore, and rowed over to the camp. A party of the fishermen received us and directed our attention to the heap of trochus-shell they had collected and stacked on the beach. (Plate XVII.) When the mollusc is taken it is brought to this depot and boiled in a large iron tank. The fish is then extracted and dried, the shell thrown on to the heap. The former is exported-to Singapore where it is considerd a dietetic luxury, the latter is packed in bags and shipped at Derby. The men had their gins, children, and an unruly yowling cortege of dogs with them. And one old gin had a tame cockatoo which vociferated as excitedly as its mistress in the aboriginal tongue, requesting the ronions to lie down.

WEDNESDAY, MAY 10th.

A gang of gins was engaged to carry water and firewood on to the "Rita". We had two galvanised iron tanks of 100 gallons capacity each to fill. The water had to be carried in eight four-gallon canvas bags. Seeing that this work would occupy the better part of the morning, I set out with Mr. Sanders and Alec to examine the surroundings of Lieron Bay. The bearing from the anchorage to the eastern end of Roe Island was N. 24° E., and that to a small isle east of it N. 10° E. The rocky walls enclosing the bay seemed so parallel and straight as to suggest an ancient fissure, or an intrusion of less resistant rock. Our course was east, at no great distance from the sea, over rough ledges of coarsely crystalline rock, consisting almost exclusively of quartz. The exterior was reddish on the whole, but here and there the surface had splintered off, exposing a whitish waxy looking rock beneath the effect of which from a distance suggested roosts. At about half a mile, in a little rough gorge with steep sides, entering out into a subsidiary bay of Lieron, a very fair soakage occurs in a small basin of the quartzose rock. It is known as Tannyerringong. Several large native fig trees mark the spot. The coarse igneous rock, consisting of silica, apears to strike east and west, with a steep plane dipping north. Joints cut the mass in the directions E.S.E. and E.N.E. The gorge runs practically north and south.



LIERON BAY, SUNDAY ISLAND, MAY 9th.

We advanced over barren quartzitic slopes, when at a distance of one and a half miles we reached an arm of the sea which cuts across the island. A reef occupies the greater part of the passage which, our native guide informed us, is called Nalungwa, and has yielded a rich harvest of trochus shell. On the opposite side, on a bearing E. 46° S., we could see a prominent group of rocks mentioned on the Admiralty Chart; its local name is Mollugulgwun. Another, though less conspicuous group lies a few chains north of the former, and goes by the name of Karrarale. A small island (Karnangning) was noted in the pass about a quarter mile north of the conspicuous groups of rock. At our feet, not many paces from the mangroves, lay a small soakage (Tjarrula) beneath a rock, the only access to the water being by means of a gap on the south, barely large enough to allow the passing of an arm. We returned to the cutter at noon.

In the afternoon, continued excitement in the natives' camp signalized a coming event. Small groups of men had departed, and could be heard calling to one another behind the bushes. A mirthful strain through all betokened their kindly intentions. It was at two o'clock, shortly after we had gone ashore, when the men returned. They had decorated their bodies very richly with various designs in ochre and white down, and wore several rolls of hair round their waist, from which a pearl shell or fur tassel was suspended to hide their nakedness. Some, in addition, wore plumes of the white cockatoo in their hair, others had bundles of emu feathers stuck in the belt behind. They all held long spear shafts, at the top end of which cross- and kite-shaped ornaments had been made out of sticks, furstring and down, the whole resembling the sacred "waningi" of Central Australia.* They passed in a line, then, circling around us, drew up in front and walked towards us with bended knees. This performance was repeated several times. There was no song, in fact no corrobboree in the strict sense; but we were told that such would follow in the evening. The women kept aloof as silent onlookers. The proceedings were referred to by them as "elma." Vide Plate XIX.

* Vide H. Basedow: Trans. Roy Soc., S.A., Vol. XXXVIII., 1904. pp. II et 17. Plate III.

After I had taken a series of snapshots of this interesting reception given in honour of our visit, we went on board again and gave the order "up anchor." We left Lieron Harbour and made east along Sunday Island. The little wind there was soon died away, and we drifted somewhat helplessly before the tide, the boat at times turning in the swirls like a top. The island presented the same rugged stone front. Off its south eastern corner, a rocky isle goes by the name of Unngarri, and a short beach half a mile north west of it Redgelle. The characteristic outline of the Mollugungwun group kept before us all the afternoon, standing like a monument against the sky, but towards evening as we drifted in, it was lost behind the cliffs. Dark misty shadows were gathering, but we were as helpless as before. The sea had that smoothness of surface which gives to it the appearance of oil. An uncomfortable swell was beginning to make itself felt when the tide turned. Our boys plied the tillers untiringly to keep the cutter's nose from the rocks which now lay on either side of us. Huge turtle were sporting in the waters about us, coming every now and again to the surface to breathe, the hissing sound of the air as it entered the nostrils being clearly audible to us. Then a sudden splash would announce that we had been sighted, and the amphibian would dive into the weedy depths for protection. Darkness had set in when a breeze sprang up which took us back to Lieron Harbour. The place was deserted; the cutters and the natives had gone. Only the plaintive whining of a solitary dog left behind reminded one of the scene of activity and merriment witnessed but a few hours before.

THURSDAY, MAY 11th.

The skipper predicted a south-easterly. "Whenever," he said, "the horizon has that blurred, hazy appearance about it, a fair breeze from the south-east might be expected." Whilst we waited, we fished. The boys used long pointed spears, we the line. Some choice garfish, up to twelve inches long, were caught.

The breeze was not long in coming. We weighed and stood away north, across Meda Pass, and between West Roe Island and a rocky isle east of it known as Unbarunberra. Immediately east lies East Roe Island (Kunndallin). Strong and dangerous currents and tidal

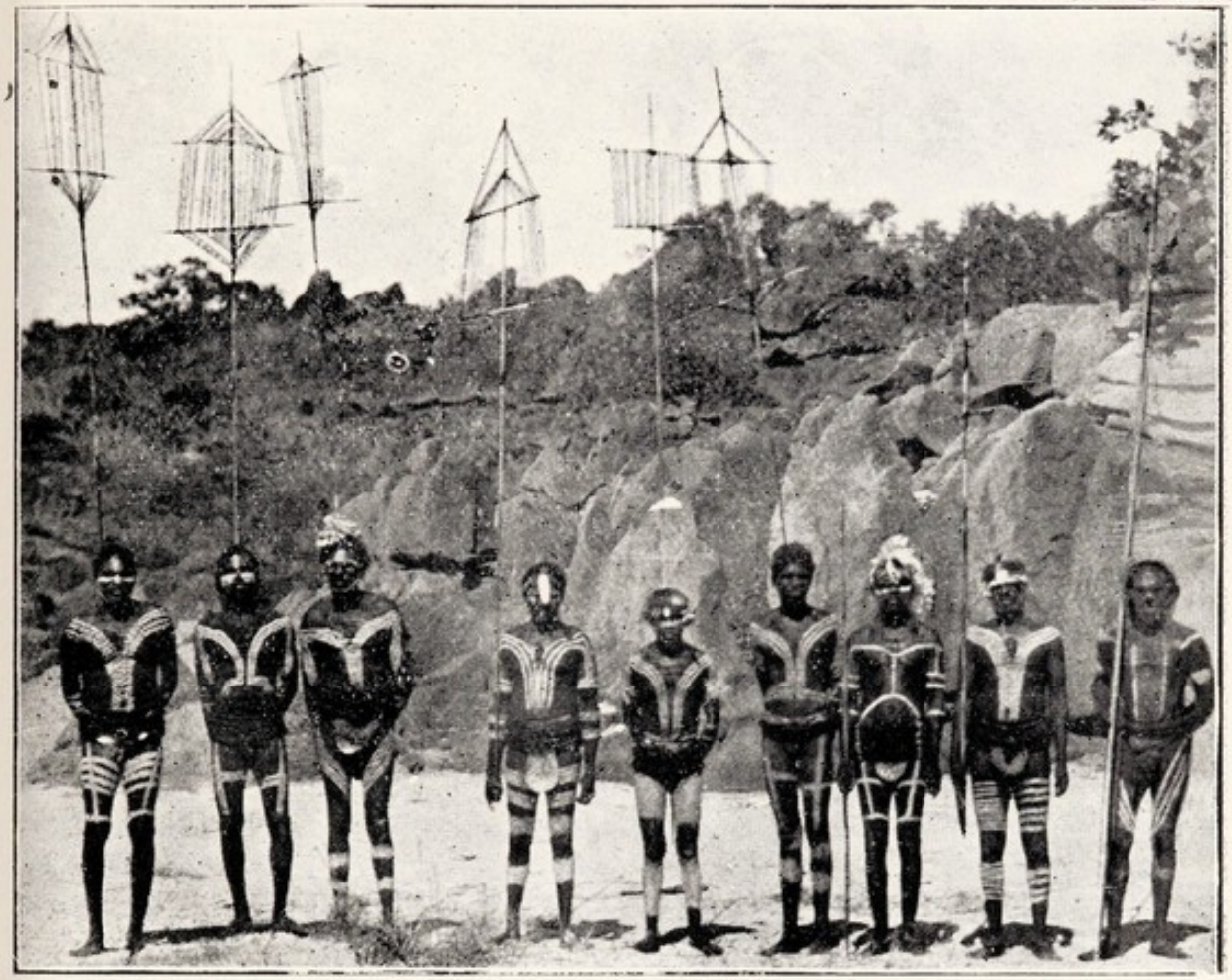


FIG. 1. CORROBBOREE, LIERON BAY, SUNDAY ISLAND, MAY 10th.

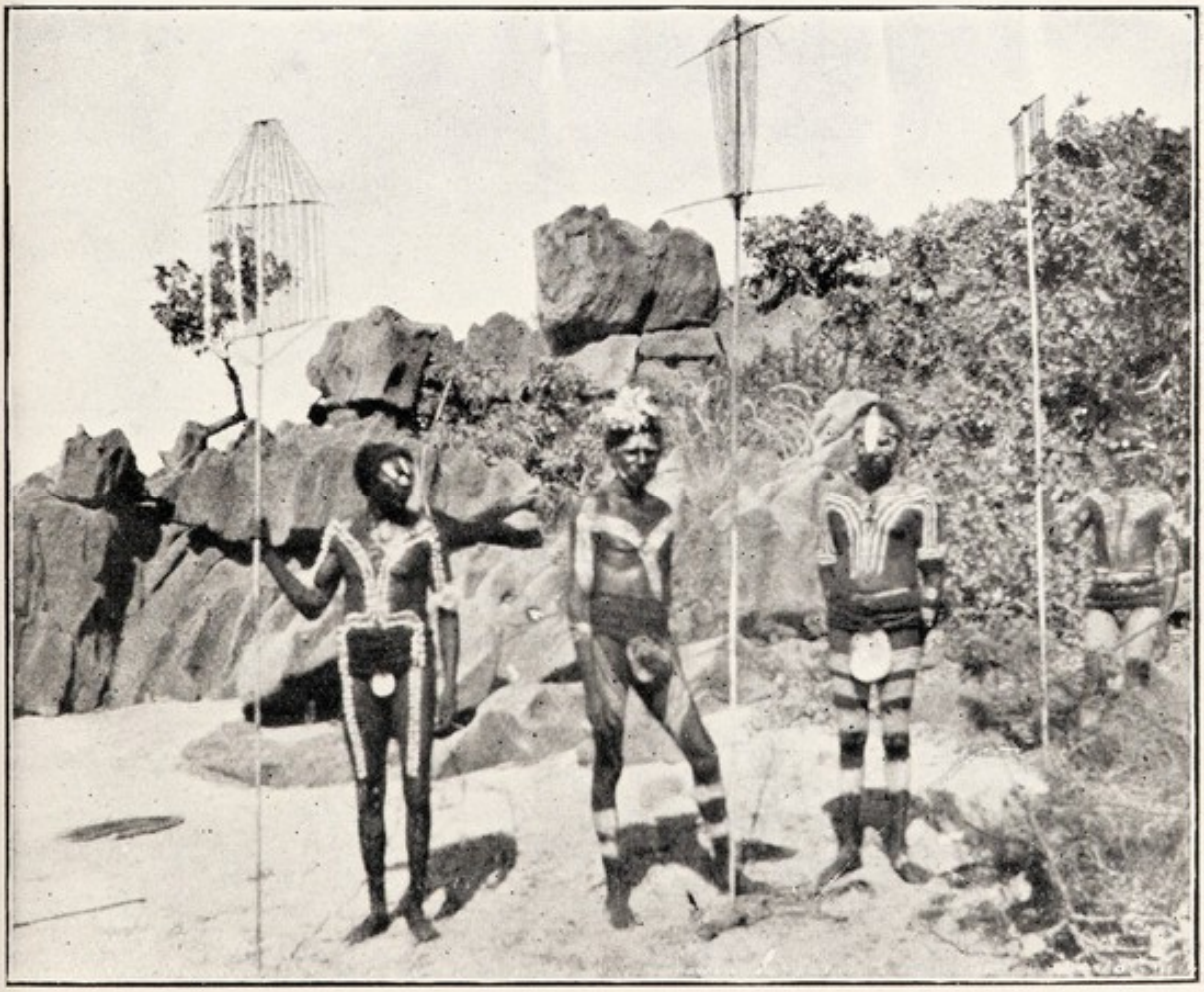


FIG. 2. CORROBBOREE, LIERON BAY, SUNDAY ISLAND, MAY 10th.

rips surround this group. The rock strikes slightly south of east, and dips north at an angle of about 45 degrees. The bedding planes are clearly defined; the northern surface of Kunndallin being barren and destitute of bush. A little grass grows on the islands. Thence we took Sunday Stait, but progress was again slow, for the wind had slackened and veered round to the north east. Tiderip Island (Nunba) consists also of bare, barren rock, riven with age. A secure anchorage and good water exist, and fish and turtle are plentiful. The natives often visit the place. The wind fell away completely in the afternoon, and we worked with the tide E.N.E., entering a pass south of Hidden Island (Wagallan) on a S.E. course. The hilly country consists of white and reddish quartzites, much crumbled, bent and eroded. South of the pass the islands (Wagalal) present a rugged and scarped face with a series of shallow, fractured folds. At the eastern end the slabby beds dip S.E., their southernmost face falling seawards as a regular slope decked with bush. Two small islands (Waienguddi) lying directly south reminded us forcibly of a sphynx mounted on a low pedestal, the head, with its pricked ears and prominent snout, being separated from the rump by a gap in the rock. Several more rocky isles occur close by.

Glancing now at the northern shore of the pass, we observed a conspicuous dark cone of quartzite which is known as Igai-ing Ngorrogin. Thence runs a vertical face eastwards, whose bedding planes are shown by the lines of vegetation to have a persistent dip south east.

When we turned north round Bangun Island into Whirlpool Pass, the steep dip planes of the beds, consisting essentially of quartzite, could be traced to beneath the water. At a point west of a small group of rocks in the pass, two native waters occur on Bangun in a rugged little gully near the sea. Opposite lay Steep Head, a bold scarp of quartzite forming the western end of an island called Wijoarra.

We cast anchor about half a mile N.N.E. of Steep Head, just beyond a short salt arm which makes Wijoarra an island. A goodly number of birds were seen in this neighbourhood, the singular scarcity of animal life in general having been frequently commented upon during the day.

FRIDAY, MAY 12th.

With the break of a perfect day, I rowed with Mr. Sanders and two boys to a small sandy beach east of our anchorage. The island is called Worla. The country consists of quartzite which cleaves readily when struck; portions of the beds are more friable, and approach a sandstone in texture. Vertical ledges of the rock strike N.W., and are jointed at right angles. The rock is extensively corroded, and many rounded nodular masses stand out from the surface. A dyke of dark coloured biabase runs N. 10° E., at the base of the quartzite cliff, along the foreshore. When we climbed to the top of the quartzite ridge we found schistose beds immediately behind it. Characteristically knotted chlorite and sericite schists stand with their planes on end, breaking through the country as a jagged wall. The foliation of the beds strikes N.W.

We found a recently deserted natives' camp; the boys explained that fresh water exists not far to the north-east. The country is well grassed, and among the timber we noted the "cypress," (*Callitris robusta*) valued in the nothern settlements on account of its ant-resisting properties.

Returning to the beach, we rowed to the south western corner of the island. Here the quartzite dips S.W. at a steep angle, and lies against a bed of schist resembling a dyke. The contact wall of the former is well-defined, and stands away from the schists; it consists of white and pinkish rock lined with secondary mica and ironstone. The schist (chlorite and sericite) is in an advanced state of decomposition. A barren white quartz reef also occurs at the same point. Across the salt water arm the Steep Head Island (Wijoarra) rose as a rugged bluff of white shattered quartzite scantily clad with trees. A large tumbled block lay at or near the water's edge, which had the shape of a classical head. Vide Plate XX., figs. 1 and 2.

It was 9.30 a.m. when we again found ourselves aboard the "Rita", drifting deeper into Whirlpool Pass before a puffy breeze. The arm is contained by quartzite ridges on either side. On the left stood a low, flat, and straight-sided island, which for all the world looked like a fortress at the entrance to a harbour. Soon we

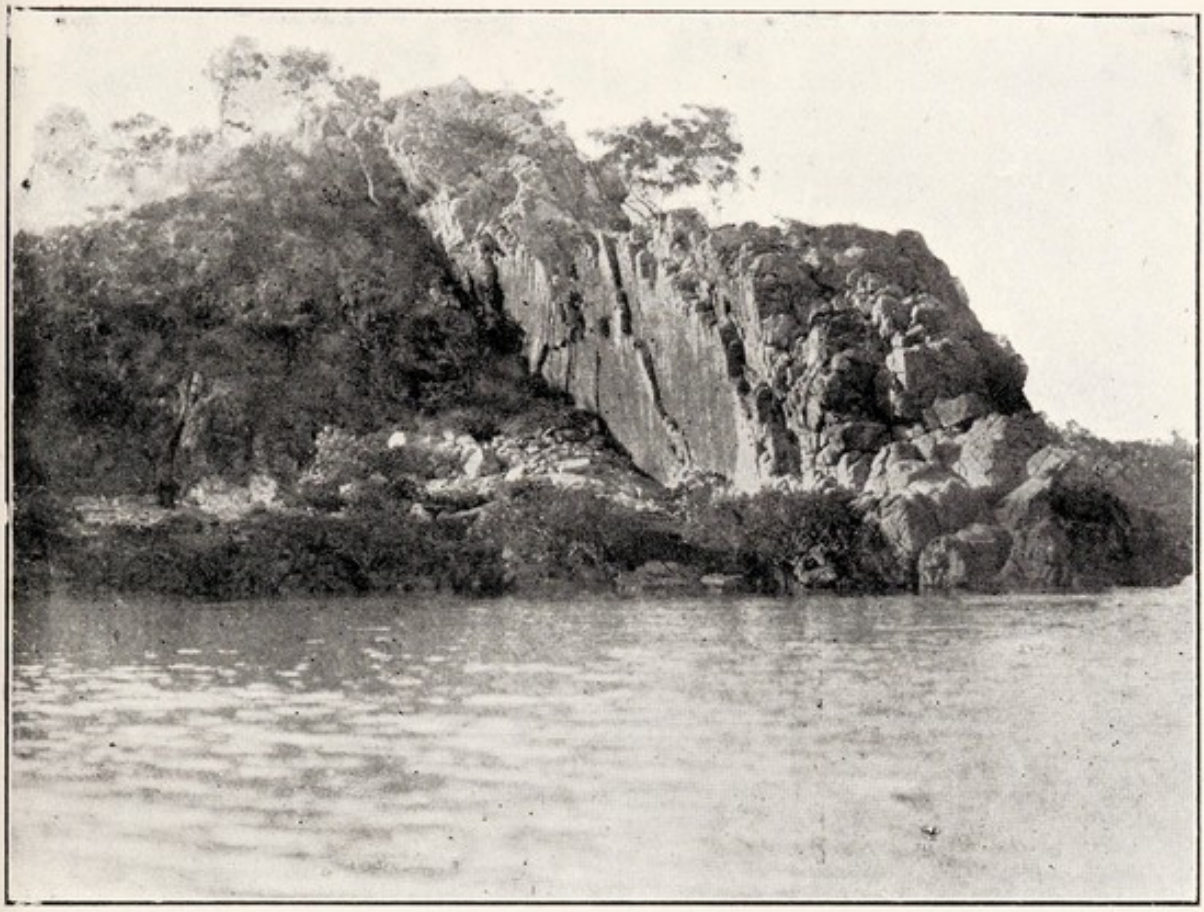


FIG. 1. STEEP BEDS OF QUARTZITE ABUTTING AGAINST DECOMPOSED SCHIST, WORLA ISLAND, WHIRLPOOL PASS, MAY 12th.

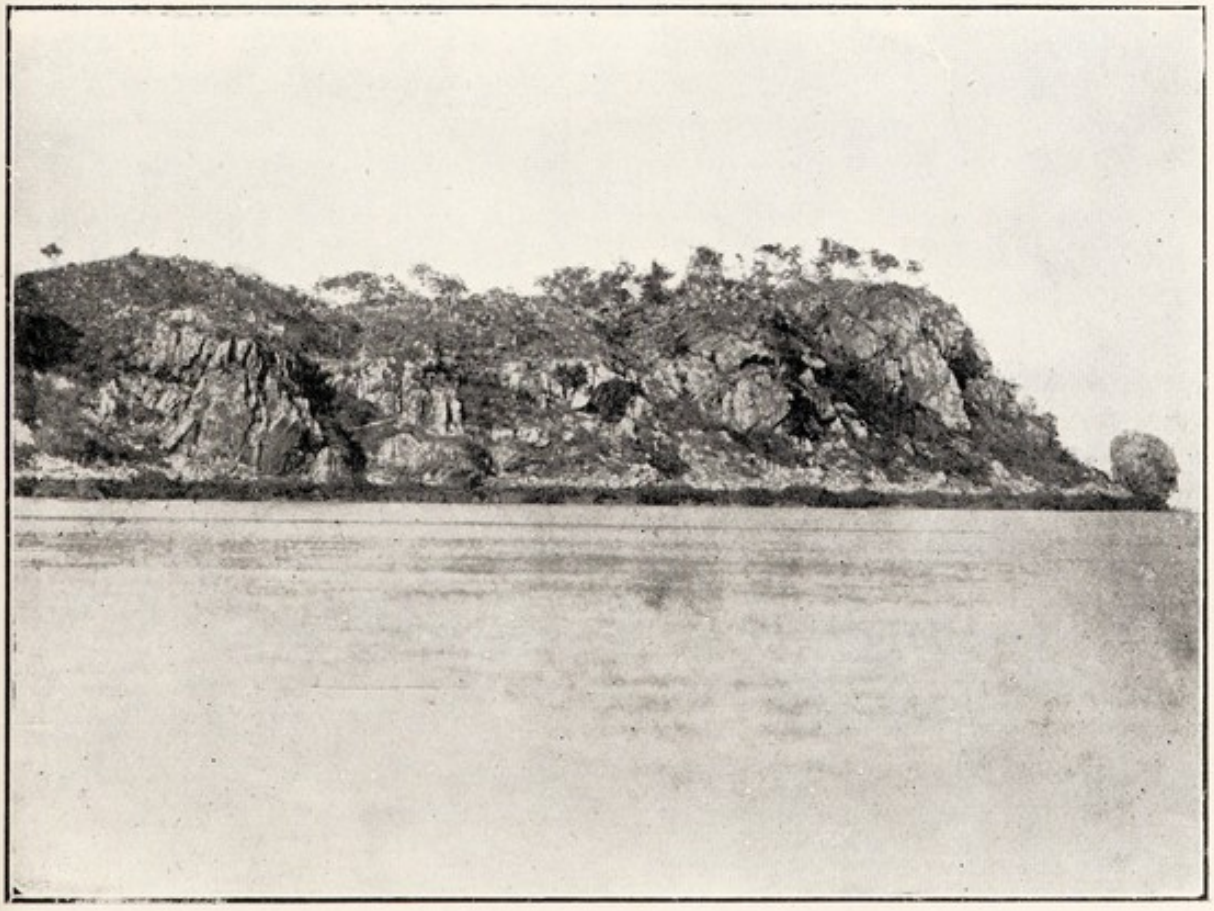


FIG. 2. NORTHERN FACE OF SHATTERED QUARTZITES OF WIJOARRA ISLAND (NEAR STEEP HEAD), WHIRLPOOL PASS, MAY 12th.

turned east and lost the wind. A more or less continuous ridge of quartzite, with a rugged, bare crown skirted the pass. The talus slopes bore a goodly amount of vegetation, and a line of mangroves fringed the foot of the southern bank. The northern shore was steep and precipitous, without a foreshore. The rock-faces and all cliffs, which are washed by the tides in this region, have become coated with a natural dado of the darkest brown and black, which roughly indicates the highest levels to which the waters can ascend. The northern ridge runs out south east to a bald, serrated wedge of rock, whilst on the other side of the Pass a bluff of quartzite forms a prominent feature, which has the aboriginal name of Panga. Whirlpool Pass turns north at this point. The quartzite front along the opposite side of the channel also runs out on the north to a bluff, the shore receding from it in a north westerly direction as a series of quartzite ledges rising more or less vertically out of the sea.

A wide expanse of water lay before us whose glazen surface reflected the skylight in streaks of silver and blue. Island masses seemed to be floating in space, leaving what appeared to be the only passage on bearing N. 20° W. of the compass needle. We drifted on with the current. To the north east lay an island with a steep cliff scarp called Magallan. Its undulating surface carried a fair depth of soil upon which grass and bush were thriving. Panga, when seen from the north, is a low cone of whitish quartzite which stands in contrast against the background of darker and reddish beds. Whirlpool pass lying directly west, this cone is an important landmark to boats coming from the north.

An imaginary line drawn north from Panga Cone roughly marks the local boundary between quartzite on the west and schist on the east. Apart from the white and pinkish colour of the former, and the dark colour of the latter, a striking contrast is noted in the physical features of the respective formations. The bare, rugged, and precipitous nature of the quartzite has already been referred to. The schist on the other hand is more uniformly eroded, and occurs as a regular range with a few outlying bluffs, scarped on the west. A group of islands composed of such schists lay on our starboard side. It is known as Gonnorre, and includes two

bluffs resting upon a table a little higher than high water level. The prevalent trend of the schists, judged from the boat, appears to be east and west. When viewed from the north, the ridge was found to consist of a number of wedge-shaped masses, scarped on the north and east, and dipping west. Terrilain is a group of four islands, the three smallest of which consist of schist, and fringe the south eastern corner of the principal, which is quartzite. A striking group of vertically jointed rock (ferruginous schist) resembling columnar basalt, stands on a tabular base at the north end of the bay between the Gonnorre Isles and the mainland, some two miles south of "Water Point." This the natives call Yourlo. Dark, iron-stained schists prevail on the mainland, the hills being less rugged, but usually truncated seawards. Here and there small white sandy beaches are interspersed between the cliffs, affording safe landings. The country is decidedly promising from a mineralogical point of view, in point of fact several copper bearing lodes are claimed to occur in the locality.

Irvine Island (Wonganing), seen from the south, presents a uniformly wooded and grassed slope, broken only in places by low cliffs. The nearer country on the mainland, comprising the whole of the "Water Point" (Kullo) Peninsula, consists of schist, while the lofty table topped hinterland is for the most part composed of quartzite. The eastern faces of both Irvine Island and Kullo Peninsula are high and abrupt.

About a mile along the shore, east of Kullo Point, a river course has cut the lofty quartzite range. And the magic brush of Nature has daubed the eastern wall of its ravine in some of the finest shades of red and purple, which the oxidation and reprecipitation of iron mineral can bring about. In the foreground tilted beds of red sandstone stand in strong relief against the paler back. This river, our boys explained, harbours many crocodiles; Mareri is its name.

Cockatoo island (Bellanye) lay north—a long, dark range with steep rocky slopes, and lightly timbered. At its south eastern corner stands a small oblong isle, Lordenain, whose black and barren beds consist of schist. South of it is another, Woolyilye, which is of a lighter colour, and has the shape of a double cone rest-

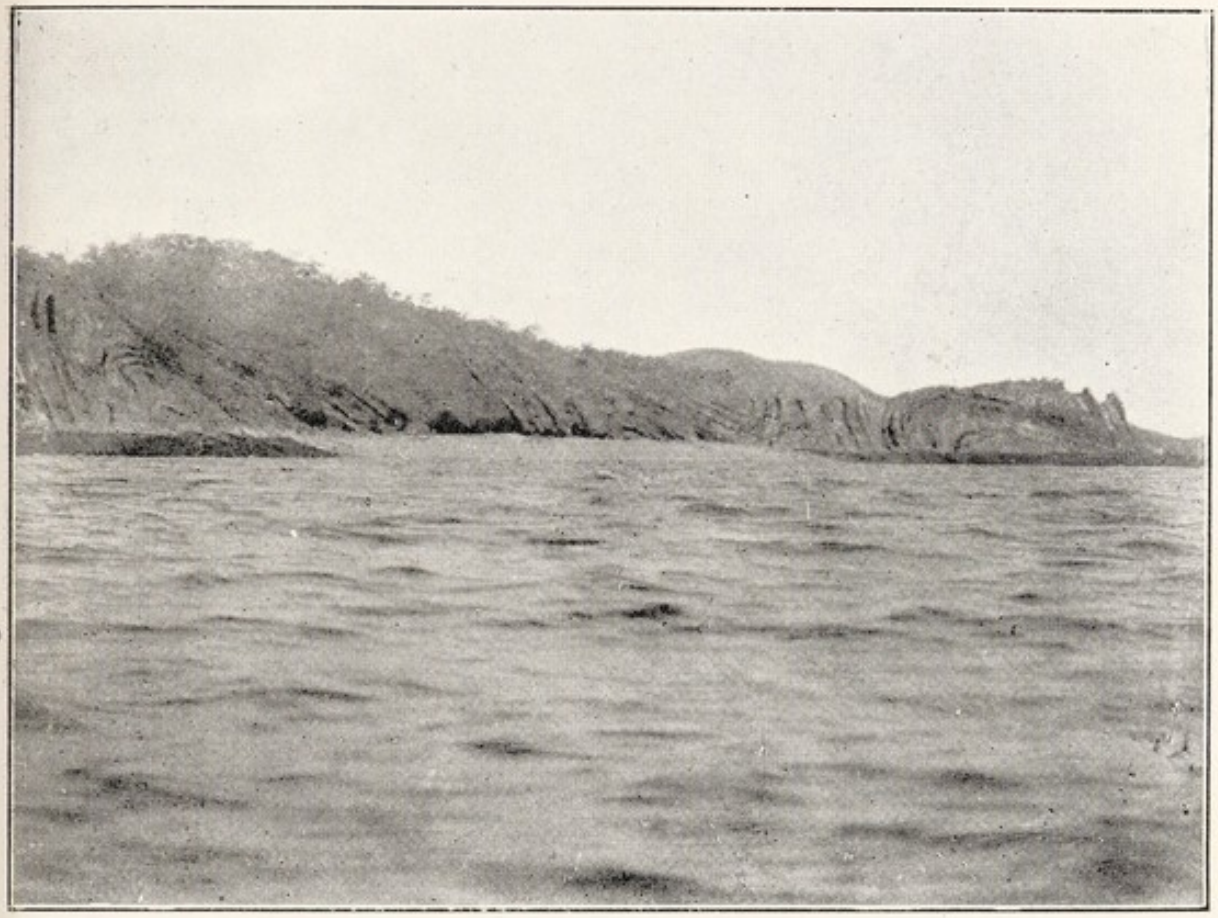


FIG. 1. FOLDED STRATA OF QUARTZITE, YAMPI SOUND, MAY 12th.

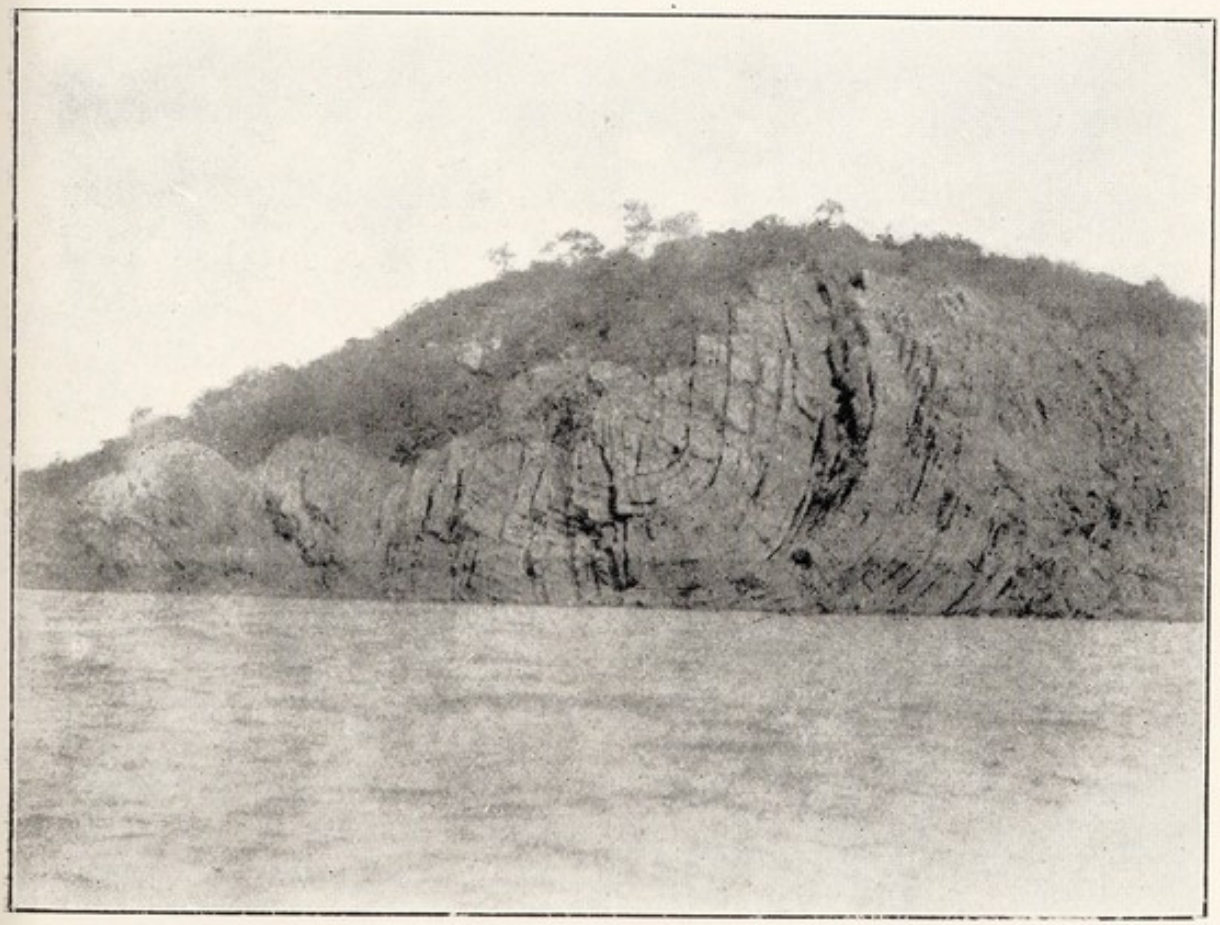


FIG. 2. SYNCLINAL FOLD AT BARRAGILLA POINT, YAMPI SOUND, MAY 12th.

ing on a low, stained table. Bathurst Island (Tchauingarre) and MacLeay Island (Gallijel) were sighted in the distance.

The wind had freshened in the latter part of the afternoon, and the "Rita" was lustily ploughing the water far from the shore. As we sat on the hatchway taking in the scenery, Jim Crow would explain, through the interpretation of Ikey, the intricacies of the country before us which he was proud to describe as his own. There was, he said, a good native water called Kangnolo about one and a half miles east of Mareri River. A sandy beach a mile further on he referred to as Winninny angarre, relating to which he recited an anecdote which caused some hilarity among his fellows. This beach is bordered on the east by a ridge of schist, which runs some distance out to sea. Higher hills of the same rock lie landwards. Behind it the mouth of a creek (Marra lungarra) appeared, which was followed by another named Wardadda. A small island (Yerilli) of quartzite and schist lies between the creeks. We had now crossed the bay, and before us stood a natural section of quartzite, in which the strata are strikingly folded after the pattern of two letters "s" lying horizontally with their longer axes parallel. At the northern point of the face (Barragilla), the vertical truncation of the quartzite beds exhibits also a sharp syncline. (Plate XXI.) Immediately to the north of Barragilla Point we beheld a wide open pass dividing the northern end of the land, which is usually shown as a peninsula on the charts, from the mainland. The island thus formed is known as Kollan, the pass as Lordo. We sailed into the latter, and threw anchor off the north shore a short distance up. Although within a boat's length of the land, we lay in over twenty fathoms of water. The pass is bounded on both sides by high quartzite ranges. On the south further evidence of the contorted strata was noted, the bent layers peeling off in parts through denudation like the leaves of a cigar. We were at the site of a discovery made some little time ago of a deposit of ironstone. From our anchorage we could see "Water Point" (Kullo), bearing W. 6° S., in the dim distance. The wind had freshened appreciably outside, but we rested peacefully for the night in the lee of the quartzite barrier.

SATURDAY, MAY 13th.

With the return of daylight the outcrop of ironstone became visible. West of the anchorage a row of four parabolic sheets of dark coloured ore rose against the rock. The first impression was that a process of mineralization had taken place within a series of anticlines, but it soon became apparent that the masses represented residual parts of a once continuous sheet of ore, since corroded by the wear of water along several little gullies which cut the body at right angles.

The boys were ordered to prepare the dinghy and we rowed ashore, landing upon a very short, sandy beach backed by a rampart of tumbled rock. Upon a terrace against the hills, barely big enough to hold a habitation however humble, we espied a ruin, all that remained of a stone hut once occupied by a white man who tended the ironstone on behalf of a distant company. Our dusky attendants, always on the lookout for specimens to assign to the preserving fluid of the collecting bottles, in which the death struggles of the unlucky captives were watched with sportive animation, scanned the beach. Soon they were digging into the sand with their hands, following up the course of tunnels communicating with openings in the surface. They had not been long at the work when one of the occupants of the holes rushed from its shelter and sped toward the sea with the celerity of a greyhound, the hunter in hot pursuit. These fleet creatures were crabs of a dirty whitish colour resembling the sand they lived in. They were undoubtedly voracious in habit, for if kept in water with kindred species which lived under the rocks, they would immediately assail the weaker, and partially devour them. They belong to the genus *Ocypoda*.

We clambered up a rough gully east. The massive ironstone wall lay north. It occurs in quartzite striking N.W., and dipping from 40° to 45° S.W. A narrow bed of chloritic clayslate overlies the latter, but quartzitic beds are again superimposed upon them. East of the landing the ferruginous lode is hidden from the water by sharp, sloped crests of quartzite. Secondary minerals occur in the formation, which simulate molluscan and other organic remains.

Growing in the shade of the eucalyptus in the gully, and covering much of the ground between the rocks we found the medicinal plant *Grewia polygama** which on account of its mucilaginous, stringent properties is extensively used in the bush for dysentery and other disorders of the bowels. The plant is plentiful throughout the North West and the Northern Territory, and is also known in India. The native name of the plant is "malagannye"; its leaves are usually chewed, but at times a decoction is made by boiling them with water in a billy-can.

When we returned to the cutter—we had all been ashore; even the skipper with his arthritic leg had toddled half way up the gully—a faint wind was blowing off the sea, and we made east along Lordo Pass. Two and a half miles had been covered when we came upon an island (Bullumba) which divides the Pass From this point the entrance to Lordo Pass bears W. 27½° N., whilst the divided arms run N.E. and S.E. respectively. The beds on Kollan Island now too exhibited ample evidence of the tectonic disturbances previously noted on the opposite side. In the centre of the island, moreover, several high bluffs of quartzite reared their heads and fronted east behind the wooded slopes. At the western end of Bullumba Island contorted quartzites stand at a deep angle, and the strike of the ridges, with a prevalent dip S.W., can be traced along the southern bank of the south eastern arm (Yikarungo), which is said to communicate with Dugong Bay. We followed up the north eastern arm which retains the name Lordo. Beyond its mouth lay an island (Malgneri), which bore E. 11° S. Another shallow synclinal with a steep western limb was noted on the northern bank; and the same fold continues on Bullumba Island across the water. The bedding in the east of Kollan Island is generally flat. At a point not quite quarter of a mile from the bifurcation of Lordo Pass, a subsidiary arm bisects Bullumba Island, and connects the two main channels. From there another quarter

* Mr. J. H. Maiden, F.R.S., who kindly determined the specimen, writes that an account of its medicinal use is contained in the Agricultural Gazette for October, 1898, quoting W. E. Armit's experience of it in north-western Queensland. Roth in his Ethnography, Bulletin No. 5, refers to its use by both whites and blacks about Normantown. Leichhardt (Overland Journey) used the fruits for a lemonade drink.

mile brought us to the end of Bullumba whose eastern edge lay like the base of a wedge between the arms of the sea. On the Kollan Island side a bay extends north-west, behind a narrow spit, towards the bluffs already noted. This inlet is Narroway. A wide expanse of water lay before us; from the point of observation the shore line ran N.E. and S.E., respectively. In the centre, and extending south towards the beach, a group of high, irregular, ironstained islands stood three quarters of a mile east of Bullumba, whose names are Warbul, Ogoolgaye, and Oluliangarre, the lastnamed being the southernmost. Wargul might serve as a good landmark when picking up Lordo Pass from the east; the entrance lies immediately north of it.

On the east of the above group and immediately south of Malgneri, two more islands guarded the coast, the northern being classified by the natives as Tardopmallo, the southern Unedgalla. The passes between these islands and between the former and the mainland lead into Dugong Bay. On the former the quartzite dips half a right-angle S.W., and does not ascend to any appreciable altitude. The rock has weathered peculiarly; the sun standing in the north west, the carved image of a huge skull can be observed on the north eastern extremity extending from slightly above high water mark to the brow of the cliff, some twenty-five feet.

Malgneri consists of two islets lying on the meridian, each, perhaps, half a mile in length, about three quarters of a mile from Kollan Island. A mile east, and roughly three miles N.N.W. from Tardopmallo, an island, shown on King's chart, is known as Tchongunnu. Most of these islands are scantily clothed with scrubby timber and tussocky grass. Seen from this point, that is from the east, the north-eastern corner of Kollan Island presents a bold headland, with a precipitous scarp rising abruptly out of the water. The scenery in the south west of the bay behind the islands is of a similar description.

In front of Tardopmallo the sea opens out southward, and is hemmed in by quartzite cliffs along the west. In the distance, some three or four miles south, a low red table of rock lies on the farther side of the entrance to Dugong Bay (Meda); it is the truncated end

of a low spit of flatly bedded sandstone extending south-east.

From a station two miles out to sea, from which the back bearing to Tchongunnu Island was W. 38° N., the following angles were taken: Two long, low islands (Karaien), scarped north and south, with scanty timber and grass, distant 10 to 15 miles, N. 36° E. A small, sloping, reddish rock (Manye), resting upon a low table, about two miles off, E. 17° N. Low islands (Korare), rather thickly overgrown with scrub, sloping northwards, and scarped south, about four miles distant, E. 28° S. An isolated bluff (Laipallalel) adjoins them on the east. And from a station whence Manye lies one mile N. 40° W. the following bearings were noted: A group consisting of one large and one small island (Karenembolye), flat and scarped, with no timber and little grass, N. 4° W.; Nawun Island N. 35° E. (Karaien lies close off the northern point of the island); the southern extremity of the two big islands shown on King's chart E. 4° N.; the northern N.E. The latter bear the native names Mellarulle (north) and Mollogul (south). The quartzites of these islands, stained a vivid red with iron oxide, are more or less horizontally bedded and flat topped. They carry a prolific growth of timber and bush.

We had made a good run, and as night was about to overtake us sought the shelter of a cove (Norngi), near the south western end of Mollogul Island.

SUNDAY, MAY 14th.

Norngi Cove is locked on three sides by a vertical cliff-front of red stained quartzites, horizontal or very gently folded. Near the south western corner is a short sandy beach, which the natives maintain is an excellent turtle ground. They asked permission to row ashore and searched the grounds for nests. But other hunters had been there recently, so their labours were fruitless. The extreme south western point consists of sculptured cliffs, with a low, flat bluff extending out to sea. Mangroves surround the bay, except at the farthest S.W. and N.W. points. A salt arm cuts across the south western corner forming a subsidiary island (Yelladannye). This arm, together with a small islet in its western union with the sea, is known as Errigi. The higher cliff tables behind the bay have undulating surfaces and carry much timber,

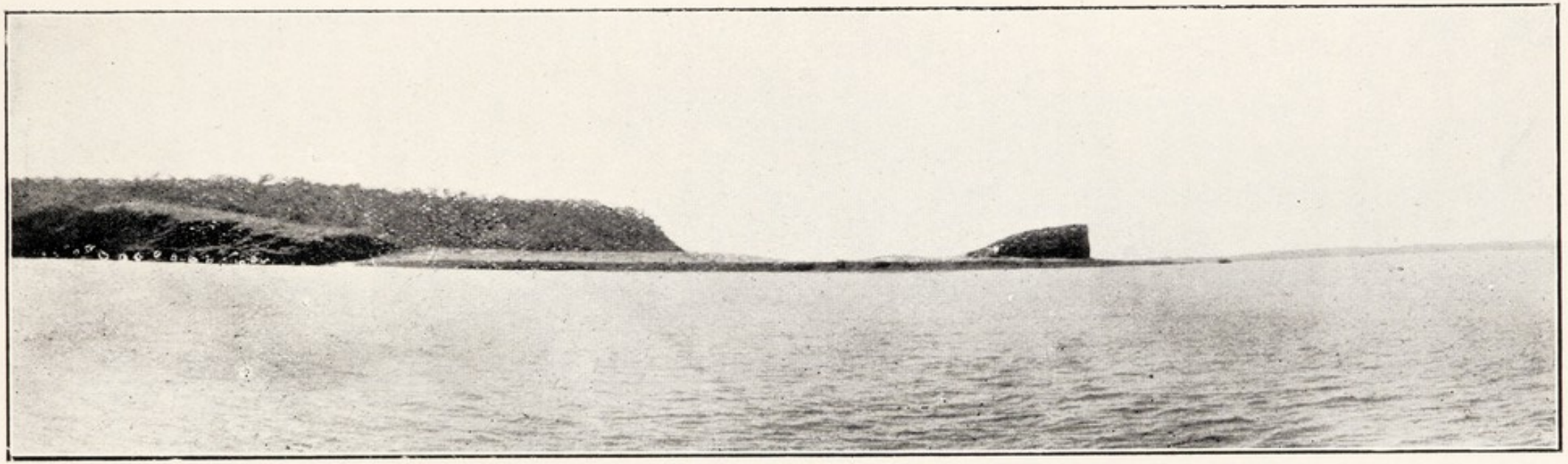
principally of the eucalyptus family. The ground is extremely rough and stony. The cliff faces are from 20 to 30 feet high, the highest elevation about 80 feet. Deep water exists in this little bay; we anchored in five fathoms at half tide, but found over fourteen a few chains west. The lead showed a muddy bottom, but, with the exception of the beach alluded to above, the shores are exceedingly rocky. Not far from the north-western corner the sea has piled the shingle across the mouth of a small inlet like an artificial railway embankment, curiously symmetrical in the arrangement of the material. Among it was noticed much dead coral.* Norngi, nevertheless, offers a secure harbour against south easterly gales.

From the anchorage, the northern head of Kollan Island bore W. 12° N., Karenembolye Island W. 37° N., Korare W. 20° S., Manye W 4½° N., and Skull Point on Tardopmallo W.

The boys, Mr. Sanders, and I landed on the northern shore of Norngi Cove and scouted Mollogul Island. Our companions soon discovered signs of a recent visitation by natives they described as "Montgomery Island blacks." Stones and undergrowth made progress somewhat arduous; the country consisted of quartzite throughout. When we returned to the dinghy Jim Crow was missing. His friends declared he was homesick and had absconded. We shouted and called for him until our voices were hoarse, without avail. Then, just as the boat was on the point of leaving, the lost man emerged from behind the cliffs unconcernedly smiling as though nothing had happened. Where he had been and what he had been up to during his absence we never could ascertain.

Whilst we waited on the "Rita" for wind and tide, several of the boys discarded their clothes and dived from the bowsprit for shell. The water was so exquisitely transparent that we could follow their graceful forms as they struck for the bottom, which then lay twenty-four feet beneath the surface. Then the only signs of human life below were occasional silvery bubbles of air which oscillated toward the light. Next a dusky head returned snorting with delight. "Me got

* The list of corals is contained in the Appendix, page 29[illegible].



SOUTH-WESTERN ASPECT OF YELLA DANNYE ISLAND, WITH BEDMINNIMEN BLUFF AT THE POINT; MAY 14th.

'em pretty fella shell."* And as he shook his curls and wiped the water from his face, the diver clasped the anchor chain and climbed aboard. Vide Plate XXIV., fig. 1.

We weighed shortly before noon. The south western head of Norngi Cove looks aged and weather-beaten —a result of north-western gales. The point consists of several pillars, needles, and jagged bluffs. The western front of Yelladannye Island is vertical; upon it the horizontal bedding, turning to a shallow synclinal trough further south, is plainly visible from the sea. The nearer high land slopes to a storm beach south, while beyond it, at the extreme south western corner, an isolated bluff lies like a watchdog before the island. This bluff is called Bedminnimen. Vide Plate XXII. We changed our course to E. 15° N., which was in a straight line for Raft Point. The most eastern visible point of Mollogul Island, known locally as Ogorre bore E. 30° N. Several dome-shaped hills, scarped seawards, ended the island on the south. On the opposite side of the pass we had entered lay the Island Woninjarre, another bore E. 38½° S. from Bedminnimen some seven to eight miles. The pass is about two miles across. From the same point two conspicuous hills, both with treble crowns, which I took to be Mount Disaster (Pangalma), and Mount Hopeless† (Ungoann) bore E. 42° S., and E. 29½° S., respectively. These hills are somewhat alike in shape, and stand as prominent features in this portion of the King Leopold Plateau. The eastern shore of the Mollogul group was marked by a number of bluffs falling precipitously to the sea.

We had now reached the tribal boundary of the Pindonal natives, the Argobuddi holding the territory from here onwards.

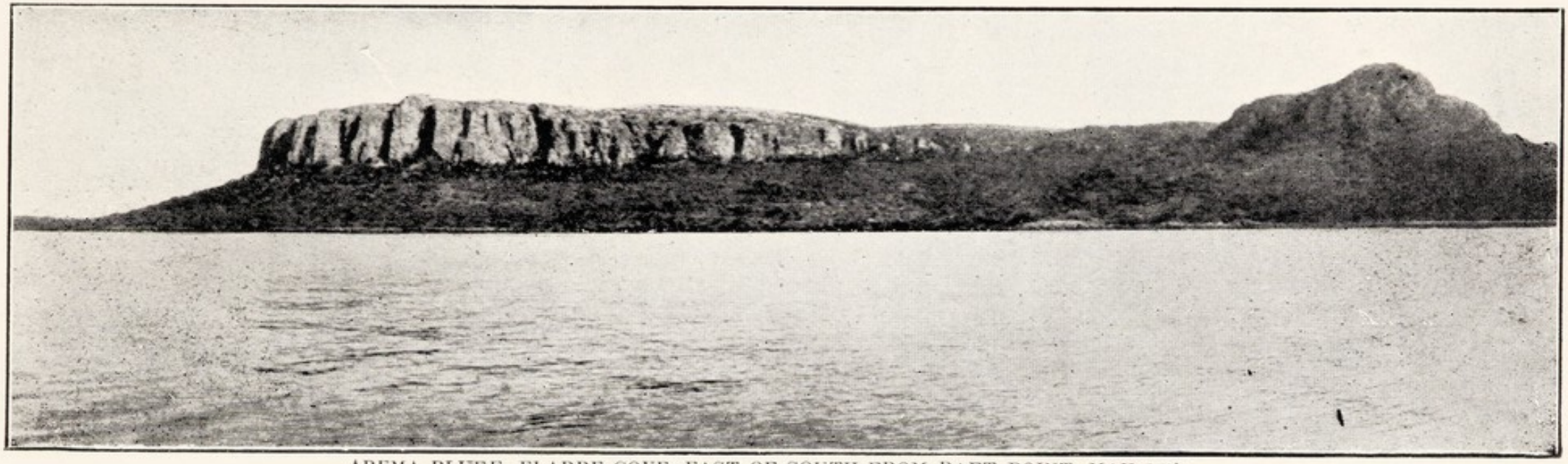
The wind failing, we drifted about with the tide. Collier Bay lay south. Banks of cumulus along the horizon and feathery cirrus in the zenith made us hopeful that wind was not far off. At 2 o'clock p.m. the boy at the helm announced "Wind, ahoy!" A dark line could be seen in the west which rapidly grew in width as it

* Since determined by Mr. Hedley to be a specimen of *Angaria delphinus*.

† Alexander Forrest: North West Exploration, Perth: By Authority: 1880, page 22. Recent plans refer to this hill as Mount Page.

came swiftly towards us, like the shadow from a travelling cloud, and broke the glazen surface of the sea. The sails were filled and we stood across the mouth of Collier Bay. On Woninjarra Island, low, cliffy faces alternated with short sandy beaches as we sped by. At 3 p.m. the temperature of the atmosphere was 32°, and that of the water 29½° Centigrade.

A bold headland rose ahead of us, slightly higher and steeper on the south than on the north. Which was Raft Point, and which Steep Island was not yet clear. More elevated country showed up at several points along the horizon northwards as far as N.E. The wind had freshened appreciably, but the tide was against us. Darkness had come. In vain we attempted to round the headland, which in the mystic shadows of night seemed first uncomfortably near, and then far off. Our cutter was the plaything of the elements. To look at the waters skipping by we might have been travelling at a terrific pace, but in reality the blast of the wind could barely hold the craft against the velocity of the tide. Some rocks loomed angrily on our starboard. The position was not an enviable one; the only thing that could be done was to keep the cutter's bow towards the stream, and to wait until the wind blew stronger still, or the tide became weaker. The former happened; it blew a squall. The billows slapped the "Rita" broadwise with terrific force; and all her timbers trembled. The frothy waters soon became master of the deck, from which they washed many useful items of our gear. Again one could not help admiring the devotion to duty on part of the aboriginal crew; each stuck to his post and obeyed orders disregardless of personal danger, and all in defiance of the angry sea. We were now breasting the flood under a doubly-reefed sail. Eventually the tide slackened, and progress could be recorded. We rounded Steep Island and turned south. The "Rita" was now in the lee of Raft Point, and well out of danger. The southerly course was kept along the shore under the guidance of the keen eyes of our boys. Jim Crow knew the country and explained that a good anchorage existed a little further on. Towards this we made. At about a mile and a half from the point we indeed entered a snug little bay and immediately cast anchor. "Good fella water sit down that way," said Jim Crow, indicating the



AREMA BLUFF, ELARRE COVE, EAST OF SOUTH FROM RAFT POINT, MAY 15th.

direction by lifting his head. Although the hour was late I decided to pull ashore with Mr. Sanders and three of the boys to verify the information. Curiosity overcame superstition, and so a temporary reluctance on part of the dusky crew was disqualified when Ikey pulled the dinghy up. Jim Crow directed operations. The boat glided over the surface, and presently entered the mangroves. A passage had been cleared, whether by white or aboriginal hand, one could not tell. Swarms of mosquitoes were in waiting, and greedily plunged their probosses into our unprotected skin. Ere long we reached a natural platform of rock, upon which we alighted. Thence we followed our guide over the rocks to a steep little gully in which water was flowing in abundance. Having satisfied ourselves that the water was fresh, and having partaken freely of it, we made back to the cutter and sought our bunks.

MONDAY, MAY 15th.

The cove we were anchored in was an excellent harbour indeed. The natives know the spot as Elarre. Entering it on a south westerly course, a gap is noticed, about half a mile wide, between two cone-shaped islands and the Raft Point Peninsula. The former lying in a line, north and south, protect the cove from the south easterlies. A high precipitous escarpment encloses it along the west and south. The southern wall terminates east in a cragged bluff of ironstained quartzite, known as Arema (Plate XXIII.) The upper half of this bluff is steep, with many vertical crevices and columns, which emerge out of a talus slope clothed with timber. Horizontal bedding planes can be detected in the face. Fresh water exists behind a dome-shaped hill about a quarter mile west. A saltwater creek enters the cove through the mangroves in the south western corner. The north western shore of Elarre Cove also consists of a scarped face of pinkish quartzite more precipitous at either extremity than in the centre. The spring exists about halfway up the slope, at a point roughly one third the whole exposure south of the northern end, that is north west from the gap between the two small islands. When facing this side, a heap of stones is noted at high water mark, at the foot of a short spur running out from

the northern bluff; a gouty stemmed boabab stands upon it. It is in the first gully south of this point that the water flows. A clump with green foliage farther south, half way along the front, indicates another spring called Edul. Our native attendants informed us that a favourite camping ground, known as Marnangalla, lies across Doubtful Bay on a bearing E. 42° S.

We again landed in the morning and kept the boys engaged replenishing our water supply. One of the rockholes lower down in the gully served the double purpose of washing tub and bath.

The country rock at Elarre Spring consists of quartzite, striking due north and south, and dipping 25 degrees east. It is underlain by a dark, lamellated, arenaceous schist or sandstone, steeply inclined a few chains east. The water pours from a crevice in the rock with a hollow, gurgling noise, thence finds its way to the bay via two or more small gullies. The fluid though clear as crystal, is of atmospheric temperature, and lacks its characteristic refreshing quality.

The weather continued to be very trying. Work completed, the boys went fishing off the rocks of the cone-shaped isles. They were very successful too. It was a treat to watch them hauling in large fish, one after the other.* (Plate XXIV., fig. 2). Fried in cutlets they made a wholesome and heartily appreciated extra course in our humble bill of fare. A few eggs of the slaty grey crane were also found in nests upon the rocky shelves of the island.

After lunch we heaved anchor and made for the mouth of the cove and steered N. 21° E. in the direction of Success Strait. Steep Island (Purruleo) bore N. 10° W. from the cove entrance. The cliffy face bounding the sea on the west shows the strata to be shallowly undulating or more or less horizontal in disposition. When halfway between Elarre and Steep Island, Red Hill (Barmangep) lay E. 6° S., a low cone with horizontal bands of quartzite, at one-third and two-thirds its height, respectively, above sea level. The name nowadays is to a certain extent a misnomer for the hill is not particularly red in appearance, but is for the

* These included the richly coloured Wrasse of the family *Labridae* and the Sea Perch (*Serranus*).

FIG. 1. OUR "BOYS" DIVING FOR SHELL FROM THE "RITA'S" BOWSPRIT. NORNGI COVE, MOLLOGUL ISLAND, MAY 14th.

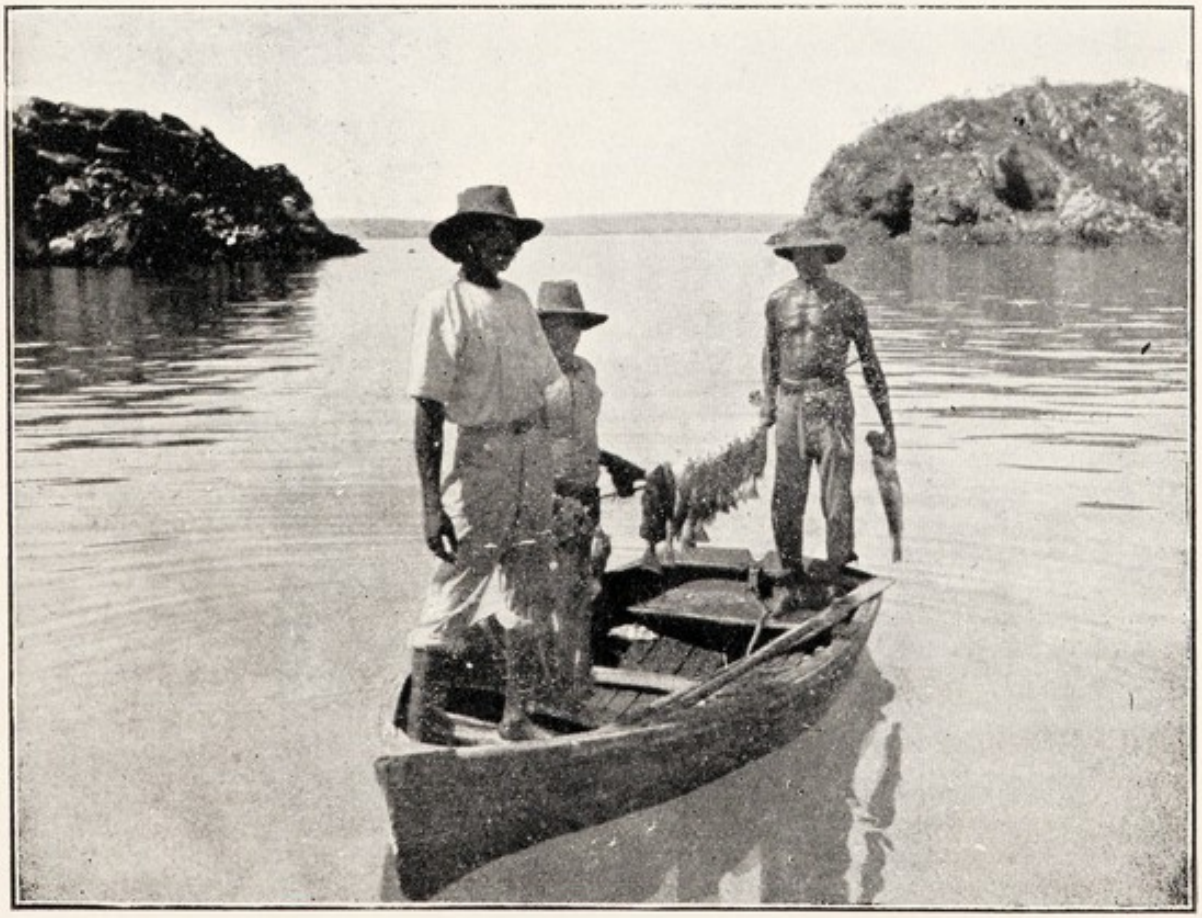
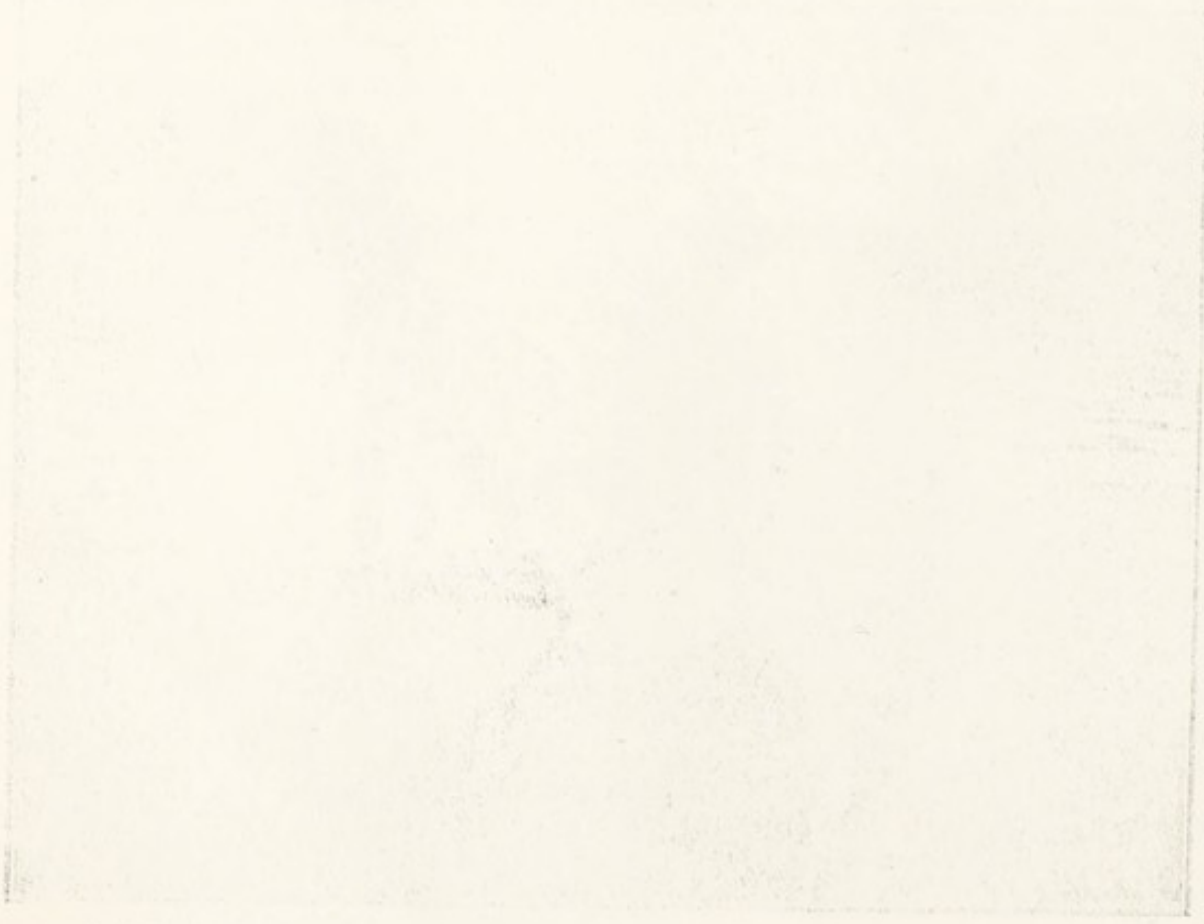
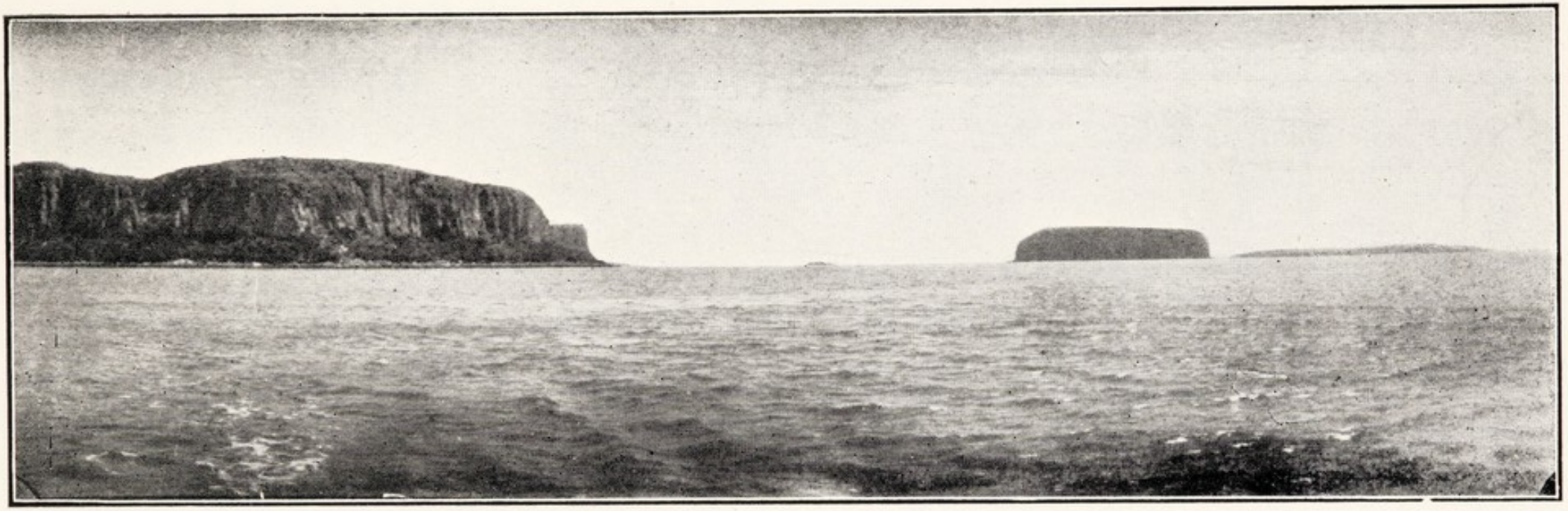


FIG. 2. OUR BOYS TEDDY, IKEY, AND JACKY, RETURNING FROM A FISHING EXCURSION, ELARRE COVE, MAY 15th.





RAFT POINT AND STEEP ISLAND, TJORRE ROCKS AND BORUL ISLAND IN THE DISTANCE, MAY 15th.

greater part covered with low, stunted vegetation. The southern and eastern shores of Doubtful Bay are held by high and more or less flat-topped barren ranges of quartzite.

Steep Island is well named. Defined by steep, vertically jointed faces, its top is slightly domed. Only at one point, on the north-eastern side, a spur of less symmetrically formed rocks destroys the characteristic features of the isle. There is no talus on Steep Island or on the opposite part of Raft Point, but it gradually developes in a southerly direction, sloping upwards as the escarpment correspondingly decreases. The maximum development is perhaps to be seen at Arema Bluff, south of which, moreover, the escarpment falls rapidly in height. Vide Plate XXV.

A small group of rocks off Raft Point is known as Tjorre, the nearest island north of Steep Island as Borul. The latter is of irregular shape, with both high and low sea scarps; its quartzite slopes are lightly timbered.

The grandeur of the scenery as we left the land was unique. The headland, with its several hoary faces and its stately island guard, frowning in their time-worn wrinkles, beamed in the golden glamour of the falling sun. Both sea and sky possessed that turquoise tint which the tropics alone can boast of. The blue of space, reflected from the steamy sea, hung about the scene, and where it mixed with the red of the cliffs a purple tone resulted. The shadows in the clefts were the deepest blue.

When we approached Success Strait we noted the foam caused by the rip of opposing currents, north-east and east of Borul Island, which had suggested the name Foam Pass to Captain King.

The N.N.W. breeze again blew this afternoon, though with less force than yesterday. Starting soon after noon, it increased in intensity to about half past four o'clock, and then died off again to a calm at 8 p.m. The temperature of the atmosphere at 3 p.m. was 30 degrees Centigrade, that of the sea 29½ degrees. The barometer with some regularity stood at or near 30.15 inches.

When the mouth of Doubtful Bay had been crossed, a vertical front of more or less horizontally resting

quartzites again stood on the north. Thence we endeavoured to take Success Strait. Vide Plate XXVI. The elements, however, were again adverse. A fair wind took us into the entrance, but there we were met by the full force of the waters ebbing west. The "Rita" stayed her course and turned her nose like an unwilling horse. To drift back to a little mud bay off the entrance on the left, and wait for the change of the tide was the only rational thing to do under the circumstances. From the entrance Elarre Cove bore S. 23° W.

Jacky and Jim Crow pulled me ashore. Leaving the latter to look after the dinghy, I made for the thickly wooded land with Jacky. The beach consisted almost exclusively of coral waste piled high by the waves. The country beyond was practically impassable owing to the accumulation of coarse rock fragments and tumbled blocks of quartzite which were littered over the whole area. Tall grass, bush and creepers covered the debris so thickly that it was dangerous to proceed without running the risk of falling into a crevice and breaking a limb. Therefore I decided to skirt the thicket along the sand lying between it and the coralline storm beach. Jacky soon drew my attention to some large, but very shy, pigeons in the tall timber ahead of us, which he said were "Good fella tucker, all same hen." I allowed him to approach the game and have a shot; but he missed. I regret this since it was the only time we saw these birds, and I was anxious to secure a skin.

It is with no small measure of gratification that I can here record a discovery which, as regards actual application in practice, is new to Australian ethnology. We came unexpectedly upon a corrobboree ground where recently a ceremony had been performed. The cleared space, the ash heaps, the foot marks, and the blood gave ample evidence of the recent doings of the tribe. There was no novelty about all this. But on the very brink of the jungle stood a pillar of stone, erected by the natives, carved in imitation of the male organ. At the function concluded but a day or two ago, the symbol of the procreative power of man had been revered—by us a record of genuine phallic worship had been established for Australia.

THE "RITA" ENTERING SUCCESS STRAIT, MATANN BLUFF IN THE CENTRE OF THE PICTURE, MAY 15th.

When the tide had turned, we heard the signal from the cutter and returned. Mr. Sanders had come ashore in the meantime and was gathering chitons and other shell fish on the rocks with Jim Crow. How soon the sense of shame takes hold of the aboriginal mind when brought under the influence, however humble, of civilization, became apparent to us this afternoon. It was difficult for Jim Crow and Ikey to row the dinghy far enough in to allow us to board her without soaking our garments to above the knees. I told the boys to take their trousers off, jump out, and pull the craft in by hand. They did as I asked, but kept their clothes on, Ikey apologizing to me afterwards that they could not have done otherwise because neither of them was wearing a loin cloth underneath.

Directly we reached the cutter we were off. The shadows of evening already lay over the Strait, and the skipper entertained grave doubts as to whether we would succeed in passing through before nightfall. It was not long ere we shot into the stream on a course N. 20° E. A long hill with a steep declivity toward the Strait, and sloping very gently east, stood on the right. Perpendicular planes of reddish quartzite crown its timbered talus. This bluff is named Matann (Plate XXVII.) On the opposite shore, the country is more broken and hilly. Parts, especially the northern slopes, are thickly overgrown with wood, including the native cypress (*Callitris robusta*). At the far end of the channel a high blue range lies across the water.

We now swept along with the tide at a lively pace. The breeze was cut off completely by the hills; and that seriously handicapped our steering. Two boys were sent to keep a close lookout from the rigging while Ikey took the helm. We sped along with an alarming velocity, the cutter rotating with the whirls.

The north-western shore continued to present a persistent front of quartzite, broken by numerous small, rugged gullies occupied by jungle. From the freshness of the growth it would appear that water exists at several sites along this range, which I have named Balami Ridge.*

* Vide May 17th.

Passing north of Matann Bluff we shot into a constriction of the Strait occasioned by a reef or mud bank which extends from the southern side to well within the centre of the channel. A small rock lay off the shore. The water gurgled and broke around us, as though we were passing over the crater of a geyser. Many a time a dark coloured patch of water appearing suddenly before us in the failing light looked like a reef, and disaster seemed imminent. The crew pulled hard on the starboard side, and we hugged the north-western shore. Thence the Matann side receded north-east and allowed the waters to spread out their volumes. A dense line of mangroves fringed the course. We had entered George Water. Anchor was cast in darkness close to the range on the north-west. Success Strait proper is about a mile and a half shorter than shown in the charts; the shores are represented more or less parallel, a good two miles north of Matann Bluff, whereas, it has been pointed out, one turns rather sharply north-east immediately north of the Bluff.

In the still of the night we heard the piercing whine of the dingo, interrupted every now and then by the hoarse bellow of a crocodile which was splashing the muddy bank not many chains from where we lay.

Mr. Sanders and one of the crew had spent much of the afternoon in argument. Among other things, the latter had told my friend that whenever he saw a person asleep an impulse to kill arose within him. I thought no more about the affair until long after midnight when a rustling noise woke me. I listened and ascertained that the sound came from the hatchway. Cautiously turning my head, there was sufficient light to show me the figure of a man stealthily crawling towards the bed of my mate. "The impulse has come", I thought, and felt for the revolver under my pillow. The man slipped on to the deck and crept to a large box in which we kept our tools, kitchen utensils, and other items in everyday use. After casting a searching glance in the direction of Mr. Sanders, who was breathing heavily in a deep sleep, he lifted the lid and picked up a large bread knife, with a broad and heavy blade, shaped like a sabre. Again glancing at Mr. Sanders, he ran his fingers along the edge! I was horrified and thought the moment had come to deal with the would-be assassin. But he again plunged his hand into the box and groped around in the

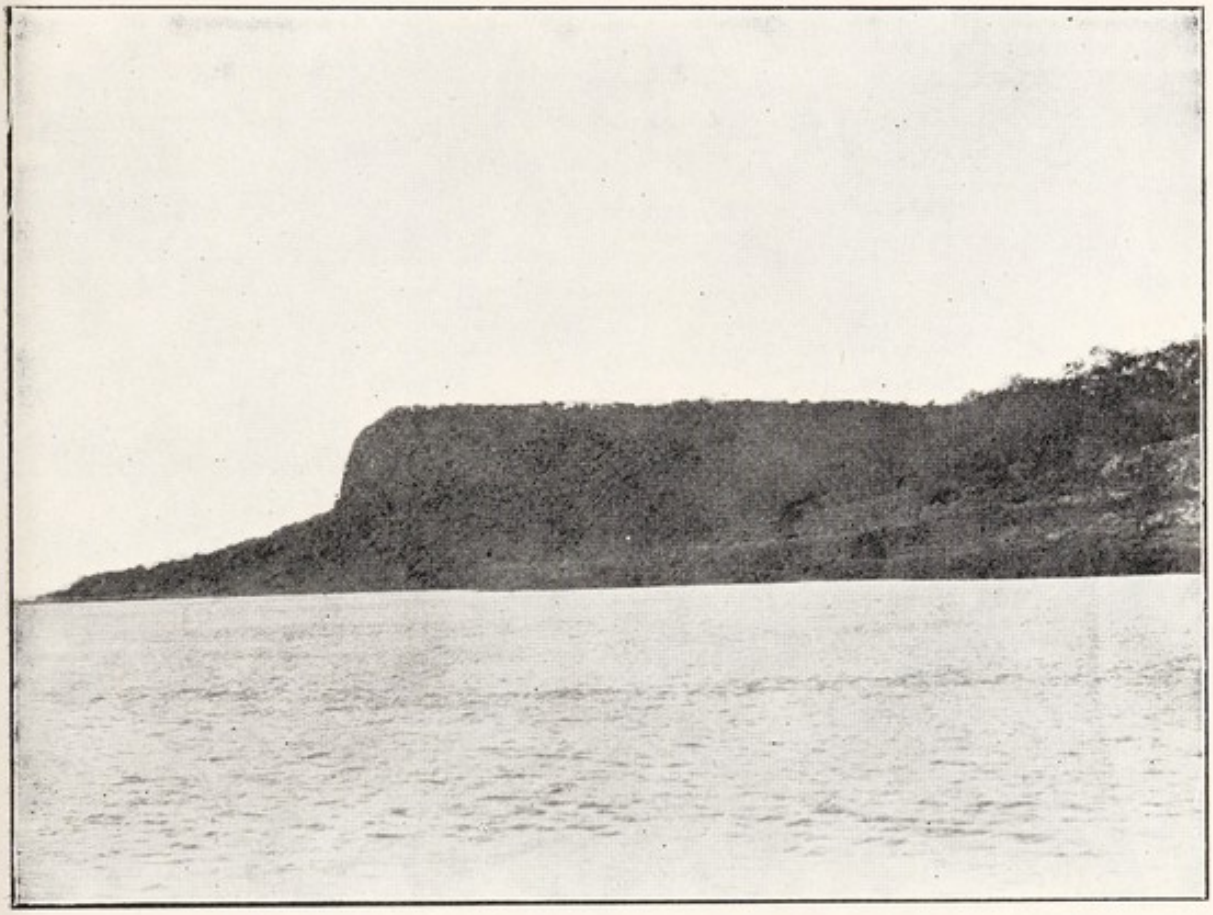


FIG. 1. MATANN BLUFF, SUCCESS STRAIT, MAY 15th.

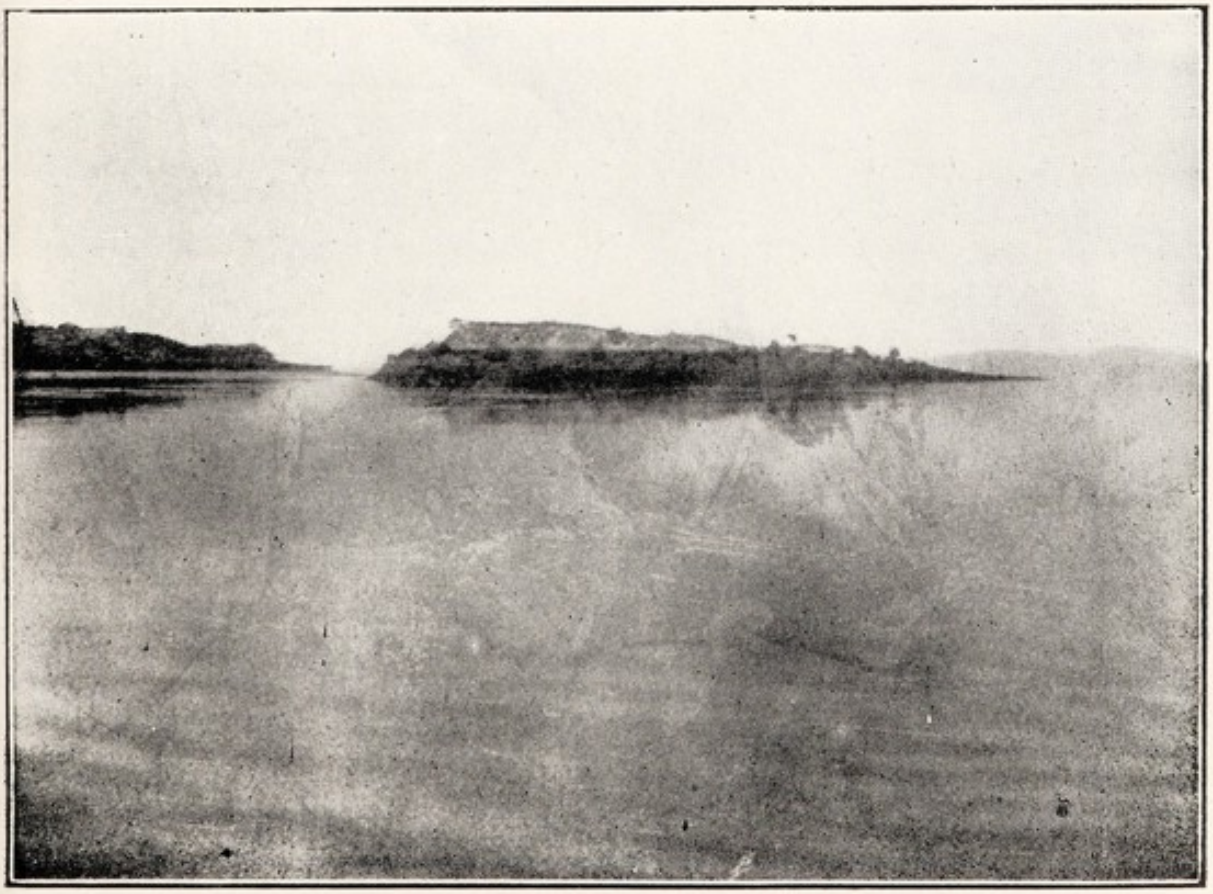


FIG. 2. ATTACK ISLE, GLENELG RIVER, MAY 16th.

dark. Presently he found what he wanted—the bread. From this he cut a chunk, and with the other hand grabbed a piece of freshly cooked corn beef. Then he withdrew as silently as he had come, and the loud gulping lasted for about an hour. I was greatly relieved, but could nevertheless not help thinking that the man had undertaken the experiment with no small risk of losing his life.

TUESDAY, MAY 16th.

From our anchorage the entrance to Success Strait bore S. 26° W., about five and a half miles; a low, projecting point decked with mangroves stood N. 42° E., and a table shaped hill N 41½° E. The north-western shore of George Water runs east of north, being also determined by the same quartzite range which lies along the side of Success Strait. Extensive mud flats abut upon this range and carry impenetrable thickets of mangroves, many of which are tall and straight in their growth like pines.

We steered N.E. The water of this remarkable inlet is of a peculiar emerald colour, a genuine *eau de Nil*. At eight miles we were abreast of the Mangrove Point, from which the backbearing to Matann Bluff read S. 36° W. From the same point a flatly dome-shaped hill bore N. 33½° E., and the table hill N. 36½° E. An open arm lies behind the mangroves which runs west towards Balami Ridge. Several more were located among the mangroves along the northern shore. It is possible that one of these form the "Probable Communication" referred to on the chart. I regret that I could not investigate this point on the spot. But the paucity of wind, and the strength of the opposing currents rendered our craft totally inadequate for the purpose. In any future exploratory undertakings in this region a lugger carrying an auxiliary engine seems indispensable.

We turned E. along the edge of the mangroves until we reached another arm, from the mouth of which the higher table hill (Mount Grey), the flatly dome-shaped hill previously sighted, bore N. 10° E. Two small islands were enclosed by the mangroves on the eastern bank, and a large one lay behind them; several boababs grew upon them, one or two even among the mangroves, proving the proximity of the firm and dry land.

Thence we made S.E. and soon entered the northern channel of the historic Glenelg River, discovered some miles inland by Sir George Grey in 1838. Well timbered rocky hills lie on either side, here and there a low escarpment. A small island* (Plate XXVII., fig. 2) lay on our right in a straight line with Matann Bluff, W. 40° S., which was composed of low, flat beds of quartzites. Mount Grey bore N. 3° W.

Continuing on a S.E.E. course, under a fair breeze, we made up the river. In less than a mile we came to a sharp bend, and turned north. The tide was ebbing fast; the main stream hugged the eastern and southern banks. The waters roared aloud as the "Rita" pluckily endeavoured to forge ahead. But it was useless. The angry torrent, foaming upon the surface, raced by with terrific rapidity. We could hold the boat up to it no longer. The moment she was turned, she was whirled back many chains ere we could regain control. We made toward the north shore and anchored in some slack water in the shelter of the point round which the current surges, about a quarter mile downstream. What a miraculous escape we had had only became known to us after. At low tide several dangerous rocks and isles appeared to view right across the very track we had chosen. How the keel had been saved from being ripped was beyond us to say. The only clear passage lay right on the opposite side, where the tide was flowing with the intensest vigour. No boat should attempt to navigate this river before anchoring and awaiting low water to obtain a comprehensive survey of this treacherous ground.

Some tall mangroves grew in the muddy bank north of the anchorage. Jim Crow was ordered to bail out the dinghy and row a party consisting of Mr. Sanders, Ikey, Jacky, and myself to the rocky point east of it. We landed and sent the boy back. Some natives had been at this place only a few hours previously. They had been making some rafts on which they had crossed the River. The stems of the tall mangroves had been used. The place was covered with the long strips of bark they had shaved from the wood. And among them were also three of the completed poles they stave to-

* I have named it Attack Isle for reasons which will be apparent below.

FIG. 1. ROCKY BANK OF RIVER GLENELG, MAY 16th.

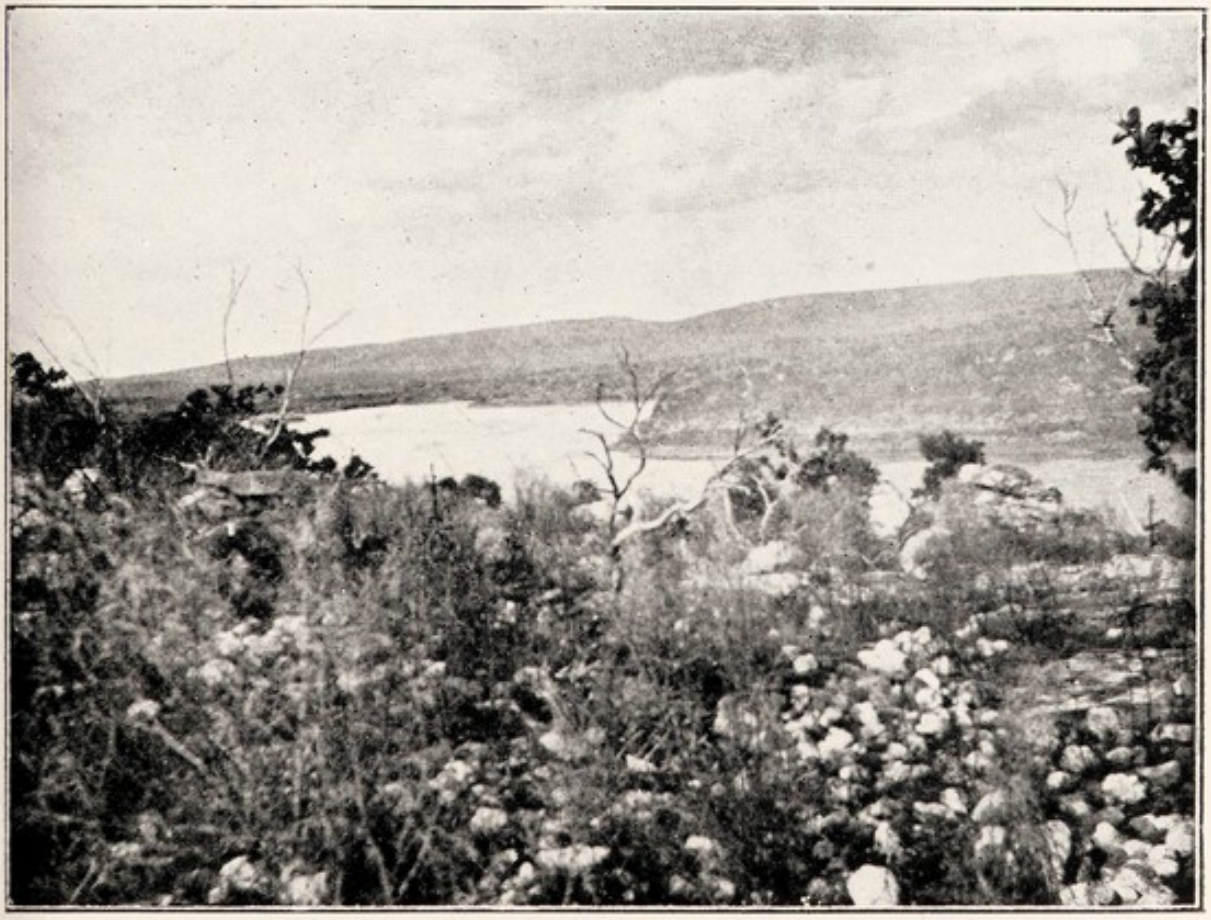


FIG. 2. THE GLENELG RIVER, NORTHERN CHANNEL, MAY 16th.
The steep banks of Gill Island are seen on opposite side of river.

gether. The thick root ends had been sharpened to a blunt point, the opposite ends were square. The poles were securely held together by three thin staffs of hard wood driven transversely through the softer tissue of the mangrove. The workers had made their meal off shell fish, the remnants of which lay strewn about the ash heaps of their fires.

We directed our steps towards the hills which form the western banks of the Glenelg (Plate XXVIII., fig. I). Progress was extremely difficult. As upon previous occasions the surface was so rough and so covered with vegetation that scrambling up one and sliding down the other side of the rock masses lying all over the ground was the only way to push on. Our sympathies were with the early explorers who under less favourable conditions traversed large tracts of this mountainous region. Several have commented upon the hardships these intrepid little bands so courageously endured while engaged upon the noble work of unravelling the mysterious unknown in one of the darkest corners of their Sovereign's dominions. Among the accumulated masses of stone we noted, as we also did on Kollan Island, peculiarly arranged heaps which looked as though the stones composing them had at one time revolved in a swirl and had been deposited in spiral lines around the common centre of gyration. A tree often stood in the middle. The heaps were usually found along the rocky courses of steep little gullies or "wildbachs." The size of some of the boulders moved by the water was incredibly large.

The geological formation consists essentially of horizontal beds of hard, compact quartzites, with prominent joints running north and south. There were signs of the late presence of aborigines everywhere. They had been digging for yams, and had collected edible brown gall-nuts* known as maradu or danawal. A far-spreading smoke in the north indicated that the tribe was there hunting. Our boys responded by setting fire to the porcupine grass and bush on the western declivity, and soon an enormous volume of black smoke circled to the sky. A variety of native pigeons was seen in this

* Mr. J. H. Maiden, to whom these nuts were subsequently submitted writes that they are galls on Bloodwood (*Brachyscelis pomiformis*). Vide Froggatt: Proc. Linn. Soc., N.S.W., Vol. XVII., fig. 7.

neighbourhood; one resembled the Torres Strait species, another was more like the rock pigeon of Central Australia, but had a white wing.

When at length we reached the summit of the range, an imposing picture burst upon our view. Down in the valley the mighty Glenelg was pouring her never-ending volumes from the south (Plate XXVIII., fig. 2). *Vis-a-vis* lay Gill Island,* which divided the main stream into two arms; the point of division could be discerned at the south end. Behind it a lofty, blue chain stood as a background, upon which a heavy cumulus was looking for support. The return journey to the boat was even more hazardous than the ascent had been, especially as much of our track had in the meantime been swept by the bush fire, and the bared rocks were nigh on red heat (Plate XXIX., fig. 1). We reached the shore and found the dinghy waiting. The tide was at its lowest, and the skipper had taken the "Rita" a little farther into the stream.

In the evening I was spared a ghastly lot. When the repast had been finished we were as usual sitting on deck discussing the day's events. It was a superb moonlight night, and, apart from the noise occasioned by the flood on the opposite side of the channel, everything around us was sublimely peaceful. I sat on the low rail of the gunwale, when unexpectedly the smooth surface of the water beneath me broke with a frightful splash. Instinctively I jumped forwards, and simultaneously came the alarm from the bows "Look out, alligator." The boys were sitting in a circle merrily chanting when it happened; and several of them were eyewitnesses. The scaly monster threw itself bodily out of the water and made a slap at me with its tail, grazing the surface of the rail over the very place I had occupied. Falling back to its element, it struck the water hard with the flat surface of its belly, then splattered below. The boys had rushed to our side and conveyed their kindly sympathy by repeatedly ejaculating "Oh dear, oh dear, oh dear." The savage reptile did not come up again, but it was not far off, for we heard it several times during the night sending forth a dull hoarse note resembling

* Named in compliment to Mr. Thos. Gill, I.S.O., Hon. Treasurer of the Royal Geographical Society of Australasia (S.A. Branch).

FIG. 1. BUSH FIRE, GLENELG RIVER, MAY 16th.

FIG. 2. SUNSET OVER GEORGE WATER.

the roar of an angry bull. Peace restored, we sat for some time watching the flight of countless flying foxes (*Pteropus gouldi*) making upstream, and then turned in for the night.

WEDNESDAY, MAY 17th.

At daylight we were astir and made towards the mouth of the Glenelg. There was no wind, and the water on our side of the river slack. The oars were requisitioned, and thanks to the cheerful pulling of the boys, we slowly drifted down. From the river mouth the largest of the several islets, which are submerged at high water, bore E. 28° S., and the arm we entered yesterday, north of the Mangrove Point, W. 20° N. A fair south easterly sea breeze now filled our sheets and carried us against the flood in the direction of Matann Bluff. But soon the breeze came "dead ahead" and we tacked north of west and south. This performance lasted the better part of the day, and very slow headway was made.

In the afternoon, as we were making towards the western shore of George Water, the man at the rudder announced that a smoke was visible on the shore ahead. We were yet a few miles off, but a small blue column could indeed be seen rising from a point, at about high-water mark, between the fringe of mangroves and the timbered quartzite spur we anchored close to two days ago. As we drew nearer one could, with the aid of the spyglass, detect the nude figure of a native perched on a rock off the beach. Far off as we were, the shrill, long-drawn call of the native now fell faintly on our ears. One would never have believed that the sound of a single human voice could have travelled such a distance and still be audible. This cry was not without effect upon Jim Crow, who had been silently staring at the moving speck of brown upon the rock. He was noticeably excited when he turned and asked permission to reply. This having been granted, he crept on all fours along the chain of the jib-boom in a manner which reminded one forcibly of a monkey. From near the end of the spar he raised his body in as conspicuous a position as possible and signalled with his arms extended. Then came from his mouth a piercing coo-ee. A reply from the shore soon followed. After several repetitions Jim Crow crept back to the deck and said "That one

good fella." Presently another figure appeared, but immediately ran under cover again. The other boys now joined in sending their greetings to the natives on the shore; a code of freemasonry seemed to prevail, which was understood by all parties concerned. The second figure reappeared from behind the trees and was accompanied by another. Jim Crow understood their language; and a regular bombardment of interrogations ensued as we neared the land. Assent was signified on either side by a loud, short exclamation which at times sounded like "Hai," at others like "Yau." I had the dinghy brought alongside, and with Mr. Sanders, Ikey, Teddy, and Jim Crow rowed ashore. Ikey was told to bring the gun and a couple of cartridges along. When we landed we noticed his pockets swelled with some fifteen to twenty rounds. With him safety was better than sorrow, for, when questioned in regard to the unreasonable quantity of ammunition he was carrying, he dryly replied "Perhaps him bad fella." The skipper preferred not to throw the anchor, but while we parleyed with the aborigines he cruised about the bay. When we alighted on the shingle of the little beach a man of middle age limped towards us; he was followed by a youth. An elderly gin remained behind with two mangy dogs. They were all very nervous, and loath to speak. Jim Crow, too, who had been so enthusiastic, had now changed his demeanour and sat down on the beach. If he spoke at all he would look away from the strangers. The older man wore his hair untidily tied in a chignon at the back of his head; the crown was covered with red ochre, as were also his cheeks and forehead. The growth of hair on his face was scanty. A longish beard pended from the point of the chin, but there were no hairs on the cheeks and neck. The moustache consisted of a few long bristles which had been plastered together with a cylindrical bead of beeswax a short length from either end. The bundles of hairs thus held with wax resembled small sized paintbrushes. His body was marred with many scars which were disposed horizontally upon the chest and epigastrium, and vertically upon the outer surface of the upper arm and thigh. The nipples were abnormally prominent for a man. The wretched fellow was in an emanciated condition, and could with difficulty stagger towards us. He was suffer-

FIG. 1. NATIVE RAFT ("KALOA") ON GEORGE WATER, MAY 17th.

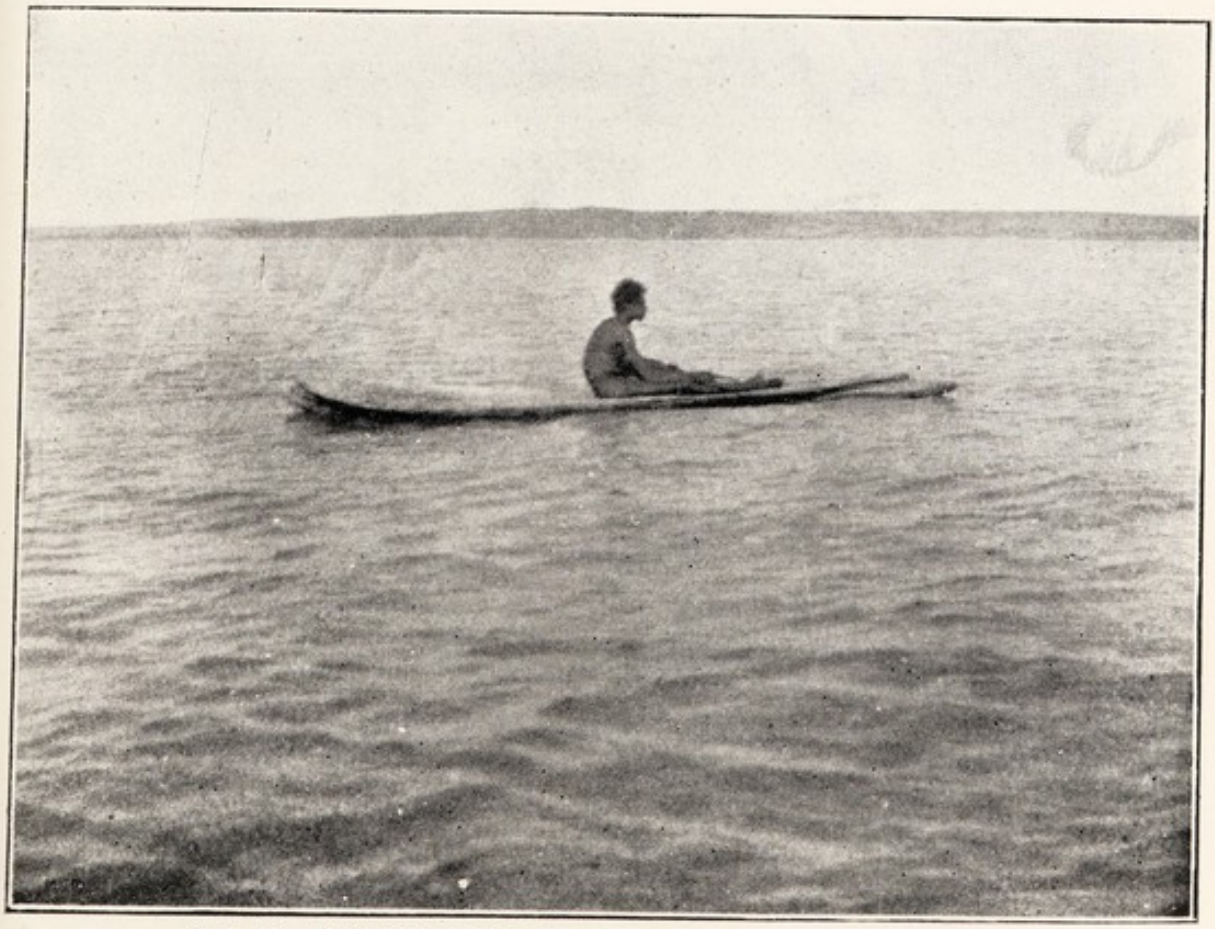


FIG. 2. NATIVE RAFT ON GEORGE WATER, MAY 17th.

ing from a septic process, which was rampant in both his knees. The joints were horribly enlarged, and from several perforations in the skin offensive matter was pouring down the limbs. The name of this sufferer was Balami. His gin was of average stature, well proportioned, and of rather pleasant appearance. She, too, had numerous cicatrices upon her chest, back, and thighs. She carried a large bark cooleman ("namarragam"), the ends of which were folded together, and tied with fibre string. Her name was Indamun. The youth, aged about seventeen years, was tall and of athletic build. His chest, abdomen, back, arms, and thighs were richly scarred. Both he and the other man were circum- and subincised. They called him Yaboyle. In one respect these natives differed from the King Sound tribes we had until then encountered; they had had none of their teeth knocked out.

The little party were in possession of two rafts which were beached above high water mark. Each raft consisted of two sets of eight mangrove poles staved together, as previously described. In one instance the poles, which had been cut from specially selected trees of the tall mangroves known as "sea pines", were uniformly curved, imparting to the structure as a whole a concave or cradle-like shape. When afloat one set of poles rides upon the other in such a manner that the thinner, square ends overlap longitudinally in the centre, leaving the pointed root ends of the two sets of trunks to act as bow and stern respectively. The forepart lies below the aft. Upon the latter, about midway between the ends, a small bundle of grass serves as a seat. Two paddles lay upon either raft; they were cut out of hard wood, and about four feet in length. The handles were circular in section, the surfaces of the blades flat or very slightly convex. Vide Plate XXX., fig. 1.

After we had distributed sweets and tobacco among the little family, we prepared to leave. Noticing this, the youth dragged the corresponding pieces of a raft to the water and floated them in their correct position. Then he jumped upon the craft and paddled by the side of our dinghy. We were astounded to see how lightly the clumsy structure shot through the water, the oarsman having repeatedly to stop propelling in order to

allow our boat to get abreast of him. He used one paddle only, dipping it alternately on both sides. He sat with his legs stretched in front of him and, as he skilfully plied the full blade, reached at arm's length forwards. Vide Plate XXX., fig. 2.

The "Rita" came forward in great style, and when she drew near, "turned-to" without dropping anchor. We boarded her and bade our cheerful escort adieu. He seemed reluctant to leave, and gave us to understand by gesture that he would gladly accompany us. He watched us for awhile as we tacked towards Success Strait, then he returned to his humble kin upon the shore.

We took Success Strait on a course S.W.S. Excitement was again in store for us when we dodged the reefs and banks in a strong tidal current, and against a tricky head wind. Successful in the navigation of the Strait, we made for a small bay about three-quarters of a mile south west from the southern entrance. Although the lead had shown a muddy bottom, we were surprised in the morning to find the cutter's nose within a length from a peaky rock whose dull grey hue had, when we anchored, hidden it in the shroud of night.

Jim Crow had by this time become quite accustomed to our routine, and after having this day officiated as interpretor was the hero of the hour. Teddy and Ikey had treated the "wild blackfellows" with marked nonchalance and deliberate slight. When asked if he would like to possess the gin, Ikey replied with an emphatic "No, too old." The saucy chap has a grown up son, Tigon, at Sunday Island, at least twenty-five years of age; the gin would not be more than thirty.

THURSDAY, MAY 18th.

When in the east the glow of orange and crimson announced the coming of day, we were astir. With the assistance of a good S.S.E. breeze we fought against a strong tide in the direction of Foam Pass. On the north, the quartzite front ran out west to a low point which is known as Ningarne. The dip of the bed is west, locally. The whipping of the south-easterly against the tidal rip produced a very lumpy and choppy sea. And it seemed an eternity ere we could pass south of the Tanarre group of islands and make northwards.

For hours we were rocked by the obstinately opposing stream of Foam Pass. The red, square cliffs of Steep Island and Raft Point see-sawed incessantly before our dizzied vision, whilst mighty waves of green sped beneath us and splashed the deck with seething foam. When at length the point had been rounded we steered for Lizard Island (Kalarne) due north. The quartzite along this western aspect of the coast is less precipitous, and there is a general tendency for the slopes to dip seawards. The High Cliffy Island, next to Kalarne, is known as Wundjalla. Point Hall (Langauru) stands out to sea as a bluff, whose surface dips towards the water. At its western foot rests a small knob which is called Narrungi. A low, narrow neck connects it with the main. Two natural harbourages exist north and another south of the Point.

As Slate Island (Wairulgunnye) was neared, indications of schist came to light in the shape of low dark rises. The north-eastern end of Slate Island itself also consists of schist, the "singular formation" which suggested the name to Stokes. The greater part of the island is, however, composed of quartzite, more or less tabular in outline, and broken on the north. A rocky isle north of Slate Island carries the name Korrugu Kauanalga, and one between it and the mainland Woula. The Cape opposite is Terrekin. According to the natives, a sandy beach near the north-eastern extremity of Slate Island is a favourite breeding ground of the turtle. It is on that account regularly visited by the local tribesmen on their egg-hunting expeditions. Many fires had been lit in the bush at the head of the bay, east of Terrekin Point. In the evening the conflagration had spread considerably, and presented a gorgeous spectacle.

A good breeze blowing and a clear moon shining, we decided to keep sailing into Camden Sound. Soon we reached Battery Point (Kauwalprak), and turned E.N.E. into South Entrance. A series of steep quartzite headlands was passed, the first of which is named Ngallingalli. The following is a native vocabulary relating to the geography of the district:—Elalill (New Island), Kumbarangarre (a small island south of the above), Orulgu (Augustus Island), Tjora (Byam Martin Island), Ningarra Kaiwa'gin (Heywood Island), Nunimba (Champagny Island), Lambalmerri (pass between Augustus and Byam Martin Islands.

The tide was flooding fast against us, but with a full sail we recorded steady progress. The course was for the Strait directly south of Augustus Island, which bears the name Marlemma. Two springs are said by the natives to exist along the southern shore of Augustus Island.

It was a glorious full moon. We sat upon the deck, watching the blue-black slopes with the shaded patches of vegetation creep by. With the exception of the merry rip of the tide beating the cutter's boards as she slowly forged her way, silence prevailed. Everyone was absorbed in meditation, and little realised the disastrous doom we were courting. When deciding upon the course, I had drawn the Skipper's attention to some rocks which were shown upon the chart to exist at the far end of Marlemma Strait, and asked him to hug the southern side. He replied to the effect that the rocks did not exist; he preferred to rely upon the knowledge of his boys, because they had often been that way in their boats. I explained that he was running a serious risk of losing not only the boat, but perhaps the lives of all of us as well. But he was so confident that he sent the crew below, and only kept Ikey to assist him at the rudder. Mr. Sanders and I remained on deck. We soon drew near to the critical spot. Then came the crash. God, what a crash it was. The top of the boat seemed to slide over the keel, creeking in every joint. And from below the grating, crushing, and grinding noises of her impact with the rock, mingled with the shrieks of terror from the boys, were conducted to the surface with undiminished intensity. Then she heeled to starboard, and each one clung to some object for support, whilst many things slid from the hatchway and were either smashed in their fall or flew overboard. "There you are," screamed the skipper, "I should have done as I thought." I crawled to his side, and looking him in the face, said: "Do you mean to imply that I wanted you to steer over the rocks?" "No," he replied, "I should have done as I first thought I ought to think." However, in spite of the ambiguous nature of his reply, there was no time for argument. The boys were by this time more composed and jibbered profusely. They were ordered to lower the main sail, and to keep the pumps working while we ascertained whether the "Rita" was a

complete wreck or not. The water did not rise in her hold and it was clear that by some miraculous happening the rock had, at any rate, not rent her side to such a degree as to make an attempt to refloat her futile. Unless the rock itself was effectually plugging it, the leak could only be small. There was enough rise left to full tide to lift the boat from its jaggy perch. That was our salvation, for we afterwards discovered that the "Rita" had struck a pinnacle from which she must inevitably have capsized if the disaster had overtaken us during the ebb tide. Knowing, too, that the flood had just about been spent when we struck the rock, the following moments were necessarily harassing, as we watched the waters lifting the vessel inch by inch into an upright position again. The suspense was broken when the rigidity of the deck gave way to the re-established buoyancy. Then rang the hearty cheers of thanks from all the men. We drifted slowly back and anchored off Brecknock Island at the junction of Marlemma and Rogers' Straits. The rise had been sufficient, but not an inch too much, to lift the cutter from the rocks, and soon the towing at the chain announced the racing of the ebb. To commemorate our providential escape, I have attached to these rocks the "Rita's" name. The night's shelter was badly selected, the sea bottom was firm and gravelly, and the anchor dragged continuously.

FRIDAY, MAY 19th.

After breakfast Mr. Sanders and I pulled over to Brecknock Island. All hands came with us, for firewood was needed. Skirting the edge of the water, I observed a dyke of dark coloured diabase cutting through the quartzite. Similar outcrops could be distinguished along Augustus Island. We found an abundance of large, tasty oysters, living upon the rocks between high and low water marks. The Rita Rocks were now fully exposed to view; they extended the greater part across the Strait. The course to be taken is practically east, in a straight line for the eastern extremity of the prominent escarpment of the table-shaped bluff called Berrial.

Returning on board, we weighed. The southern boundary of Augustus Island consists of a quartzite escarpment, and a talus clothed with timber. The diabase intrusive occurs as a low, black ridge along the fore-

shore. The small islands situate near the end of Rogers' Strait (Augustus Harbour), consist entirely of igneous rock; they are covered with dense tropical growth. From amongst the timber, lines of accumulated debris, eroded fragments of the rock, project into the Strait like artificial breakwaters. On the opposite side of an inlet opening south (Augustus Water), the same class of igneous rock holds an intermediate position between the quartzite escarpment and the talus slope of Berrial Bluff.

The prominent scarp along the southern slope of Augustus Island, displaying horizontal beds of quartzite, runs out east to a small headland called Bunumaarri. The latter is uniformly sloped and decked with trees with the exception of the eastern face, which is broken vertically. From abreast of this point, Mount King (Melarrilerring) bore south, and Mount Grey a degree or two east of south, the nearer irregularly conical, the farther flatly domed. To the north the open arm of Port George IV., passed toward Brunswick Bay; the wide expanse of the Indian Ocean lay beyond. Two islands of unusual appearance stood in the opening. Entrance Island (Marra) is a long comparatively flat-topped ridge, with a dome-shaped elevation in its centre. Hummock Island (Warmini Kolemine) is, as its name implies hilly, but its shape is decidedly quaint and irregular. South-east of it lies a point on the mainland, known as Wiarra, which consists of a small conoid head, backed by bold quartzite escarpments. The surrounding slopes are sparsely wooded. We turned into the south-eastern inlet or Port George IV. proper.* Whilst crossing the open arm, we had caught a fresh breeze off the sea, but Wiarra Point soon cut that off, and we lay motionless in the inlet's mouth. The atmosphere was thick, and the glare from some heavy white cumulus above was dazzling to the eye.

Looking back across the arm, the quartzite beds were seen along the front of a well-defined range of table-topped hills, with here and there an outcrop of igneous rock along the foot. Square Hill, the most conspicuous landmark on Augustus Island, is known as Warrangu.

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* The main arm east of Augustus Island with its several inlets was named Port George IV. by Capt. P. P. King, R.N., (Survey Coast of Australia, London, 1827, Vol. II., p. 74.

The southern border of the inlet consists of a steep range of pale red quartzite, at the base of which a brownish-black igneous rock occurs at different levels. The range is thinly timbered. The northern shore is loftier. There the range is scarped, some distance from the top, and has a talus. The crest is lightly, the basal slopes densely overgrown with wood. Igneous rock occurs above high water mark, practically throughout the whole length. At one point, about half way along, a creek breaks through the range; the escarpment right above it is called Mandilangu.

Late in the afternoon a fresh breeze blew from ahead, and we made fair progress by tacking. At the far end of the port, we espied the small white-washed roof of a human habitation. This was a mission station. How lonely it seemed among the barren waste of quartzite hills. We directed our course towards it. Near the head of the inlet, on the left, two spurs of blackish-brown igneous rock run to sea in a south-westerly direction. The surface is covered with large water-worn blocks and tors, among which the fresh green of trees and grass relieved the general sameness of the landscape. The spurs were connected by a low ridge; in the foreground lay a slimy looking mud beach. South of the spurs, a small mangrove creek, called Molnangin, passed east, at the end of which the mission house could be seen. North of the same spurs, another salt-water arm, known as Kanilbu, wended its way inland, immediately below Wannongundu, the south-eastern extremity of the quartzite front of the north shore.

We had advanced as far as practicable. The tide had ebbed, and the cutter's nose lay buried in the mud. In haste I ordered Ikey and Jim Crow to row Mr. Sanders and myself to the muddy beach on our port, whence we waded knee-deep toward the firmer ground. When we reached it, a naked "blackfellow" emerged from the cover of the mangroves, and joined us without altering the expression of his face or uttering a word. Whatever we said he would endeavour to repeat. We ascertained that his name was Jabu. He was quite a youth, and appeared to be alone. He had knock-knees and flat-feet, an extraordinary condition among the aborigines. A few thin scars decorated his chest, abdomen, and limbs, but his teeth were intact and perfect. He carried a

light reed spear. Having sent the dinghy back immediately, I intimated to Jabu that we wished to walk to the Mission Station, and that we wanted him to lead the way. To that he gladly consented, and made for the mangroves. We followed. Soon we were lost in a tangled maze of roots, ducking, dodging, and jumping, as we pursued our nimble guide. When at last we reached the stony ground, we were covered from head to foot with green slime and mud. Jabu was now very friendly and talked all the while. We were fortunate to have found him, for he led us along a native footpath, which made our march between and over the rocks considerably easier than it would otherwise have been. One and a half miles brought us to the end of the mangrove inlet just as night was falling. The Mission House stood in front of us. It was a tiny galvanised iron structure built on piles some ten feet above the ground. A blood-thirsty hound was tearing savagely at his chain to fly at us. But there was not a sign of the occupants anywhere. We wondered at this, because we had from a distance noticed a number of persons moving about. The only access to the domicile was by means of a ladder. We walked to it and cast a glance at the door above. A chill ran through our blood. The barrel of a gun was projecting from a loophole, and it pointed straight at us. "Stop! Who are you? What do you want?" It is a mighty queer sensation to be thus interrogated by an unknown person at the point of a firearm. The voice was firm and deep, but in spite of its good disguise we recognised the female behind it. I introduced myself and Mr. Sanders. Then we heard that a heavy bar was being removed, and presently the door flew open. Standing in the doorway was a little party, consisting of two white women, a child, and several gins. "Pleased to meet you," said Mrs. Wilson, as she climbed down the ladder, "we heard some time ago that you were coming. You must excuse the unfriendly reception we gave you, but our husbands are away, and one has to be so careful these times; you might have been pirates. This is Mrs. Paton, and this my little boy." Soon we were sitting at the missionaries' table, telling the ladies all the more recent happenings of the outside world. News are received here just whenever the Mission cutter is dispatched to Broome, which is not very often. One must respect these people who spend the

better part of their lives in exile, attending to the needs and training of the aborigines. Mrs. Wilson was an experienced missionary of the resolute type; Mrs. Paton, a young wife, but still a mere girl, who had lived her girlhood in the environment of the gaiety of Melbourne. The husbands were camped in the bush, some nine miles off, engaged in the erection of new headquarters. Mrs. Wilson was kind enough to send a native messenger to the men requesting them to return with the next tide, which would be somewhere about midnight. The bribe must have been a good one, for the aboriginal undertook to deliver the errand, in spite of the dark, and chanced the evil spirits. We slept that night at the Mission House.

SATURDAY, MAY 20th.

We were awakened at dawn by the rattle of an anchor chain, and the buzz of voices. Mr. Wilson and party had arrived. When we met, he extended to us the same hearty welcome, both individually and on behalf of the Presbyterian Board of Missions, as his wife had previously done. Both Mr. Wilson and his assistant, Mr. Paton, son of the famous doctor-missionary, rendered me valuable aid in my researches.

In the daylight we examined the place more closely. The quaint little house stood upon an alluvial patch, not many acres in extent, which, except on the side facing the port, was enclosed by high ranges of quartzite. Eucalypts and corkscrew palms (Pandanus) were the principal representatives of the vegetable kingdom upon it. On the northern side, a small area had been cleared for a kitchen garden. Water was supplied by a spring which flows on the other side of the house, i.e., practically adjacent to the extreme end of the tidal inlet (Molnangin). Apart from the boisterous watch dog, there were a herd of goats and some fowls running on the premises. The missionaries had cleared a passage through the mangroves, which allowed their boat to anchor at high water, within a stone's throw of the house. The baking of the little settlement is done in an oven made out of ant hill clay, a very effective material.

A fair number of natives had come along with the "white fellows", mostly men. They called themselves

the Worora. Never before have I seen such an elaborate system of cosmetic scars as decorated the bodies of these people. Practically the whole of the body was covered with the marks; they were horizontal upon chest, abdomen, thighs, buttocks, upper arms, and middle of back, and vertical over the shoulder blades, and deltoid muscles, also upon the small of the back and calves. A few vertical ridges were further interspersed between the horizontal upon the outer surfaces of the thighs. Circumcision and subincision are practised, but no teeth are removed during the initiation ceremonies. The people walked about naked, the only pretence at dress being a firmly plaited hair belt, with or without a small pearl shell appendage over the pubes. The principal weapons in use are the reed spear, ("djinnalye"), with a long mangrove point and stone head, the spear-thrower ("yungulcha"), and the throwing stick. A type of water carrier was found, which, so far as I am aware, is new to Australian ethnography. It consists of a cylindrical bucket ("wirrauwa"), made of paper bark, the joints of which are stitched with strips of vine and sealed with gum. The vessel is carried by a fur-string handle. The boomerang is quite unknown. I examined the men in turn and found a number of interesting medical cases, all of which were photographed. Among them was a shocking example of *framboesia* in which the greater part of the face was eaten away.

Early in the afternoon I walked to the top of a quartzite hill, accompanied by a wily fellow named Goodamen, to examine a cave. On our way we encountered an old man who was stone blind. It was astonishing how the old chap could find his way over the rocks and crevices without injury befalling him. Goodamen muttered a few words in passing, to which the other grunted in reply. The cave was a wet weather shelter, and upon its walls were discovered numerous drawings of the hand, a few of the foot, and several large fish designs, all done in pipe clay and red ochre. A small native fig tree helped to protect the shelter from the weather. From the top of the rise, a magnificent view was obtained of Port George IV. and the range, passing northward into High Bluff Point, which separates it from Hanover Bay. This was the Naiungunni country. Vide Plate XXXII., fig. 1.

FIG. 1 PORT GEORGE IV. MISSION, MAY 20th.

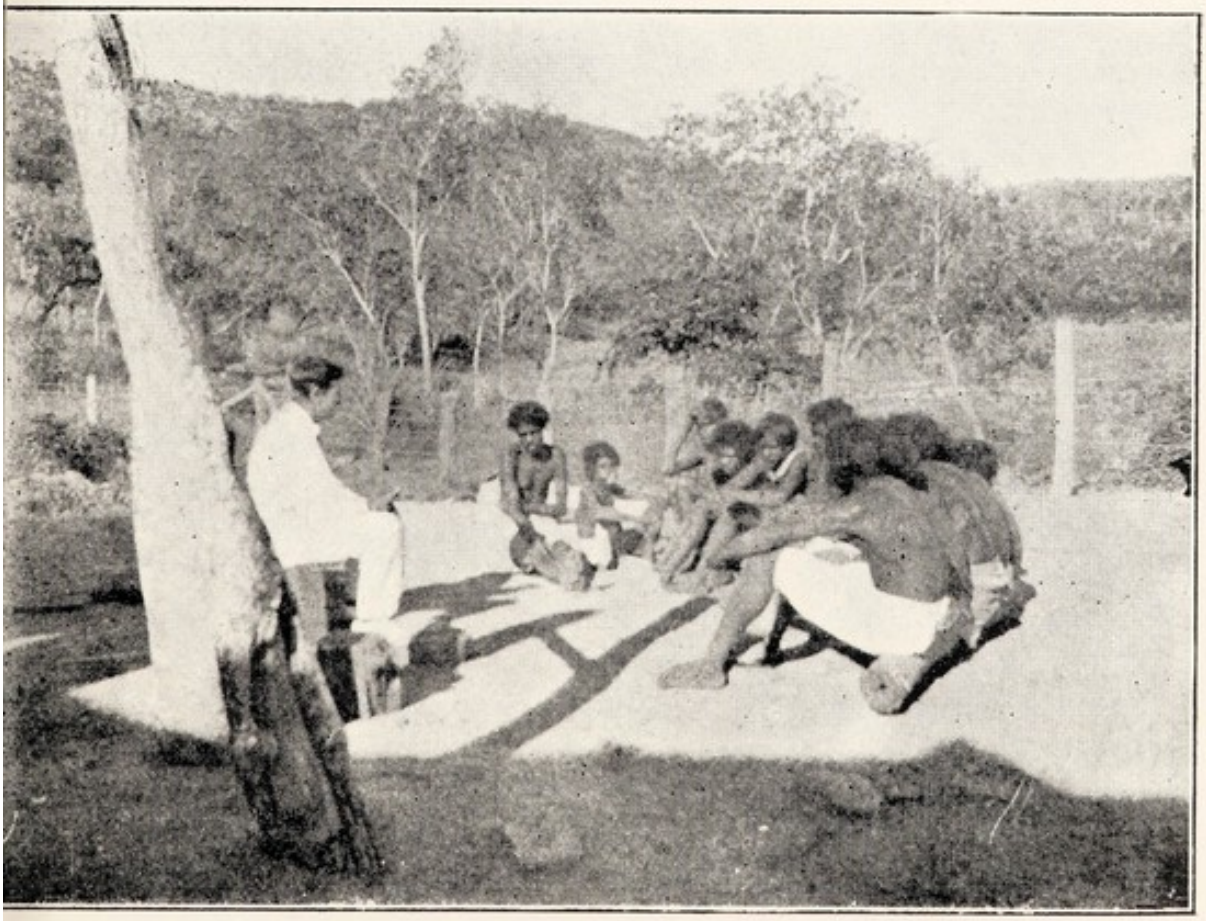


FIG. 2. THE MISSIONARY AND HIS PUPILS, MAY 20th.

When we returned, another group of natives had arrived. A fine collection was made of spears, spear-throwers, fire-making sticks, water-carriers, fur and human hair-belts, ceremonial objects, and implements.

The skipper had in the meantime come ashore, and it was arranged to get under way at 4 p.m., which hour was not far off. He had brought the "Rita" well up the arm, and our "boys" had also landed. They quickly made friends with the "wild fellows", whom they presented with boomerangs and other little things. I sent the dinghy back at once with our collections and belongings. Mr. Wilson then called his pupils together, who sat in a semicircle in front of him and sang to the air of several familiar hymns. The tunes had been creditably learned, but it stood to reason that these raw children of the wilds could with difficulty pronounce the words which to them were meaningless. Vide Plate XXXI., fig. 2.

The boat returned, and we said "good-bye" to our kindly hosts. As we rowed for the cutter, the missionaries called upon the little congregation to give us three cheers. The hearty response did not, however, stop at three, but was continued like a decimal repeater until we were well out of sight. Many of the natives wished to accompany us; we took Goodamen and another youth. Clear of the mangroves, we turned north of west around a point called Alemordu, thence along the south-western shore of the Port to Berrial Bluff. A salt-water creek (Norgo) enters the sea immediately east of Berrial. It was upon the higher reaches of this creek that Mr. Wilson was establishing the new mission. A reef at the mouth, about half a mile from the Bluff is named Jelorl. We anchored for the night off Berrial. The boys were in high glee, and spent the better part of the night in corrobboree and song. The strangers could not speak more than a word or two of English, and with the exception of Jim Crow, none of our boys could understand any of their language. However, with the aid of a little pidgin English and Jim Crow's interpretation they could make themselves understood. And many a yarn was spun which brought forth roars of laughter. When bed time came along, Ikey volunteered to keep an eye open over night, and to protect us, "Suppose him bad fella."

SUNDAY, MAY 21st.

By daylight we were preparing for an inland excursion. We had ascertained from our new friends that there was a big camping ground of the aborigines, somewhere near the top of Berrial Bluff. This was to be our destination. Taking the cameras and firearms, I instructed Ikey and Alec to row Mr. Sanders, the guides, and myself ashore. Leaving Alec in charge of the boat, the rest of our little party marched towards the thicket surrounding the Bluff. Trees, tall grass, and bush hid the outside world from us as we followed the trail of the active Goodamen. The obstruction was not the grass and bush so much as the boulders of rock they concealed. The bare-footed native seemed instinctively to feel the stability of the ground as he leaped like an antelope from one rock to another. The clumsy white man, with his heavily nailed boots, had to balance himself upon one and feel for the next before he undertook the step—and then it was uncertain. The exclusion of the sea-breeze from our systems soon told on us, and we began to perspire to excess. Mr. Sanders felt the effects so badly that I told him to remain behind at a small billabong, called Angalo, which we had reached. Leaving him to rest in the shade of a spreading tree, with a firearm for protection, I pushed on. Compared with what lay in store for us, our march till then appeared like child's play. The ground became more sloping, the boulders larger, and the flexible shoots of the creeping plants more crowded. To advance meant to crawl, and to slide, and to jump. Several times I felt like abandoning my objective, but, after a momentary pause, I continued. At last we reached the end of the quartzite slope, and before us stood a vertical wall of diabase. The camping ground lay above it! The only way to reach it was by climbing up a flight of steps or holes which had been cut into the rock by the aborigines. I looked searchingly at the obstacle, meditating whether an attempt to scale it would be worth the risk. I was fagged beyond description. My heart was thumping against the ribs as if to stop me from attempting more, and my lungs were panting for the want of fresh air. In this dilemma my eye met that of Goodeman, who was waiting half way up the wall. He was earnestly studying my countenance and, I could see, his

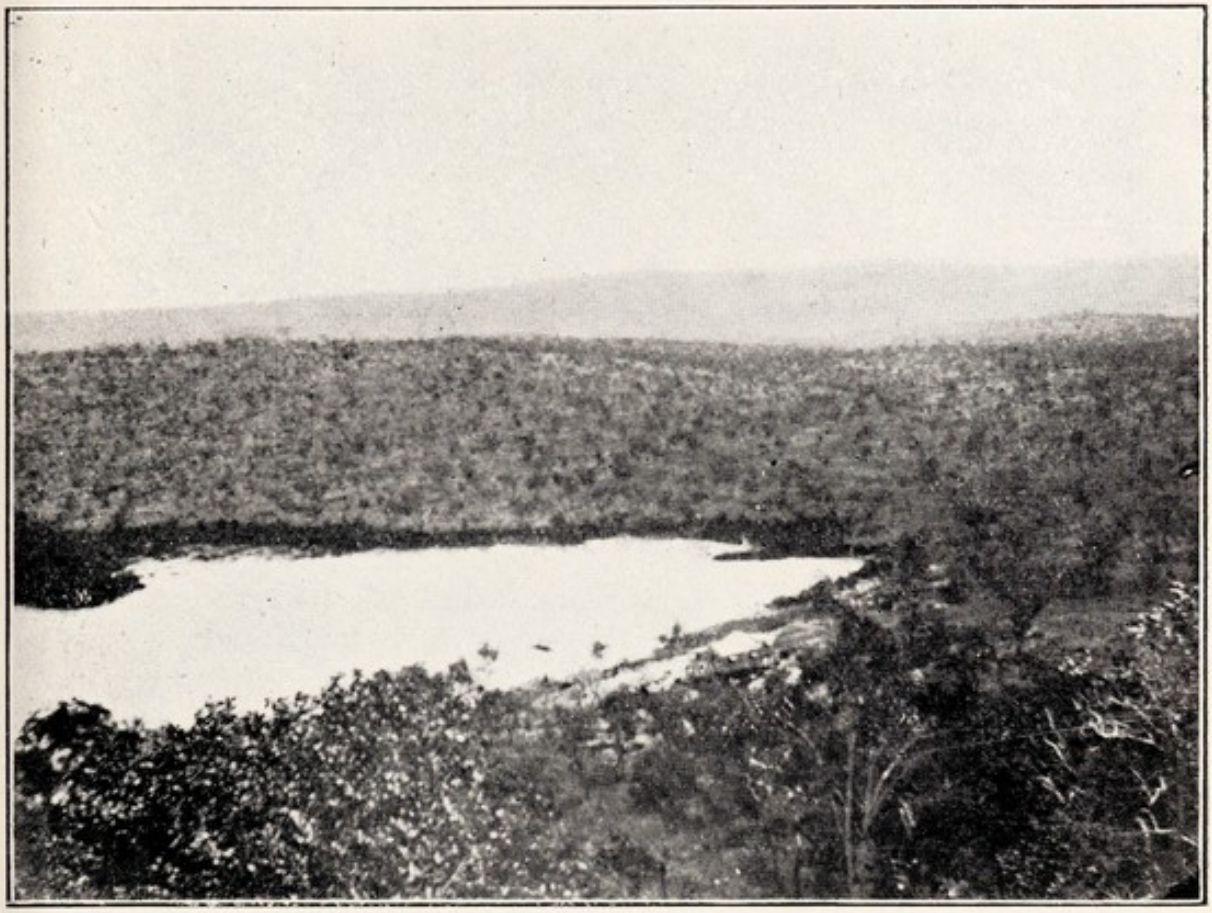


FIG. 1. THE HEAD OF PORT GEORGE IV. MAY 20th.
Note Mission Station on shore in foreground.

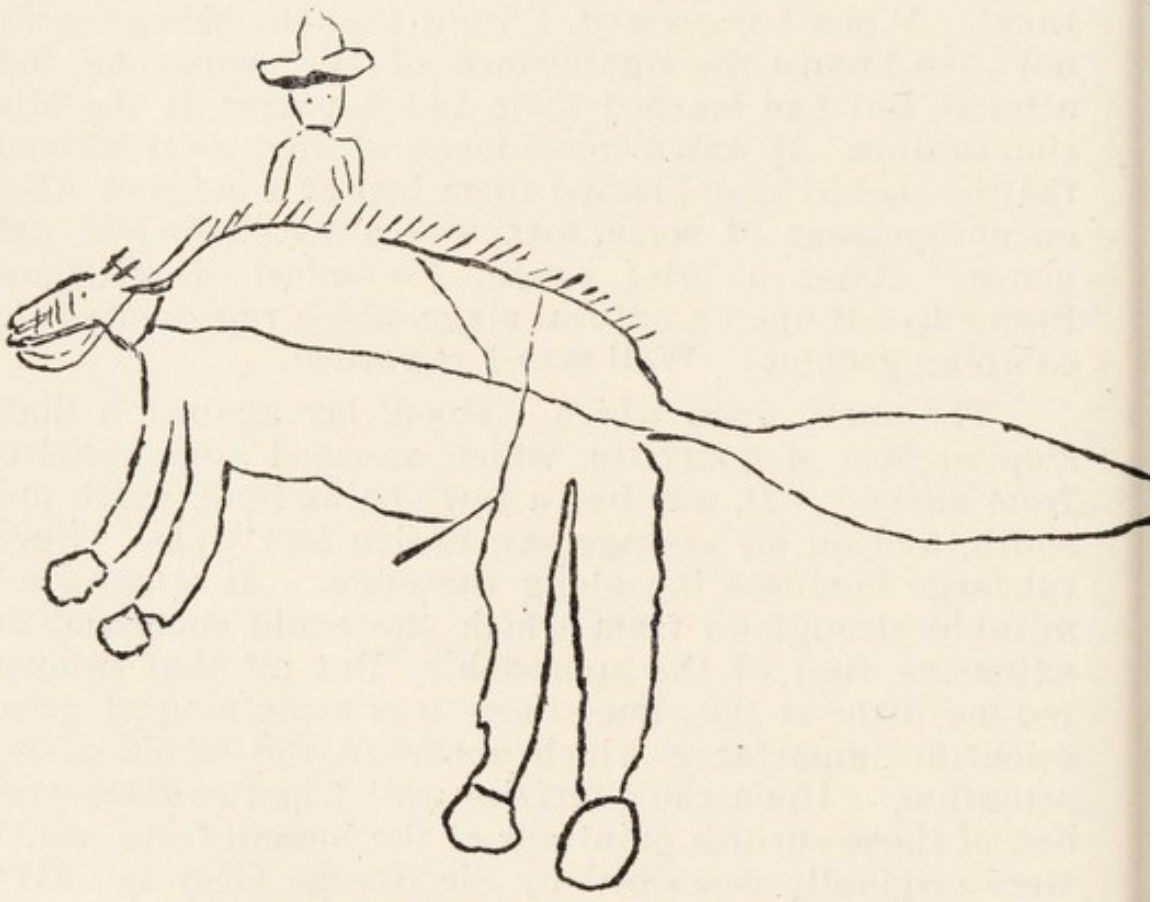
FIG. 2 ABORIGINAL CAVE DRAWING OF HUMAN FIGURE, BERRIAL BLUFF, MAY 21st.

sympathies were with me. Until that time this savage had been mute, but now he chuckled and said to me: "All for the blood of Jesus!" Had a thunderbolt crashed in front of me, I could scarcely have received a greater shock. Goodamen, the wild naked man, who could master but a word or two of English, had spoken thus! When I recovered, I knew that the savage could not have known the significance of the words he had uttered, but had learned them like a parrot at the Mission Station. It was a coincidence, strange as it seemed, that he should have blurted them just at a moment when encouragement of some sort was a psychological exigence. After a brief pause, I climbed the wall and found myself upon a natural stage which represented the camping ground. Well was I rewarded.

The shelf, upon which I stood, lay against a high, sloping face of quartzite, which afforded ample shelter from above. It was but a few chains long, north and south, and on an average say twelve feet wide. Several large boulders lay along the edge. It was an admirable stronghold from which one could command an extensive view of the approach. But all that interested me little at the time; there was something of great scientific importance which absorbed the whole of my attention. Upon the quartzite wall I had re-discovered one of those curious paintings of the human form, which were originally described by Sir George Grey in 1841*, but have subsequently been submitted to much criticism by sceptical scientists. The figure was nine feet long, and was lying full length at repose. Vide Plates XXXII. et XXXIII. I was forcibly reminded of a Buddha in a Ceylonese temple. The colours used were red, brown, black, and white. The figure appeared to be clothed in a long, shaded garment, resembling a priestly gown, from which only the head, shoulders, hands, and feet protruded. The face, whose features were represented by the eyes and nose, was surrounded by a peculiar concentric band, through which, and from which, lines radiated outwards like the hair of a Struvelpeter. The whole effect might have passed for the halo of a Saint. The picture was, in every detail, a fac-simile of the type so carefully described and

* Journals Two Expeditions of Discovery, North-West and Western Australia, 1837-1839, London 1841.

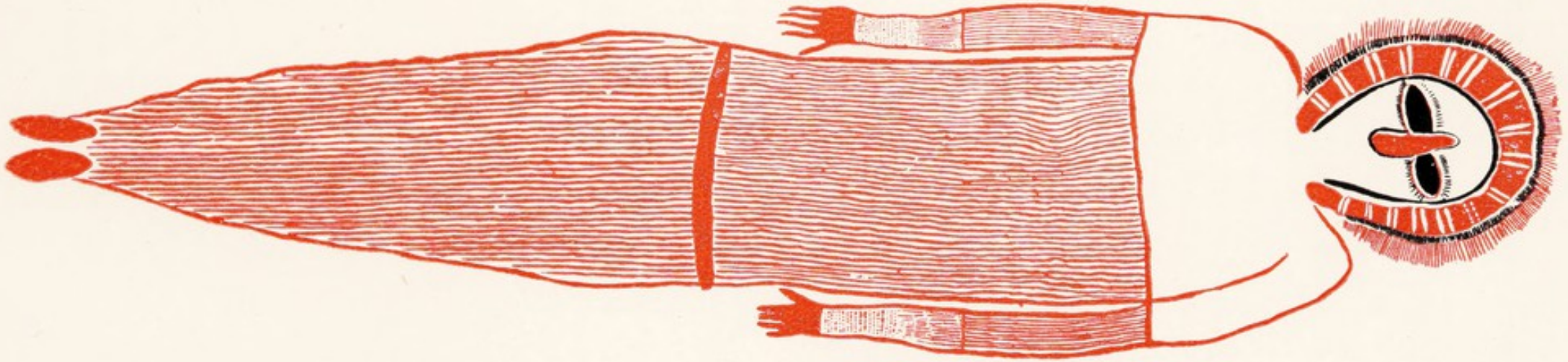
illustrated by Sir George Grey. Since its creation, another artist had exercised his talents by scribbling over the top of it, with charcoal, a sketch which was intended to depict an animal, presumably a horse, with a human being, a white-fellow, mounted upon it.



Aboriginal Charcoal Drawing of Whitefellow on Horse, Berrial Bluff.

On other parts of the wall, there were several similar, though less imposing, designs (ongurri) of the human figure, as well as those of fish, yams, hands, and animal tracks. Near the southern end of the wall was a vault which contained the skeleton, without the skull, of a dead adult male (emandje). The bones were wrapped in a paper bark parcel, and had been laid upon a ledge which was protected from above by an overhanging rock, and from outside by drooping branches of a tree. Upon the wall immediately beneath the bones were the imprints of two left hands, and, not far from the floor, the picture of a fish drawn in red and white.

The surface of the camping ground was to a great extent covered with sheets of paper-bark (angamma), upon which the natives had rested. The leavings of their



ABORIGINAL CAVE-DRAWING OF HUMAN FIGURE, BERRIAL BLUFF. MAY 21st.

meals were scattered about the place—shell fish and kangaroo bones. The place so interested me that I spent the whole morning there, tracing, sketching, and photographing the paintings. The three boys rendered valuable assistance by holding the sheets against the rock as I traced the designs.

Work completed, we retraced our steps down the hill. A halt was necessary at Angalo Billabong to make good the loss of moisture our systems had suffered through the continued exertions. The tracks in the ground informed my swarthy companions that Alec had been there, and had, with Mr. Sanders, returned to the boat. We followed, and eventually reached the shore. Our friends were collecting oysters, coral, and shells on the rocks bared at low water. Among other things, Alec found a large living specimen of *Fusus pricei*. As I was not quite certain where our next place of landing would be, I thought it best not to take the local boys further along. I allowed them to come on board that we could give them a few useful things to take back; then they were sent ashore with, I am sure, a disappointed heart.

We weighed immediately, and stood away to the west with a favourable tide and a fair breeze. Marlemma Strait was navigated without mishap, and we soon found ourselves in Brecknock Harbour. South lay Mount Lookover or Koloarre, a bold hill of igneous rock at the head of the bay. There is a great contrast between its round contour and the square tabular appearance of the quartzite which extends toward Battery Point. A dark brownish-black, or even blue-black, igneous rock was noted along the base of the entire escarpment, including Ngallingalli Bluff. It extends to from one-half to two-thirds the whole height of the cliffs. The bedding planes of the quartzite are practically horizontal.

A huge conflagration was raging in the south, from which an enormous column of smoke was rising high into the sky. I noticed to-day, as I had on previous occasions also, that, when the vortex had reached a certain altitude, a small white cloud would start to form at the point, and gradually develope into a big white cumulus. This formation re-dissolved and re-formed twice during the afternoon.

From a point in the centre of the South Entrance between New Island and Battery Point, about one mile east from the latter, Berrial Bluff bore E. 14° N.; the prominent table top extends round the back of Camden Harbour to E. 3° N. Ngallingalli Point lies due south of some small islands off New Island. At this point the igneous rock occupies about one-half the height of the section, but it disappears rapidly from view in a westerly direction. The quartzite beds touch water level only at one place east of Ngallingalli, that is in the second little bay. No igneous rock was noticed here. At the same spot, clumps of Pandanus on the north shore, a quarter mile inland, may indicate the presence of fresh water. Battery Point is composed of quartzite alone. It is of lesser altitude, having only one or two local elevations, in the cliff faces of which a very shallow synclinal folding was discernible. The point is connected with Ngallingalli by a rough stony slope, scantily decked with timber and "spinifex." A low cliff table stands but a foot or two above high water mark, and carries a few cubical blocks of quartzite, which owe their origin to an ancient system of jointing. A singular red pinnacle or needle of sandstone was noted, not far from the shore, which rested in a vertical position upon a low pedestal of similar rock; it is known as Mambungan.

The quartzite of New Island dips west, and has a uniform slope to the sea on that side. The rocks south of it appeared like the ruins of an ancient edifice in the shadows of the setting sun. The island to the north-west is low and thickly covered with bush of a dull green colour; a local bulge in the beds on the west terminates in a sea scarp. Square Hill (Warrangu), on Augustus Island is a prominent table-top of quartzite. From Battery Point toward Slate Island, the shore is skirted by undulating, wooded ridges, with here and there a very low escarpment above high water.

We directed our course more south to Slate Island, and anchored a couple of miles off it, opposite a small sandy beach which lay between two low rocky heads. A heavy swell rocked us through the night, and little sleep we had.

MONDAY, MAY 22nd.

At 2 a.m., as I lay awake on my stretcher, I felt the tide slackening. Then came a fresh breeze from the north-west. The opportunity seemed too good to miss, so I aroused the skipper. He, after sniffing the air and taking a general stock of the elements, declared himself to be in concord. The boys were summoned, and we made off. But the hopes of a good morn's run soon vanished, for, after ten miles had been recorded, the wind died away. The cutter lay on the water, idly flapping her empty canvas as the swell rolled by. Point Hall (Languru), bore S.E. We tried to steer west, to clear the reefs which lay south-west. But the tide swept us south, and dangerously close to the Cockell Bank (Tirriwuland'). Then a N.W.W. breeze sprang up, and we tacked between the latter Bank and Montgomery Island, a low and grove-fringed flat named Yauiyago. Practically no headway was made, and for the remainder of the day we sailed apparently away from the land, but we could not lose sight of Hall Point. At 3 p.m. the temperature of both the atmosphere and of the sea registered 29½° Centigrade. Raft Point was picked up with the spy glasses in the S.E., and the Mollogul Group of Islands lay slightly west of south; towards sun down, Kollan Island loomed in the distant south-west. We were much concerned about the coral ledge, shown on the Admiralty Charts to extend north in longitude 124° 5′. The skipper kept a boy constantly in the mast-head, not too enviable a duty considering the very heavy swell we were contending with. We diligently searched the water with our glasses, but not a sign of the reef could be detected. The skipper became excited, and eventually climbed aloft himself. But all in vain. When the daylight had faded we were obliged to cast anchor, in 7½ fathoms, in an unprotected place, which could have meant naught but disaster, had the north-westerly freshened overnight.

TUESDAY, MAY 23rd.

With the full tide, at 3 a.m., we lifted the anchor and crept slowly westward. At daylight I was able to take a few angles to fix our position. The eastern extremity of the Mollogul Islands bore south, the red bluff of Nawun S. 14½° W., and the low Karaien group S. 22°

W. and S 26° W., respectively. Now we discerned a far extending reef which ran west from Montgomery Island for some considerable distance beyond a line drawn north of Mollogul Island. This reef, which is named Karalanbolan, is no doubt the one referred to on the Admiralty Charts. The surf was breaking heavily upon it, and the roar of the foam-crowned waters could be heard for many miles out. Flocks of sea birds were stalking about the muddy surface in search of food, and, when we passed them, screeched aloud to warn the less alert of approaching danger. When the sun rose, the sea glowed like liquid gold. As we stood opposite Karaien Islands, steep escarpments of quartzite were noticed along the northern edge; and off it lay a gull rock which had the shape of an archway. The southern edge is also scarped, but lower, with several sandy beaches in the foreground. The islands are covered with bush and grass, but timber is scarce. When opposite the western edge of Karalanbolan Reef, Cockell Bank bore N. 24° E. And when Mollogul and Karaien were in line, the bearing over the top of the two was S. 40° E. Karenembolye is a low quartzite island, with rocky cliff faces on the west, north-west, and north. It is covered with tussocks and grass. No timber, but several large red ant hills were seen upon the surface. From the extreme eastern end of this isle, Maiye bears S. 3½° W. The second member of the Karenembolye Group lies about one mile S. 24° E., and consists entirely of rock. The name of this island is Belluerdelle.

From a point one mile north of Karenembolye, the following bearings were taken:—The eastern end of the lastnamed island, when it is also in line with the eastern point of Belluerdelle, S. 24° E., the northernmost point of Kollan Island W. 12° S., Laipallalel Island, when it is also in line with the eastern end of Karenembolye, S. 12° E., Karaien Islands E. 24° N., Nawun E. 2° S., Kongunn E. 6° S., the north point of Mellarulle E. 13° S., the pass between Melarulle and Mollogull E. 42½° S. When Nawun lies in a straight line with the southern edge of both Karenembolye and Belluerdelle, the reading of the dial is E. 8° N.

Tchongunnu and Malgneri Islands both present bare, steep slopes, coincident with the bedding planes,

dipping to the water's edge on the north. The north-eastern point of Kollan Island is known as Keba, the north-western as Mitchillinarri.

We beat towards Keba Point, near which lay a small rocky island (Ulmordo Kanarongola); thence we tacked, north of Kollan Island, against a fresh north-westerly breeze. Night had set in. The camp fire of a party of natives was burning on the beach south of Keba. After a monotonous sail of several hours, we at length reached Yampi Sound and turned south. The northern aspect of Kollan Island was a vertical sea scarp of dark rock. South-west of Mitchillinarri Point lay a small island (Jarrowewa), and another (Ugolgilk) on the opposite side, off Cockatoo Island; between the former and Lordo Pass, a small rocky isle goes by the name of Urunna. We managed in the dark to steer clear of the various dangers in this pass, and kept sailing all night. But to sail in these waters does not necessarily mean to cover any distance when the tide is against one.

WEDNESDAY, MAY 24th.

At dawn we were abreast of Water Point (Kullo). There was not a breath of wind, and we drifted towards Terrilain Island. The south-eastern islets of this group consist of schist, striking W.N.W., and dipping seaward; the main member is of folded quartzite. The latter is jointed S.S.E., and at right angles, and weathers into quadrangular and cubical blocks. With the help of our oarsmen, we managed to keep the boat under control and made north, hugging the shores of the island. Terrilain bears a poor growth of wood, bush, and grass; and its undulating surface is covered with outcrops of quartzite and bands of schist. The north-eastern front consists of bare, tabular cliffs of quartzite, bedded horizontally, and jointed vertically. From this point Kullo bore E. 6° S., Mitchillinarri E. 9° N., Dampier's Monument (Yaulgi), W. 16° N.

When we turned west, a small sandy beach appeared, which was bounded by dip-slopes of the quartzite on either side. At the western end, moreover, beds of schist were noticed which either overlie, or are interbedded with, the quartzite. In the foreground lay a

boulder which had been eaten into by natural agencies in such a way that it apeared as though some person, ship-wrecked or otherwise, had carved the letters ADL into it. The northern face of Terrilain is more or less flat-topped, and has a rocky talus covered with verdure. Another small beach was noted near the north-western point, upon which a few pandanus grew.

The western shore trends S.S.W. The surface of the cliffs is thinly overlain by red lateritic soil. Between the rocky slopes of bluish quartzite a few sandy beaches appeared, the largest of which, behind the north-western point, is known as Metjema. The last-named is bounded on the south and south-east by steep white quartzite escarpments and slopes of rocky debris. A gully communicates with the inland, the sides of which were richly garbed with timber. The entrance to this beach is obstructed by dangerous rocks, which trend W.N.W., and are covered at half tide. Another small beach lies a quarter mile south. Pandanus grow in abundance at the back of it. A native water, called Yerrauwalangarre, is said to exist at this spot. An islet off the south-western corner goes by the name of Dederolurro. Not far from it, the quartzite and schist beds of the cliff section have been thrown into a sharp synclinal, whose south arm is vertical. At the point itself, the quartzite has been broken away for some distance between two steep joint planes. The surface is more thickly timbered here than elsewhere.

Shortly after mid-day a fresh breeze came from the west, and we could steer a course W. 40° S. for a gap between the Hidden Island Group and some rocky isles north of it (Goodigoodinga). As we left Terrilain Island, we could see that the southern shore is less precipitous and more uniformly sloped than the other sides. The Hidden Island Group consists of two entities—a western one, Hidden Island proper or Wagallan, and an eastern one, Bangun, which skirts Whirlpool Pass. Hidden Island is separated from Bangun by a passage, from one-and-a-half to two miles wide, which runs S.E. and N.W. The prominent cone Igai-ing Ngorrigin lies at the south-eastern end. The Goodigoodinga Islets and rocks are peculiarly weathered and sea-beaten; the beds composing them dip south at half a right angle. A sandy beach opposite them, on the north-eastern end

of Bangun Island, known as Nganga Ngangalarre is noted for its sand; the natives maintain one sinks into it, "all same mud." Another long, low island (Kannemunga), lies south-west about five miles from Hidden Island. It is of slight elevation on the western end, but tapers east to little or no height above high-water mark. Between it and the prominent cone lies the Talgo Group.

The wind again deserted us in the afternoon, but, by very careful engineering on part of the native crew, we passed Tiderip Island. Suddenly we were caught in a swirling current, and shooting forward into Sunday Strait, miraculously escaped striking the reef off this group. Thence we drifted throughout the night, hopelessly at the mercy of the treacherous currents, but carefully guarded by the keenness of an aboriginal eye.

THURSDAY, MAY 25th.

When daylight came, we found ourselves near Long Island. Then a south-easterly favoured us, and we sailed across Sunday Strait and anchored in Liering Creek. We landed and walked toward the Sunday Island Mission Station. The country rock along the creek consists of coarsely crystalline quartzite, striking S.E The beds are intruded by dykes of pegmatite, containing crystals of black tourmaline, and of greisen with large cleavage flakes of mica. The foliation planes are much contorted. The quartzite beds run in jointed ledges parallel to the course of the creek. A fringe of mangroves extends to the tidal limit, about one mile inland. As we drew near to the Station, which is about a mile and a quarter from the landing, we were sighted by the dusky inhabitants, and soon a jabbering escort led us to the headquarters.

The natives in the afternoon brought along a rare collection of weapons, implements, and curios for exchange. The articles included painted boomerangs, waddies, bark food-carriers, stone knives, pearl shell ornaments to hang over the forehead and pubes, hair belts, ceremonial objects, large melon- and other reef shells, coral, *et cetera*. Mr. Hadley added some pearl and turtle shell. There were also a few medical cases waiting for treatment. The young girls were indulging in an unusual pastime. Two rows of seven or eight

each were standing a couple of chains apart, and, whilst facing one another, were bombarding their opponents with consolidated cakes of cow dung. The missiles were thrown over-arm with considerable skill, even by the smallest girls, due allowance being made for the curvature in flight. It was part of the game to dodge the flying bodies, and, whenever a hit was recorded, a triumphant cheer would ring from the opposite side. In rushing wildly about the space, the light calico skirts of these playing damsels would fly high in the air, exposing their slender limbs beneath. In their eagerness to hit, and avoid being hit, they repeatedly exclaimed: "Arre minya, arre minya." Some of the more experienced throwers showed their proficiency by using flat slabs of stone in lieu of the cakes of dung. A congregation of old gins sat around proudly watching and applauding the girls in the arena. The names of the performers, which were often applauded, were Mindo, Minowe, Turkai, Mutchu, and Sugari. Vide Plate XXXIV., fig. 1.

Mr. Hadley distributed a number of things out of the Mission store among the women, principally handkerchiefs and useful things to wear. An old gin, Dekabi by name, was very anxious to possess a richly coloured cotton garb which was among the presentation lot. Hadley, not noticing this, handed it to another, whereupon Dekabi protested: "Me wantem dat one." To avoid trouble, the missionary passed her a superior and warmer article, saying: "This one more better long a you, you all time cornbi-cornbi*." She seized it with disgust, flung it at his feet and cried: "That one Government thing no damn good." Then Dekabi gave the would-be benefactor the full length of her aboriginal tongue, and retired with a dignified straightening of the back.

Several gins had a washing day. The method they adopt is to spread the clothes upon the grass, soak and soap it well, and finally rinse it thoroughly with clean water. One of them, Chiwiddie, wanting to make the most of the opportunity, divested herself of everything she wore, washed it, and lay in the grass until the sun had dried it again. I was struck with the friendly and

*Cornbi-cornbi means to cough.

FIG. 1. GIRLS AT PLAY, SUNDAY ISLAND MISSION, MAY 25th.
Note Leichhardt Pines in Background.

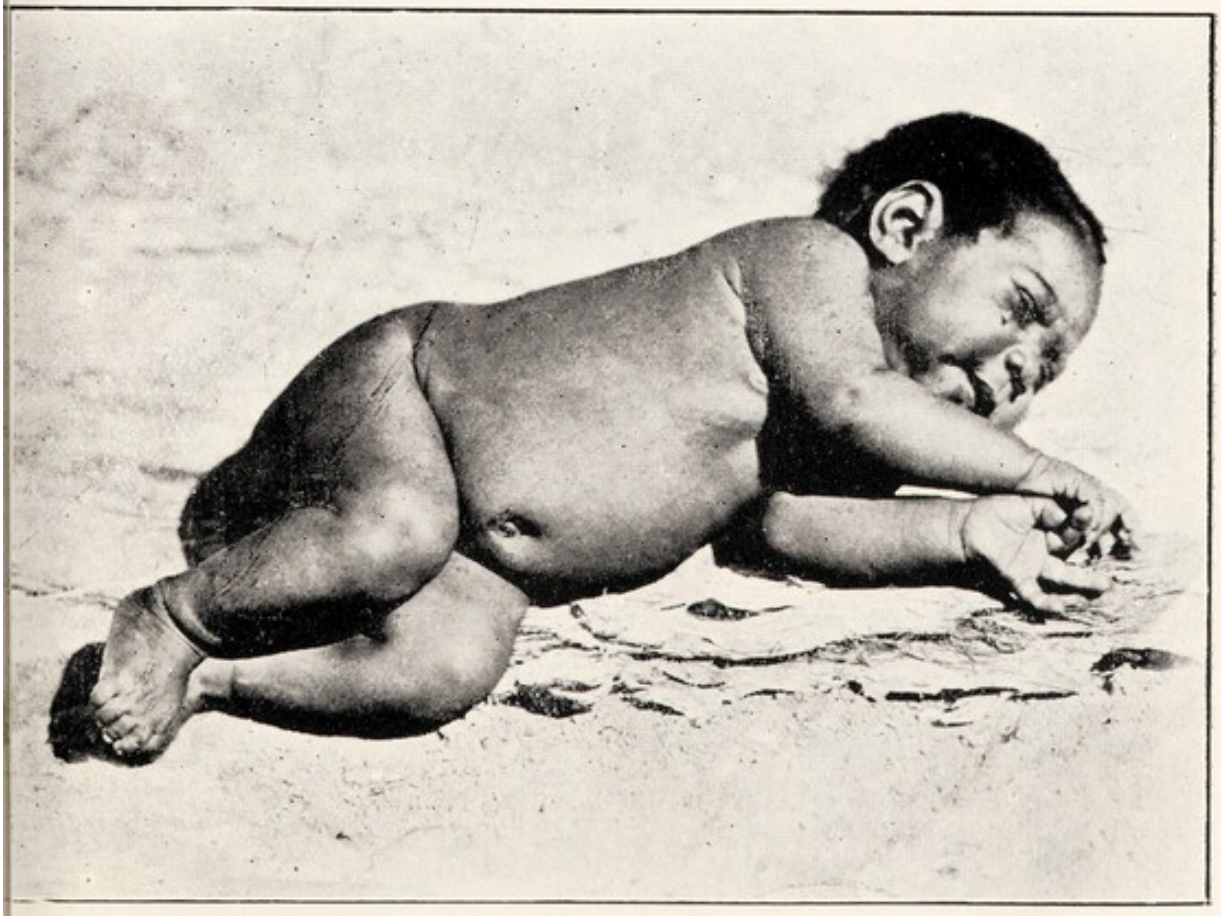


FIG. 2. INFANT OF SUNDAY ISLAND TRIBE SLEEPING UPON STRIPS OF PAPER BARK.

brotherly spirit which prevailed among the members of this tribe. Pullam, a little urchin, wearing the long blue coat of its father, and a red handkerchief tied below its podgy belly, was carrying a canister of water to its mother when it lost the track. It started to cry, and other kiddies rushed up immediately to console it. I often noticed the children walking hand in hand, or with an arm of one around another's neck. Among the little girls or "flappers", one noticed the beginning of affectation, which in the older developes coquetry, and then licentiousness.

A low outcrop of granite, with bluish felspar, was found in the little flat adjoining the Mission Station. The surrounding ridges consist of compacted siliceous quartzite of coarsely crystalline texture. The beds on an average strike N.E., and dip from 30° to 35° N.W. The principal joints run N.W., and E. and W., the angles of dip being 80° S.W., and 45° S., respectively.

A message came to us early in the afternoon that the tide was favourable, and a stiff breeze was blowing. Accompanied by practically the whole of the settlement, we marched back to Liering Creek, and boarded the "Rita." Thence we moved out to Meda Pass and caught the full force of the wind. The cutter lay over on her side and dashed through the water at a great pace. It was necessary to close-reef the main sail. We passed between Long Island (Ungalern), and one immediately north of it, known as Dish, toward Port Usborne. When darkness set in, the tide was opposing us with dreadful velocity. Progress was tedious until, at length, we reached the Port at 8 p.m. A restless night was in store for us. High waves were tossing the little craft into the air, and she in her fall would slap the waters hard with her keel. The blow did not abate until the early morn.

FRIDAY, MAY 26th.

We attempted to get away at daylight, but the wind had been suddenly followed by a calm. Quartzite ridges surrounded us. The northern head of Point Usborne is called Tudori, the southern Tarrowe; a small rocky island in the mouth of the harbour goes by the name of Ngamang Ngamang. Point Usborne itself is known as Manangu, the island near it as Kuruero.

It was a long and tiresome drift across Stokes' Bay; the Kimbolton Ranges and Point Cunningham danced before us the whole of the day. The skipper was restless, and the "boys" anxious to reach Derby. Jim Crow had never been there before, and reiterated with some excitement: "Me go Kanga." Kanga is their name for the mainland. When other measures failed, the lads attempted to coax or charm a breeze by whistling. Alec thought he saw a ripple on the water, and mentioned it to the skipper. "Wind!" echoed he, "there's not enough wind in that to blow a fly from a grid iron." But the lad was right. It came, although the day was spent. We led into King Sound and passed Point Torment at 8.30 p.m. Then all was calm again. At 11 p.m. an outgoing steamboat passed us.

SATURDAY, MAY 27th.

We drifted up King Sound (Medana), with an early tide, and reached the jetty of Derby at 8 a.m. I communicated with Wharfinger Moore, who immediately sent a special truck down to the boat to collect my baggage and gear. In the township we were welcomed by the Medical Magistrate and other friends. Mails were received from, and messages dispatched to, Adelaide and Perth.

SUNDAY, MAY 28th—SATURDAY, JUNE 3rd.

The greater part of this week was spent in packing our collections, for which purpose the Government Goodsheds were placed at our disposal. Official visits were paid, and several short excursions made into the nearer surroundings of Derby. Among the latter was a visit to an experimental garden, where an attempt had been made to grow vegetables and economic tropical plants; but the results did not appear to be particularly promising. Some fine cattle was, however, awaiting shipment for southern ports. Dr. Elliott again had several new cases to show me at the Hospital. The township was livelier than usual, for a number of station hands had arrived from the back blocks who were travelling south to enlist in the King's Army. The farewell festivities reached a climax in the evenings when the hotels were crowded to overflowing with men. Instrumental music and songs would, as

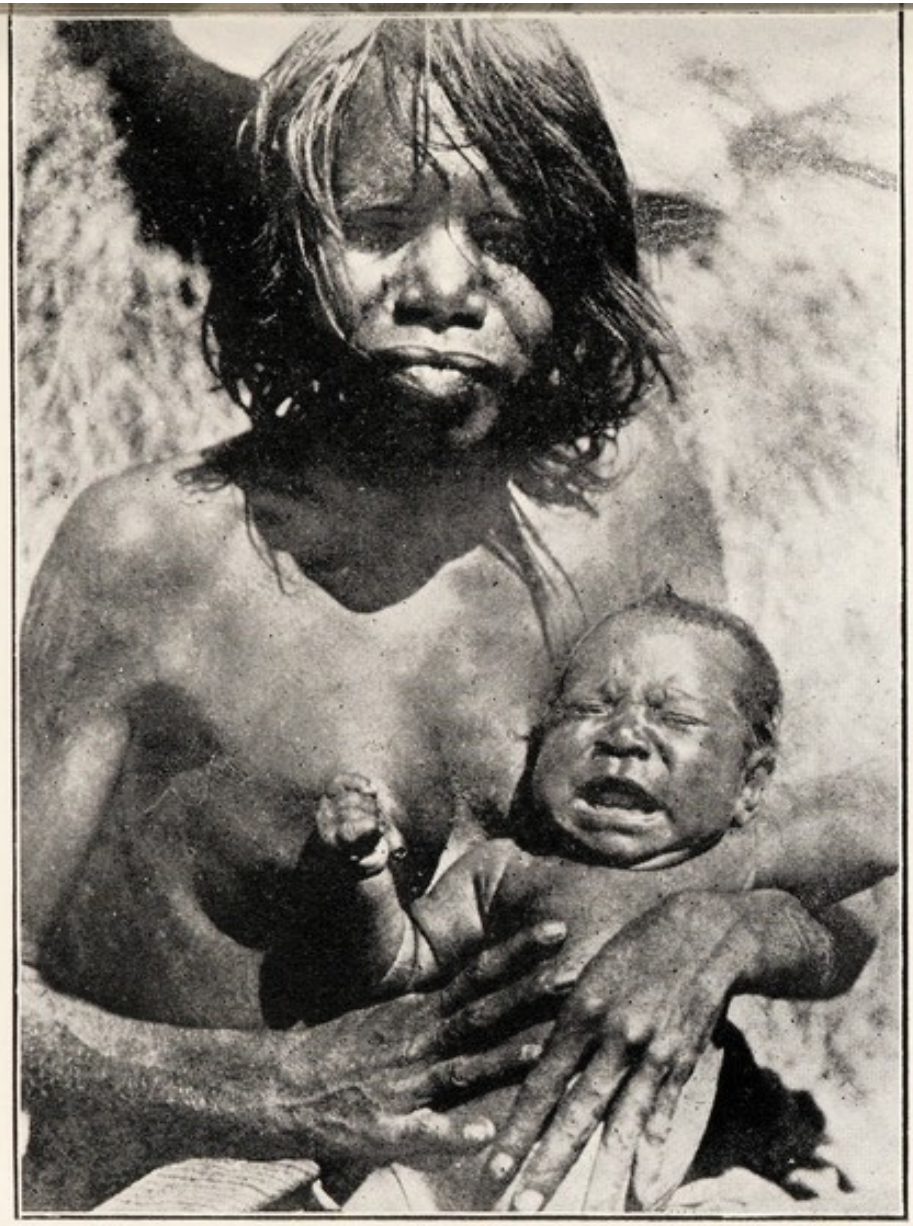


FIG. 1. A MOTHER AND CHILD OF THE SUNDAY ISLAND TRIBE.

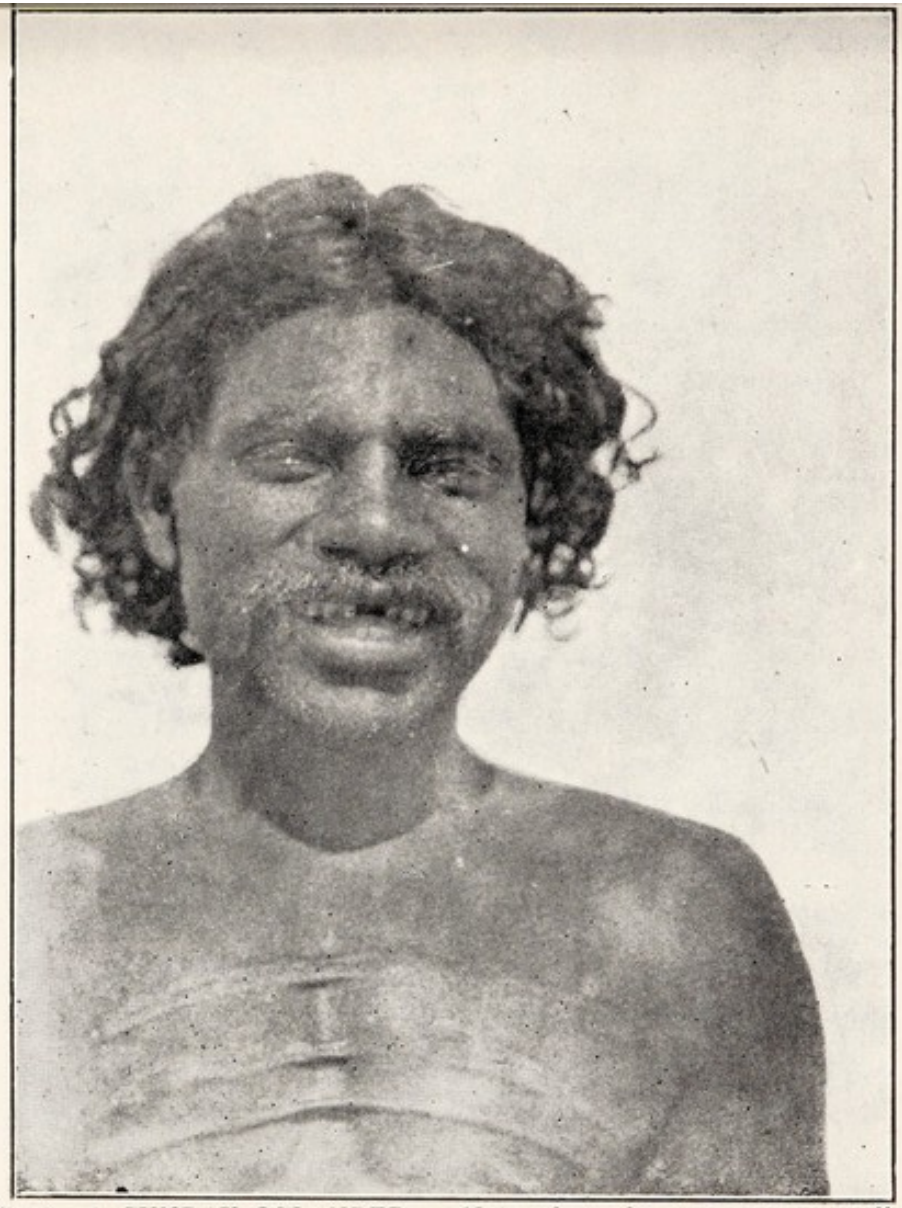


FIG. 2. A SUNDAY ISLANDER. Note that the two upper median incisors have been artificially removed.

the merriment and excitement grew, rise to an intense pitch of vociferation which included imitation corrobborees and war cries of the aborigines. Occasionally a revolver shot might be fired from the balcony, not with intent to harm or kill, but merely to add enchantment to the din. One might have imagined oneself among the cowboys in some far State across the Atlantic. In the thick of the raving crowd was the parson; his favourite seat was on the rail of the wide verandah. He was not beseeching his dear brethren to desist, nor begrudging these hardy lads their harmless revelry. Nay, he was one of "the boys" himself, and smoked and sang with them, setting an earnest and honest standard by example. He did not take intoxicating liquor, but had no compunction in walking to the bar when somebody "shouted all round," and drinking a ginger beer. The people told me that he was a great success, and even the roughest hands respected him.

A goodly number of aborigines were camped near the township, and they, too, celebrated a happy reunion. They came together in the evening on the shores of the great tidal mud flat and danced and sang to the clack of the boomerang. Their laughing faces could be seen in the glare of the never failing fire, and the outlines of the lanky limbs of the dancers lay against it when they skipped across the intervening space. We ascertained from one of the performers that the festivity was in honour of some of their young men who had been working a long way out, but were now on a visit to their old home at Derby, which in their own tongue they called Burrela.

The boabab nuts were sufficiently hardened by this time that they permitted of being carved upon by the natives. Some of the men were very clever at artfully decorating their surfaces with designs of the kangaroo, emu, fish, and other objects. The nuts are eagerly sought after by the local residents who send them as curios to their friends living south or in the mother country. The carving is done with the point of a knife or of a flint chip.

The nights were still as hot as before, and vermin was abundant. Any bright lights attracted myriads of moths, the dead and maimed of which would accumulate

in heaps beneath the flame. The moths, again, enticed many spiders of the tarantula type to leave their hiding places and gorge themselves with an easy catch.

It was apparent that the waterholes which had been filled during the rainy season in the outlying districts were beginning to dry up, for swarms of coloured finches could be seen daily frequenting the troughs and other receptacles containing water in the immediate surroundings of the dwellings. The three principal species concerned were the zebra finch (*Zonaeginthus castanotis*,) the *Poephila acuticauda*, which is locally called the "black-bib" or "black-throat", and the Gouldian grass finch (*Poephila gouldiae*). These birds are trapped by both residents and dealers, and thousands are annually exported to Australian and foreign markets. It is remarkable how quickly the birds accustom themselves to their captivity; after but a few days in the cage the latter two species will alight upon one's hand and pick up seeds from the palm. Several eucalyptus were, moreover, in full bloom, the honey of which attracted screeching flights of the Blue Mountain (*Trichoglossus rubritorquis*). These beautiful creatures, when they settled, would hang clumsily on the drooping flower bunches, greedily licking the juice, as it oozed from the calyx, and warble contentedly.

FROM DERBY TO WYNDHAM.

SUNDAY, JUNE 4th.

Early in the morning it was announced that the smoke of a steamboat had been seen behind the mangrove fringe of King Sound; it was making towards the jetty. This could be that of no other than of the belated "N2". The "Jack" was hoisted on the tall pole of the Goodsheds, and the Assistant Wharfinger climbed on to the roof with a telescope. It was the expected boat! Soon she berthed and we all drove down to meet old friends. Mr. Sanders and I had booked passages for Wyndham, and immediately took possession of our cabin. The boat was to sail that night, but, owing to the poor pressure in the pipes, sufficient water could not be drawn in time, and the departure had to be postponed until the afternoon of the following day.

MONDAY, JUNE 5th.

Captain Saunders and I walked ashore and attended the local court proceedings, presided over by the Resident Megistrate. His Honor invited us to sit upon the bench, beside the Justices, Messrs. Thurkle and McGovern. The latter gentleman was one of the oldest identities in the district. The case dealt with the naturalization of a local Chinese merchant.

At 2 p.m. sharp, the S.S. "N2" left the mooring and steamed (N. 31° W.) up the Sound. Opposite the Fairway Rocks, we turned north, then north of west through Meda Pass. When north of the Cape Leveque Light, a northern course was followed into the darkness, until the Adele Island Reefs lay well to the south east.

TUESDAY, JUNE 6th to WEDNESDAY, JUNE 7th.

At sea we kept north-easterly to clear the maze of isles and reefs which skirt the coast, turning east, above the Holothuria Banks, between Penguin Shoal and Warn Rock. Captain Saunders told me that natives are often seen on rafts in this neighbourhood. When the latter rock was cleared, we steered south-easterly to abreast of Lesuer Island, thence hugged the shore to Cambridge Gulf. The country throughout the course consisted of more or less flat-topped ridges and tablelands of sandstone and quartzite, with, here and there, more conspicuous landmarks like Mount Casuarina, which I am told can be "picked up" from a long way out to sea. Schist and dark coloured dykes of igneous rock were also noted.

THURSDAY, JUNE 8th.

At daybreak Lacrosse Island* lay on our port. Its beaches are visited by very numerous turtles, which leave the water to deposit their eggs in the sand. It might have been on that account that De Rougemont selected this region as the playground of his anecdotes. We steamed down the Gulf west of Adolphus Island. The Captain called me on to the bridge deck to witness the navigation of the narrow passage, west of Fairfax Island; precipitous cliffs of quartzite lay on either side. Then, just as the vessel was about to enter, an accident occurred, which, but for the presence of mind displayed by the Captain, might

* Named by the French Navigator Baudin.

have ended disastrously. The steering gear again refused to respond to the wheel. To have drifted into the narrow channel with the strong tide would have meant a certain wreck. But we had in the meantime gone so close to the entrance that a diversion of the unwieldly vessel's course with the use of her propellors alone seemed impossible. Without a moment's hesitation, the Captain chose to attempt it. The signals flew down to the engine room, "hard" on her starboard, and "stop" on her port. The next few moments would decide. Her nose began to swing to the east, apparently to crash into the quartzite wall ahead. A sensation was imminent on the lower decks. She cleared the rocks by a hair's breadth, a second's indecision on part of the master would have sealed our fate. The lever sent further orders to the engineers, who, by faithfully responding, helped to counteract the swinging of her stern. We took the wider, eastern passage and used the engines to keep her straight until the damage was repaired. View Hill, the original landing place of the pioneers, lay right in front in the east; far and near were a number of tables and hills shaped like haystacks. Then the Gulf drew in to what is now known as the West Arm, and many banks obstructed the way of the muddy current. At least three big rivers, the Forrest, the Pentecost, and the King, discharge their waters into this inlet, which might account for the excessive turbidity. Steam was reduced to a minimum. We sighted the Bastion Range, and later the white-washed roofs of the few galvanised iron buildings, which constitute the township of Wyndham. "This hole is the last place God made on earth," said an officer to me as he rushed abaft to see that the boat was correctly moored. The little settlement lay at the very foot of the barren wall of the tabletops, upon a narrow strip of ground against the mud banks of the Gulf. It was agony almost to look upon the place from the boat; dancing waves of heated air and mirage effects everywhere met the inquisitive gaze. Not a garden nor a decent tree to rest the eye upon. The country seemed fagged, and so were the people that stood on the pier. Life in the tropics is trying under the best of conditions, but to exist here, cut off from the air by the heated slopes of rock, in an atmosphere of nauseating vapours, which are daily evolved by the broiling mud, must at times be nigh on intolerable. A general gloom over-

shadowed the scene. We noticed, too, that flags were flying half mast, and, when the agent came on board, we heard of Lord Kitchener's tragic end.

As is usual at these out-of-the-way little ports, practically all the inhabitants came to meet the boat. The Rev. E. R. Gribble, with whom we had arranged to proceed to the Forrest River, was among them. We landed and, after visiting the Post Office, paid our respects to the Resident Medical Magistrate (Dr. Stevens.)

At about 4 o'clock in the afternoon, we walked to the jetty with the Rev. Gribble, where a dinghy was awaiting us. An aboriginal crew of three rowed us to the Forrest River Mission Motor Boat, which was lying at anchor a few chains out. The engine was soon going and once again we were on the move. The little boat raced along with the tide, and before nightfall entered the Forrest River. We anchored for the night in the sheltered water of its mouth.

FRIDAY, JUNE 9th.

Just before dawn we were awakened by a faint but long-drawn booming sound, which at first we could not explain, but when it was repeated soon after, recognised as the farewell whistle of the s.s. "N. 2." As the crow flies, we were at least thirteen miles distant. When the coming of day illumined the scene, the mudbanks of the Forrest, crowned with mangroves, lay on either side; upstream a tableland rose in the distance through which the river had cut its way. The Forrest is known tribally as Marara or Monungu, Cambridge Gulf as Gulanji. We made an early start. The tide was low but flooding. Barely a mile had been covered when one of the boys came up to me and whispered "Alligator," whilst he pointed to an object upon the south-shore in the distance. I asked Mr. Gribble to stop the engine and allow us to drift up to the creature, thinking I might be able to get a shot. When we drew nearer, we could see a crocodile (*Crocodilus porosus*) which had come on to the muddy shore to play in the warmth of the morning sun. Its dimensions were huge, and on that account the antics it was cutting seemed the more ridiculous. The reptile raised its body clear of the ground and wagged its brawny tail, at times curling it upwards. Then it would circle round with a poky trot and scratch large

chunks of the mud into the air; and we heard a hoarse wheezy blast coming from its lungs. We were all watching the game with intense interest, when suddenly it scampered down the bank and disappeared beneath the water, not to return again. In spite of our caution we had been scented.

We had entered the chasm in the ranges through which the Forrest flows. Steep walls of red sandstone and quartzite enclosed it. In places schist predominated, and the steepness of the banks gave way to semi-conical accumulations of rock litter. The stratification of the quartzite was often horizontal, and so in parts the cracked and weathered walls looked like masonry or stacks of bricks laid by human hands. Such an effect was particularly striking on the eastern side of a northern bend in the River, thirteen miles from its mouth. Another mile further upstream a tributary appeared on the South, which I heard from one of the aborigines was Manangal. One of the boys called Una, a tall, strapping fellow, had decreed himself a chum of mine, and sat with me on the roof of the launch chatting familiarly. He did not know much English, but, seeing that I was asking the names of different things, kept saying "You savee this one." Among other things, he showed me a very large scar on his left shin, which was the result of an encounter he had had with a crocodile while fording the River. Several of these reptiles were sighted as we sped along, but the thud of the engine usually alarmed them before we came near to them. Only once my friend pulld me suddenly by the arm and gasped "Bam-burramiddi," as he pointed to a crocodile directly opposite us, but it was too late, for we, too, had been noticed and the reptile bounded back into the flood.

Beyond the gorge, a wide comparatively level country opened out, which was surrounded on all sides by blue mountain chains. Volumes of smoke from bush-fires, lit by hunting natives, rose on either side of the River. Some jabirus (*Xenorhynchus asiaticus*) were stalking about the plain. "That one" said Una, name Gorongula, him plenty cry." This bird I might explain, is noted for its loud reverberent call. Una continued, "Eat'em bone, good fella," then looking at the altitude of the sun, "Me sorry long a binjy." I interpreted the first statement to

mean that the bird's flesh, which he called "bone," was good to eat. The second part of the sentence was more of a conundrum, which took some thinking over. He saw that I did not understand, and said again, "Me sorry long a binjy." This time he drew in his abdomen, and showed his ribs against the skin. He was hungry, and thought it time for luncheon! Remarkable way of expression I thought. But Una did not worry about that; and when he added "No cut 'em, no good, Narli sleep long time," I gave up guessing any more. The cutting very likely referred to an initiation rite, but who Narli was and why he or she slept so long was beyond my imagination altogether.

In the afternoon we reached the landing, some twenty five miles from the mouth, near which the Forrest River Mission Station has been established. This place is about the limit of the tidal influence in the Forrest River, and at the same time the end of the navigable stretch. A few hundred yards further upstream, quartzite ranges reappear on either side, and their rocky beds lie across the way.

An assemblage of natives was awaiting our arrival. It was a motley lot, mainly males. They sent all sorts of messages to our crew by gesture. One code was to announce that some horsemen had come into the station. It was communicated by moving the arms, bent in the elbow, in much the same way as a man does when riding a trotting horse, and following this by a sweep of the arms full length in the direction of their camp. The buzz of the voices proved that we were the objects of much discussion, perhaps criticism. Occasionally a wit would pass a remark which evoked a burst of laughter. "Come along you boys," ordered our reverend Pilot, "all about, help whitefellow." A prompt response to the appeal soon emptied the launch of her cargo, and a string of carriers moved towards the Station.

We walked ahead with the Missionary. Bunting was flying everywhere as though to mark a festive event. We reached the picket fence which encloses the little settlement. In front of the gate, two rows of dusky maidens, all neatly clad in linen frocks, formed a guard of honour, and, as we halted to salute them, sang the National Anthem. We bared our heads and listened attentively. The sincerity and innocence of the little

voices, endeavouring to pronounce the difficult wording made the familiar strain appear particularly solemn and charming. We thanked the singers and turned to the Missionary House.

The Station is conducted by the Anglican Church, and is under the direct control of the Perth Diocesan Board of Missions. The enclosure contains a number of thatched cottages and huts, with open, well-ventilated roofs and wide verandahs. Being amply overgrown with the green trailing shoots of *Mormordica balsamina*, from which the scarlet fruits hang in profusion, the structures are not only economic but extremely effective, from a scenic point of view. Apart from the native timber surrounding the settlement, the grounds also contained arbors of ornamental tropical growth and shrubberies. At the rear was a kitchen garden, in which the sweet potato, Chinese spinach, pumpkin, watermelon, chilli, and loofa grew well. Birds are permanently protected, and scores of them, especially the beautiful blood-finch (*Neochmia phaeton*) were breeding in the green and in the thatch. They were quite as tame as an aviary-kept bird. Vide Plate XXXVI.

The Rev. E. R. Gribble was in charge. His long and painstaking experience at the Yarrabah Mission in Queensland had paved the way to an early success at the Forrest River. Mr. Gribble's methods are entirely practical, his axiom being that example is better than precept With a raw heathen folk like this it is useless, if not ludicrous, to start with the Bible and Hymn Book, and try to persuade oneself that because a "blackfellow" can rattle off passages from the Holy Text like a cockatoo he is a Christian. Give them legal and medical protection, and a solid moral standard to emulate, when the rest will follow in time. In the course of conversation with Mr. Gribble, I ascertained that he was inclined toward that view. He is the right man at the right post. The only white Assistant on the place was Mr. Sherwin, an enthusiast, who had the vigour and assurance of youth well on his side. He supervised the boys' home. The remaining members of the staff were a Queensland native, Jim Noble, and his half-caste wife, both of whom had rendered the Mission faithful service. Noble spoke a perfect English, and could read and write as well as any ordinary whiteman; moreover he was an accom-

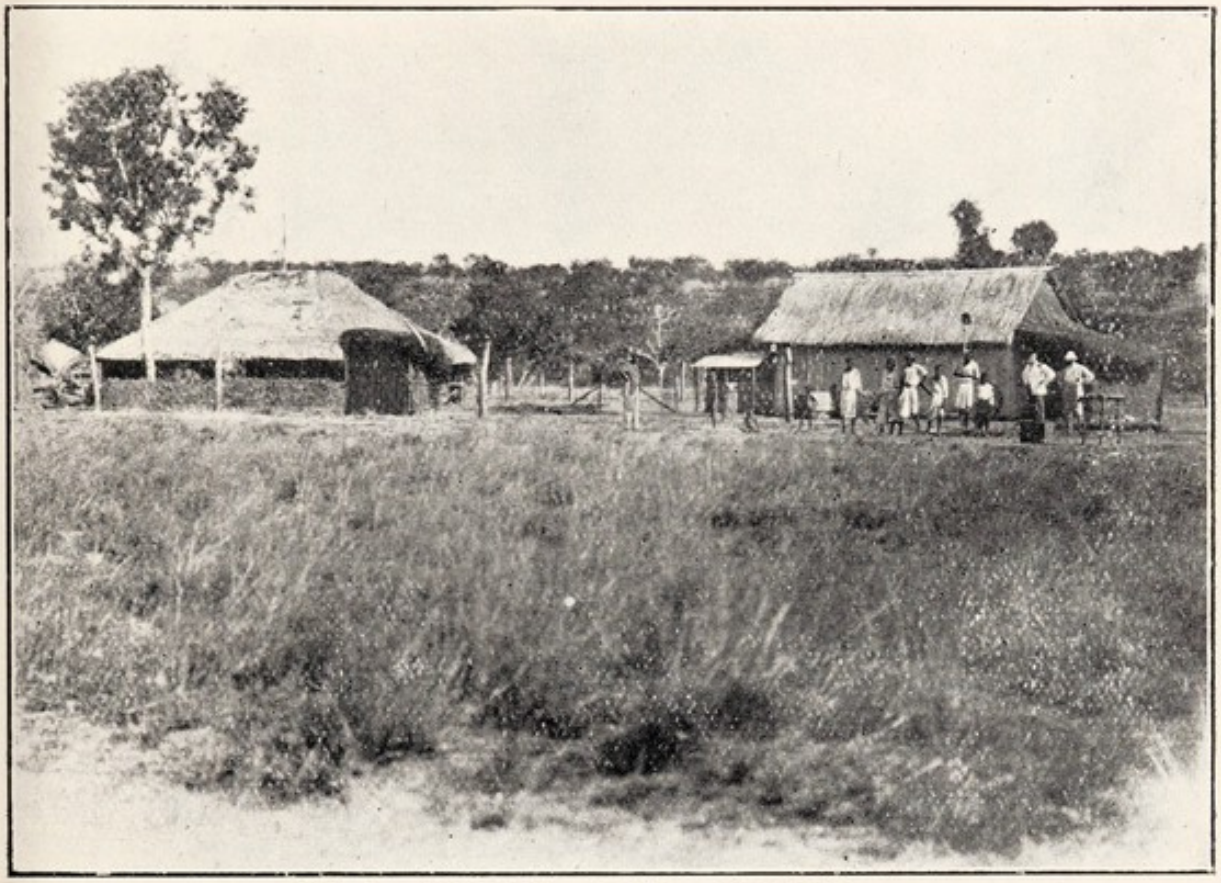


FIG. 1. FORREST RIVER MISSION.

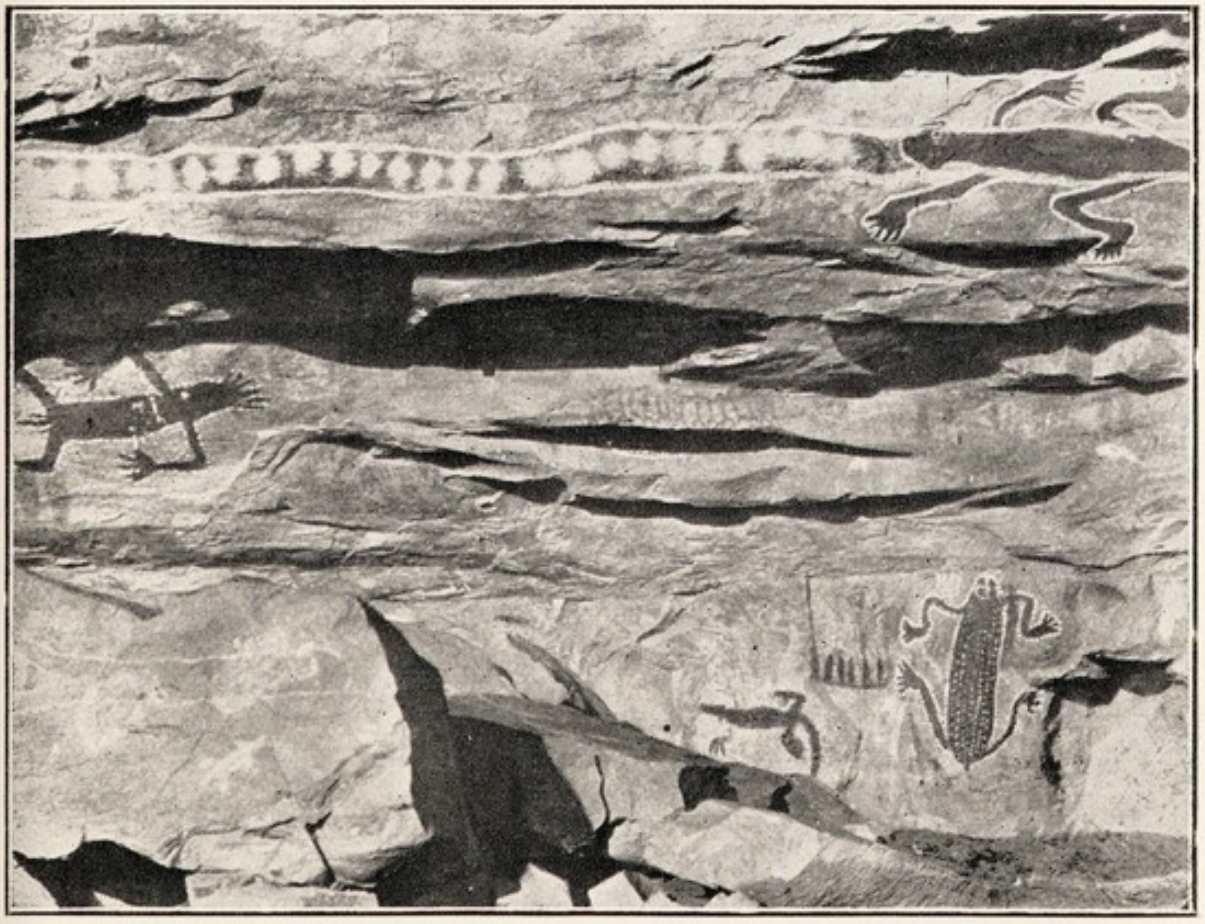


FIG. 2. ABORIGINAL OCHRE-DRAWINGS, FORREST RIVER, June 11th.

plished carpenter, and indeed a handy man to have about the place. Mrs. Noble had charge of the girls' home. Some two hundred natives were upon the reserve when we arrived. The children were living under the station-cover, entirely supported by the institution, the old folks were bivouacking outside the enclosure. The girls were dressed in light calico frocks, the boys wore coloured loin cloths, the party in camp were naked. They were a fine, intellectual looking lot. The only thing some of them wore which might have pretended to hide their shame was a fur belt with a tassel or pearl shell hanging from it. But this was usually tied so high above the hips that the pubes were partly or fully exposed. It was apparent, therefore, that these belts were worn not to appear modest, but on the contrary more as an ornament which attracted the attention to the sex. Some of the women had but a mere hair-string tied around the waist. Several of the men had, in addition, decorated themselves with a broad white band above the forehead, which kept the locks from falling in their face. Others affected the same result by smearing an ochre paste over the hair, which they had tied in a chignon at the back. One old man had waxed the ends of his moustache like our friend Balami had done at George Water (vide May 17th), but this fellow had also divided his beard into two parts, and treated the ends of each similarly. Their bodies were, like elsewhere, covered with scars, principally horizontal; the cuts had been made vertically on the outer surface of the upper arms and upon the thighs, the former being uncommonly long and numerous. Only a few men had had the two upper, outer incisors knocked out. All adult males were circum- and sub-incised. Apart from a couple of cases of tertiary lues, which might have been congenital, and one of blindness, with ectroprium, after gonorrhoeal infection of the eye, I found no evidence of venereal trouble. There was, however, a man stricken with beriberi, who was lying helplessly in a dropsical condition on the sandy bed of his camp.

SATURDAY, JUNE 10th.

In the morning we walked with Mr. Gribble and a number of natives along the foot of the quartzite range northwards. A series of pools, covered with blue water

lilies, occurs here, and many small duck were swimming upon the water. It was in one of these that a young naturalist named L. Burns, when on a recent visit to the Mission with His Grace, Bishop Trower, became entangled in the long stalks and roots of the aquatic plants, and lost his life. One of the pools, moreover was inhabited by a young crocodile (*C. Johnstoni*) which had been caught and placed there by the natives. It was looked upon as one of the station pets, and was accordingly protected.

Some huge boababs stood near the brink of the pools, beneath which the horsemen were encamped, whose arrival the natives had yesterday signalled to our boys from afar. East lay a plain bearing grass, bush, and timber, which belongs to the mission; it should be well adapted for cattle breeding. In the distance, north and west, the grey misty ranges, partly concealed by streaks of smoke which were resting on the heavy morning air, tempted mightily for exploitation, but our time was drawing in, and all such thoughts had of necessity to be abandoned. We returned to the Station, passing a herd of fat goats on the way.

Among the notabilia on the premises was a monkey, Binjo by name. This animal was so knowing and so cute that the natives regarded it as a real "little man." It had a leather strap around its belly, by means of which it was secured to an upright pole with a long chain. Bingo had a large circle of admirers, but there was no love lost between him and some of the older men; his greatest pals were the little boys. These and he were inseparable and usually at play. But, like amongst the best of friends, occasional disputes arose which always ended in an open tussle. It was not merely a sham fight arranged for the occasion, but a genuine affair, in which hands, teeth, and fingernails alike were used with equal frequency. And not always did young humanity fare best; Bingo was as determined as he was crafty. Several times after the arena had been covered with hair, skin, and blood, the boy took advantage of the monkey's tether and ran away howling, leaving the ring to his assailant. Bingo would then jump triumphantly on to his perch, show his teeth, and cry "Arre, arre." Vide Plate XXXVII.

I spent the afternoon examining the aborigines. A score or two more had arrived from the hunting fields.

The gins had their cradle-shaped carriers of bark filled with the tubes of the blue water-lily (*Nymphaea stellata*). They were cooking some in ashes. The vegetable (Kapa) is much like a small, warty potato, very starchy and of good flavour. Others were manufacturing hair-string (barndi) with a primitive spindle (orangu) they twirled between the fingers of one hand, as the material was being supplied through the other hand. Some men were engrossed in stone spear-head making. The delicacy of the work, and the patience displayed by the craftsmen when time after time the fine points broke, would have impressed even the most casual observer. The blades were evidently needed for some event which was about to take place. The reed spear, with a long mangrove point, and a stone head, is, as elsewhere in the North-West, the principal weapon in use; a long flat thrower is used to project it. The boomerang is not used. The bullroarer (maiangarri) is employed to a slight extent during corrobborees. Among the kit of an old, white-bearded man, apparently a dignitary of high order, I found pieces of gypsum (awunn), both crystalline and burnt, red ochre (bilji), yellow ochre (karndarre), acacia gum (narndu), triodia-gum (garl), and a crystal of heavy spar (yerlit). The acacia and triodia gums were used, when warmed and mixed with ashes, for such purposes as to attach a stone-head to a spear. The ochres and the burnt gypsum represented pigments for personal or other decorations. The baryte-crystal was a charm, which the old chap carried about with him to make rain.

Several of the newly arrived men were greatly interested in my figure. They felt me all over, and occasionally pinched the skin through my shirt or pants. When satisfied that my bodily substance was genuine, they smacked their lips and nodded their heads in an appreciative manner.

Within a few chains of the camp, a low oblong mound, covered with a few cut branches of an acacia, indicated the last earthly resting place of a departed aboriginal. I intimated to an old man, who professed to be a relative of the dead, that I wished to possess the skull. Much to my surprise he accepted my suggestion jovially, and offered his services to dig it out for me. The old man and I walked to the grave, and a number of others, including several children, followed. Arrived at the

spot, the old man removed the acacia limbs, and began to dig up the soil near one end of the mound with his bony fingers. He soon reached a layer of bark and leaves, which he removed. Immediately beneath it lay the corpse. The skin had barely rotted away, and an intensely objectionable odour reached our nostrils. But the digger did not seem to mind in the least. He rubbed the skin and hair from the bone, and raised the skull, to hand it to me. I beckoned to him to run away and wash it. But he ordered some of the morbidly curious onlookers to fetch some water. When it came to hand, the bone was soon cleansed, the remaining portions of the brain hooked through the large foramen with a stick, and the cavity rinsed. All these operations were so skilfully executed that a professional body-snatcher could not have managed better. When at length I received the skull, I recognised it as that of a very old man, in which not a single tooth was left in either jaw.

As regards the dialect of these people, we again found it totally different to that of any other tribes we had met. Water, as expressing the earliest want of life, is called ngawa, a decidely primitive combination of sounds, which is akin to those described by Garner of the anthropoid apes. The affirmative is rendered by yau, the negative by yaderre. The numerals are aiyarra (one), majarra (two), jumma (three), and bulinyarra (a large number). Following is a short list of words:—Kangaroo (armba); emu (wieri); dingo (lewa); turtle (bundul); nose (nunjuro); mouth (moga); eye (oumbul); hair (barndi); hand (mial); foot (woura); arm (nameru); leg (nganballa); fire (unane); smoke (moli).

The name of the local tribal country is Dadawe, hence the Mission has been christened "Dadaway." The territory lying west, about the head of the Forrest River is known as Kolaia, that immediately south as Arrawurri that north as Bimba, whilst the King River country is referred to as Ngulamu.

I had again reached the Station, and was in the act of photographing a native, when a loud alarm-cry was raised, which was immediately taken up all around, Bingo was loose! He was already chasing some of the old fellows whom he could not like. Within a moment the scene of happy peacefulness was changed. A

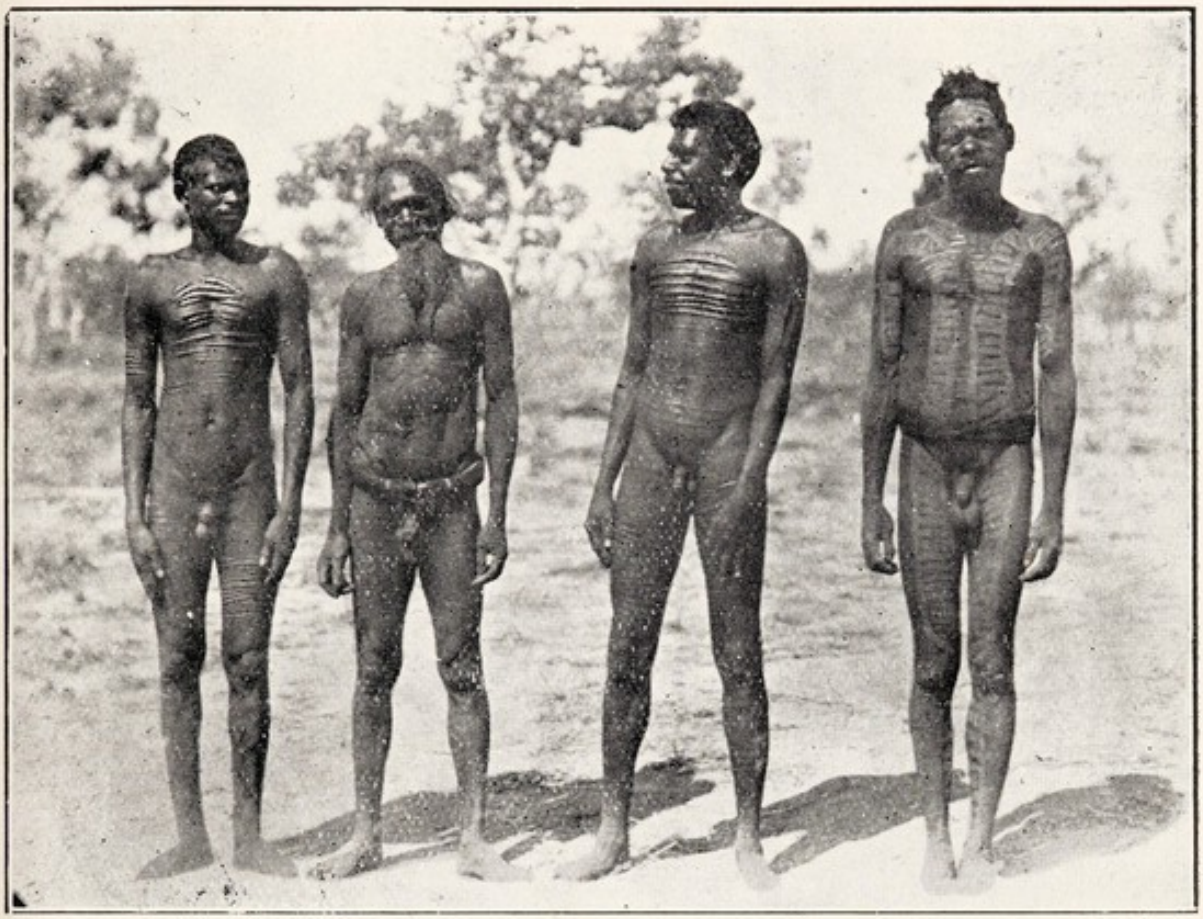


FIG. 1 GROUP OF MEN, FORREST RIVER.

FIG. 2. FIGHT BETWEEN ABORIGINAL AND MONKEY, FORREST RIVER, JUNE 30th.

stampede had occurred amongst the terror stricken community; my model too, had bolted. Old warriors who had all the day been stalking on parade in stolid indifference, wielding their spear-throwers with an air of defiance which made the world look a chit, had now turned cowards. Bingo was certainly in excellent form, and had picked his mark. I caught sight of him, bounding like a cat, with his tail erect, after the fleeing naked form of a terrified native, whose clotted hair was lifted by the wind. Fast as the native was, the simian was faster, and soon overtook its prey. Just as Bingo was contemplating the *coup d' etat*, the unfortunate man, beyond himself with fright, threw away his only means of defence, his spearthrower. Like in ancient chivalry, Bingo stayed and picked up the weapon. As he held it in his right hand, he glanced victoriously at the fugitive, and raised the war cry "Arre arre." To us Europeans the event was a treat in comedy. Even the little boys feared Bingo off the chain, and sought protection behind us. "Go on, you boys," said Mr. Sanders, as he pushed one of them forward, you go along and catch Bingo." "Please, no Sar, please, no Sar," came the emphatic rejoinder in an imploring way, "Bingo mad." The tumult had brought the Rev. Gribble upon the scene; and he, to save further trouble, resolved to catch the monkey. But this was more easily said than done. Coaxing with sweetmeats and nuts was without avail, so a general hunt resulted. It took over half an hour to catch the runaway, and many funny incidences occurred during the chase. Several of the terrified natives never returned to the station.

In the evening Mr. Gribble arranged for all the natives to assemble in the square, and entertained them with a magic lantern he had brought from Yarrabah. We were all seated in front of the screen. The ceremony started with an explosion, which again caused a panic among the more timid. But when the kerosene lamp sent a sooty flame high above the apparatus, they thought it was grand, and applauded the fire-fighting operator. The flame extinguished, a series of pictures was projected upon the calico. The subjects were largely scenes from the Queensland Mission, with a few coloured comic slides interspersed. Mr. Gribble lucidly explained every picture. The dusky audience more than appreciated the humorous side of the demonstration.

In retaliation the natives arranged a gala corrobboree just outside the reserve. After the usual preliminary noise and excitement, the fires were lit, and the performance begun. A lengthy programme was rendered, which included in separate acts many animal impersonations and hunting scenes, as well as several primitive religious ceremonies of worship, during which the performers acted like fanatics. It was again my good fortune to note the existence of phallicism among these tribes; it was a weird dance in which the symbol of nature's generative power was held erect in a suggestive fashion.

I am reserving a full account of these ceremonies for my anthropological report. The repertoire included corrobborees of the emu, the kangaroo, the crocodile, the fire, and such like. In one of the acts an elaborate peaked head dress was used, which they called "Ngardaddi." The following might be taken as a typical example in which the crow had suggested the principal cast. A number of men formed a circle and lowered their bodies between their knees. They dropped their heads and lifted their arms, which they bent in the elbow to represent wings. The latter they moved supplely to and fro in much the same way as a young bird does when it is being, or wants to be, fed. At the same time a chant was started in imitation of the crow's call: "A wa, a wa, a weh", and this was oftimes repeated. Then they all hopped around like so many birds in search of food; and two men entered the ring. Still in the same posture, these two hopped towards each other, and extended their arms until each pair crossed the opposite pair. In that position they swung their bodies backwards and forwards, the while the arms see-sawed in front of them. Then they rejoined the group, and all continued the hopping. In the next act an old man lay flat on his back, in the centre of the ring, with his arms and legs stretched from him. He represented a carcase. The "crows" hopped around him and cried: "A, a, a, la la, la-la-la", the last three notes being uttered in quick succession. This was repeated. One of the crow-men then hopped to the "dead" man. He lifted one of the arms from the ground, held it up, and let it go. The limb fell "lifelessly" to earth. Immediately this had happened all performers jumped into an upright position, rushed to-

wards the man feigning death, and carried him from view. Apart from the imitation of the crow's call, no regular song accompanied the act, but all the onlookers were beating time to the hopping with their hands against their thighs. These ceremonies extended far into the night, when at length the humid air became so overladen with dust, smoke, and the strongly penetrating odour of the aborigine's sweat-glands that we were compelled to retreat to our quarters.

The Rev. Gribble had three boys at the station, whom he was specially bringing up and educating. They were affectionate little fellows named Djurlan Nedburre, and Amarre. Their skin was "clean" (that is without any cosmetic scars), and they had in no way yet been subjected to any tribal mutilations. All they wore was a hair-string around the waist. The rightful parents were quite willing to allow the lads to live with the white man; and an excellent foster father he made. The boys followed Mr. Gribble wherever he went; and many a time during the day "daddy" was called upon to tender kindly advice or assistance. At night they slept on blankets laid on the floor at the foot of their protector's bed.

WHITSUNDAY, JUNE 11th.

The time table at the Dadaway Mission was somewhat as follows:—

—Week Days.—

Morning:—5.30 a.m., rising bell; 6 a.m., Matins; 6.30 a.m., breakfast at dormitories; 8 a.m., work; 12 noon, cease work; natives' dinner. Afternoon:—1 p.m., staff lunch; 2 p.m., school and work; 4.30 p.m., cease work; 5 p.m., Evensong; 8.30, bed.

—Sunday.—

6.30 a.m., H.C.; 9 a.m., native service; 5 p.m., Evensong.

The afternoons of Wednesday and Saturday were considered as half holidays.

Holy Communion was to be administered. As Mr. Sanders and I donned our Sunday linen, we could see from the window the band of communicants assemble just outside the missionary's bungalow. We hastened to the little chapel adjoining the boys' dining room; and the procession followed. The Rev. Gribble, wearing a

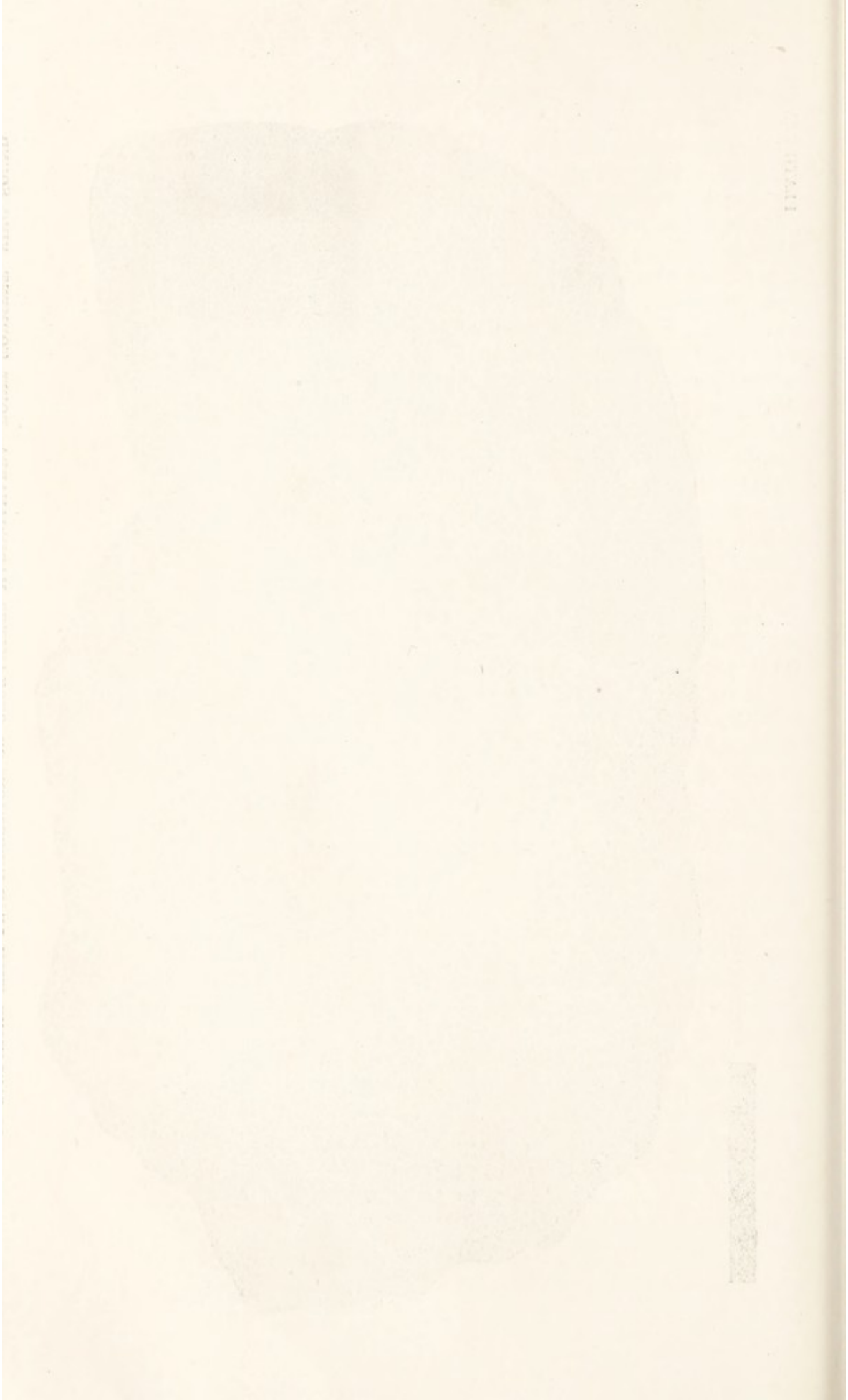
white surplice, was assisted by Mr. Sherwin and Jim Noble. A strong native carried the crosier. Apart from the little choir boys, the band consisted exclusively of girls. As they sang, they slowly entered the chapel, and we stood up. The back seats and the dining room were occupied by about a hundred naked natives of both sexes. The ceremony was conducted earnestly, and in full accord with the orthodox rubric. We received the consecrated bread, which, owing to the fact that only damper was baked on the station, had to be given in the form of imported dry biscuit. The chalice was ministered, and we sipped the wine. This most sacred act concluded, there was an unexpected interruption which temporarily unhinged the sereneness of a primitive hunting mind. The circumstance that the station dog was chasing a fowl outside solicited an irrepressible shriek from one of the congregation: "Hai, kill 'em fowl!" But the stern glance of the minister soon restored order. The Rev. Gribble next addressed his little audience at length. Among other things, he said: "My good fellows, we have to-day the pleasure of extending a hearty welcome to two visitors at Dadaway. One is a big Judja*, who was for some time 'Government man' to all the blackfellows on the other side of Gulanji (Cambridge Gulf)." Here the speaker was interrupted by appreciative "I's", "Hai's!" and smacks of the tongue. "The other", Mr. Gribble continued, "is Mr. Sanders, who is helping him to travel among your tribes to cure your sick and comfort your flour-bags.† When they return to the big white fellows' camp, one moon south from here, they will tell the Government that all the blackfellows they saw were good, and then the Government will send along plenty blankets, tea, sugar, and flour. (Prolonged applause). The great, good God of the white fellows is watching over these men and protecting them from any bad and wicked black-fellows. Mr. Sanders has a piccaninny like our Minnowe, who is praying every night to the great God to spare her daddy. The Judja is not married, and has no piccaninny to pray . . ." At this there was an outburst of laughter and

* "Judja" is the local word for a chief. The Rev. Gribble was referring to my term of office in the Northern Territory as Chief Medical Inspector and Chief Protector of Aborigines under the Commonwealth Government.

† Throughout the North of Australia "flourbag", when applied personally, has the meaning of "old man."

1 2 3 4 5 CENTIMETERS.

SLAB OF MESOZOIC SANDSTONE WITH LEAF IMPRESSIONS OF *OTOZAMITES*, MADINGANARRA, POINT TORMENT, KING SOUND.



cries of exclamation which drowned the Missionary's speech completely. To think that a man much taller than any of the tribe, and a Judja as well, was without at least a harem and a large family of piccaninnies was beyond them. Mr. Gribble finished his address, and we walked back to the bungalow.

We had arranged an excursion up the Forrest River. Messrs. Gribble, Sherwin, and Sanders, and I were soon on the way, with from twenty-five to thirty natives, marching west. The quartzite range was scaled, and we followed our guides along the crest. Every now and again we stood on the verge of an escarp overlooking the course of the River. The banks were for the most part steep and precipitous; the bedding of the quartzite was horizontal. The stony surface of the range was covered with the dark red flowers of the *Polycarpaea longiflora*. We found our way between the rocks, until after a heavy tramp of eight miles we reached the point of junction of a tributary with the Forrest River. The scenic effect of the high precipitous red banks, as they lay before an undulating sea of slaty-green timber which extended to the distant blue, was grandiose. The main course came from the north of west, the affluent from more south westerly. Triodia grew in abundance on the stony river slopes; the tussocks much resembled a grazing flock of sheep. The natives collected a quantity of resin from the stalks of these tussocks, which they warmed and moulded into a cake for future use. They called the resin "garl"; its principal use is to knit the stone blades to the spear heads. At the foot of the steep escarpment we stood upon lay a valley clothed with verdure, in the centre of which a row of paper barks, and other trees indicated the smaller channel occupied by the river in the dry season. We descended as best we could, at times leaping from rock to rock, at others gravitating with the rubble.

At the foot of the cliff we turned south westerly. The skeleton of a child was discovered, wrapped in paper bark, in a crevice about six feet above the ground. Then, as we passed some brushwood, a unique picture came suddenly before our eyes. Every accessible space on the vertical face of rock which graced the eastern bank was covered with an aggregation of ochre paintings. Here the aboriginal talents must have been

at work for years, yea generations. There were fresh as well as old and obliterated designs; some of the new had been drawn over those erased by time like a modern trait inscribed upon an ancient palimpsest. That this elaborate display of primitive art had a meaning more than the mere interpretation of form, there could be no doubt. I told Mr. Gribble that I wished to remain at this "art gallery" of the aborigines to study and copy a series of the designs. The whole party, with the exceptin of two men I selected to assist me, thereupon camped in the valley under some shady trees which grew on the edge of a waterhole. It was indeed a fine assortment in ochre drawings. The colours were red, brown, yellow, white, and black; the yellows and reds in particular were very rich. As regards the subjects it would be impossible to describe them here in detail. There were kangaroo, some crudely drawn, others so proportionate and neatly executed that the average white man could not have done better. A richly spotted snake, many yards in length, filled the frieze beneath a natural cornice of rock. Peculiarly modified representations of the human form were, perhaps, most numerous; the nose and mouth were rarely shown, but the sex unduly prominent. A few heads with the halo-like markings above them were also contained in the collection, but they were less perfect than those seen at Port Gorge IV. In addition there were some highly ornate designs of the spear-thrower, and possibly of the boomerang also, and, lastly, very numerous human hand and foot marks and animal spoors. The copying of designs so absorbed my attention that I did not notice the time fly. It was noon when we reached the spot, and after three o'clock when the yawning of one of my native assistants reminded me that my companions were waiting for me at the water hole. I joined them. They had made good use of the time by indulging in a refreshing bath. Vide Plate XXXVI.

Some of the natives had been collecting the corms of a kind of bullrush and cyperus species, which they ate either raw or roasted. The flavour was quite sweet. They had moreover stripped a quantity of bark from several trees growing near the camp which they place in small pools of water known to contain fish. The bark contains a narcotic which stupifies the fish and brings them

to the surface in a helpless condition. The bark is called "Mora."

Our bivouac was entirely under the patronage of the tribe. An additional dozen or more members had arrived in the interim, and the whole body sat around us. They jested and chatted so loudly that we could barely hear our own voices. All were happy with the exception of one middle-aged warrior with a red-ochred forehead who seemed to object to the intrusion of the white man. At length some of the boys commenced to sing, and one by one the others took up the air:

Madji madji la la i
Madji madji la la
Malangolanna malangolangolan na i
Madji madji lale.

The sun was already dropping behind the purple wall of the river scarp when we prepared for the return march. As we made up the valley, the broken rays, in falling through the foliage, were illuminating the evening mists in queerly shaped and moving flecks, in which the more imaginative of our escort might have seen the dancing of the mystic devil-devils. We successfully negotiated the steep face in the dusk, and retraced our steps over the rugged hills. The Mission Station was reached long after dark.

MONDAY, JUNE 12th.

The greater part of the morning was occupied in making the necessary preparations for our departure in the afternoon. Whilst taking a last stroll in the nearer environment of the station, I discovered several bushes of the parrot plant or Hack's Pea (*Crotalaria Cunninghami*). This was the first time I had found it on the North Coast, and its occurrence here considerably extended my knowledge of its geographical distribution. In the deserts of Central Australia it is rather plentiful. Another interesting find was made on the muddy banks of the Forrest River in the form of a petrified cray-fish. It was a fresh water species, and its mode of occurrence was similar to that of specimens I had found on the

shores of King Sound and in the Northern Territory.* These forms have no great geological antiquity, and are not true fossils. The species are still living in other localities, and the molecular substitution of the original tissues by mineral matter is far from complete. A petrified bi-valve (*Austraella sordida*) was also found at the same place. The deposit containing these remains must be regarded in the light of a "raised beach" of comparatively recent age.

Soon after lunch, a body of natives carried our belongings to the landing. We followed and waited for the tide to make. To demonstrate how antagonistic the myriad forces of ants are which over-run this region, I mention the following. I had caught several blood finches (*Neochmia phaeton*), two old birds and five young, intending to take them south. As we stood on the river bank, waiting for the tide, I rested the cage for just a few minutes in the shade of a mangrove. When I lifted it again, the box was swarming with little black ants. All the young birds had been stung to death and were being greedily devoured. The hen of the old pair was also so badly bitten that she lay in agony upon the bottom flapping her wings. She died soon after. The male bird had been hurt, but not fatally, and he revived after isolating him from the aggressive pest.

The natives were whiling away the time in sport. The young women and girls had moved a chain or two down the river and were indulging in a bath. They sang and laughed aloud in undisguised appreciation of the pleasure the water afforded them. The lads, too, were continually plunging into the refreshing medium for a swim. A favourite method of amusement was to run down the slope and slide along the mud whilst they balanced themselves with their arms held above head. One was prone to find an analogy with European school children skidding on the ice. The more so when presently they stayed the sliding to have a sham fight with mud balls. But for the oppressive heat, the mud flats might then easily have represented a snow field. When-

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* The crayfish from the Forrest River and a semi-fossilized crab from King Sound were submitted to Mr. R. Etheridge, Curator and Director of the Australian Museum, who determined them to be *Thalassina anomala* and *Macropthalmus sennatus* respectively. Compare also "Sub-fossil Crustaceans from the Coasts of Australia", by R. Etheridge and A. R. McCulloch: Records Austr. Museum, Sydney, Vol. XI., No. 1, 1916.

ever a "ball" struck, and stuck to the naked body like a pancake, the opponents' "Hai!" or "Ai!" would ring through the air. The victim then took a "header" into the water, removed the mud, and re-appeared to take part in the competition again. Finally all players, friend and foe alike, basked in the sun to dry and rest.

By degrees the motor launch was lifted from its muddy bed by the rising tide. When it floated, Una was sent aboard with the dinghy and two or three boys to wash the deck and prepare the craft for the journey. Then the luggage was towed across, and, when the boat returned, we followed. A start was made directly the tide showed signs of slackening. The natives remained on the bank sending us their farewell coo-ees until we were well out of sight. Good progress was made. The passage through the gorge in the ranges was even more pisturesque than on the outward trip. The sun was setting and threw a warmish glow of golden red upon the weathered face of quartzite and its timber-crown of modest silvery grey. From the latter, volumes of smoke shot forth with the blast of fire beneath them. The natives had been chasing in the ranges and had set large tracts of bush alight. By nightfall we were clear of the hills, and pushed on; the dark fringe of mangroves on either side guided us. At about 10 o'clock p.m. Point Laffan stood south; we entered Cambridge Gulf and made down Hare's Channel towards Wyndham. Then the harbour lights were "picked up". There were, moreover, other lights which informed us that a steamboat was lying at the wharf; and soon the familiar outline of the "N2" was recognised. This came as a surprise, for the Captain had told us not to expect the boat until Tuesday! Luckily we arrived early, and so saved a two-months' wait at Wyndham.

FROM WYNDHAM TO ADELAIDE.

The S.S. "N2" sailed that very night (June 12th). By daylight we had reached Fairfax Island, and this time navigated the narrow pass without mishap. So numerous are the islands and reefs in this North-Western corner of Australia that mariners prefer to anchor during the dark hours of night. We also did. Many

of the crew and passengers sacrificed their sleep and fished; but no great haul was made. The bait they used was supplied by the flesh of several flying fish which had dropped upon the deck during the day. Numerous black and yellow banded sea-snakes (*Distira Stokesii*), the bite of which is said to be lethal, were seen in this region. We reached Derby in three days and departed again about midnight.

I was lying upon my bunk, endeavouring to find a little sleep in the hot stagnant air of the cabin, when a loud knock came at the door, and the Chief Officer entered. He seemed perturbed, and asked me to come immediately to a man who had fallen overboard, but had been rescued from the water in a lifeless condition. We hastened abaft to the unfortunate fellow, who was a steward, and after a while managed to call him back to life. I was kept busy througout the trip. Besides several malarial and other medical cases, which I removed to the ship's hospital, a chapter of accidents was chronicled. The Chief Officer was rammed by a bullock which splintered his forearm, a sail-maker slashed his arm, and the butcher swallowed a bone which stuck in his gullet. The recent visit of a quack to the district was bearing fruit in the shape of numerous aching teeth he professed to have filled; they now had to be extracted.

This was the busiest time of the year for the cattle men. All the holds and every available space on the boat was stocked. The miserable creatures, which had just arrived from the endless, open pastures of the wilds, were packed like sardines; and the boat was never designed for cattle shipping. The little fresh air that was conveyed below by the wind-sails was totally inadequate. It was consequently the order of the day to assign a number of carcases to the deep.

There were, moreover, eight aboriginals on board who had been sentenced to several years' imprisonment for cattle killing. They did not know what they were about to undergo, and were full of cheer. A police officer watched over them.

We called at the same ports as specified on the upward journey, and in addition looked in at Balla Balla. The weather was hot to North-West Cape, thence we rapidly ran into a cooler atmosphere. Calm seas favoured us as far as Geraldton, but from that Port to

Fremantle the conditions were decidedly stormy. Fremantle was reached at 11 o'clock, a.m., on Saturday, June 24th. We had barely an hour to trans-ship to the S.S. "Zealandia," and could thus not pay our respects to the authorities at Perth. I managed, however, to drive to the office of the State Steamship Service, and left my card for transmission to the Hon. the Premier.

Boisterous seas, with mountainous waves, awaited us in the Great Australian Bight, but, fortunately for us, we were travelling with the weather. Apart from the storm, the journey was uneventful. An army officer requested me to attend several returned soldiers lying in the second saloon, one of whom was in a high fever. Adelaide was reached in the evening of Tuesday, June 27th.

"MUNDUS EST DEI VIVA STATUA!"

SPECIAL REPORTS.

A SYNOPSIS OF THE GEOLOGY OF THE NORTH-WESTERN AUSTRALIAN COASTAL DISTRICTS.

By
Herbert Basedow.

PHYSIOGRAPHIC FEATURES.

The region hereunder discussed lies in the extreme north-western corner of Australia and is bounded, so far as the Western State is concerned, by the Indian Ocean, and the Fitzroy and Ord Rivers. A similar class of country, however, extends eastwards, far into the Northern Territory. West Australian geologists refer to this area as the Northern or Kimberley Division.* It is a mountainous tract traversed by numerous rivers, and stands in marked physiograhical contrast to the comparatively low "desert" immediately south and south-east of it.

Although the map makes reference to many separate ranges, we may, for the present, without having regard to different geological ages, look upon the whole of this region as consisting primarily of one vast tableland. Since its upheaval, it has suffered so considerably through atmospheric denuding forces and river wear that there is, perhaps, no more rugged and rougher piece of country in the whole of Australia. Deep ravines, canyons, and gorges cut this fell in all directions, the steeper courses being obstructed by the accumulation of the dislodged rock masses. In places more extensive valleys have resulted, which carry a fair depth of alluvium; in that case a well-defined river bed or an inlet from the sea has usually found its way along the plain.

The sides of the separate ridges and ranges are often steep and scarped, their bases emerging from rocky talus slopes.

* J. T. Jutson: Geol. Survey, W.A., Bull. No. 61, 1914.

The ranges are topped with stunted trees, principally eucalyptus and, less plentifully, boabab. The talus and valley soils bear a more prolific growth of tropical verdure, especially where soakages and springs reach the surface.

The coastal districts of the Northern Division enjoy an annual rainfall of between thirty and forty inches*; and high temperatures prevail. The alternating processes of heating and cooling brought about by a scorching sun on the one hand, and a sudden cloud burst on the other, have materially helped to fracture the brittle quartzite beds which largely build up the ranges. Where the rock has stood, its surfaces are covered with a fine ferruginous film similar in character to, but not so pronounced as, the protective films upon rocks of desert countries. This mineralogical "varnish" gives to all the exposed surfaces a reddish colour.

A glance at the map will suffice to show that the North-West Coast has suffered, since the upheaval which formed the ranges, a very considerable subsidence. The numerous archipelagoes and countless islands which fringe this coast are the remains of a former extension of the great northern mountainous area; they have been sparated by normal processes of erosion, and subsequently sunk by earth movements to such an extent that the sea could encroach along the intervening valleys, and submerge and "drown" them. From that period onwards the sunken lands have been under the devastating influence of an excessive marine denudation. How considerable this additional erosive agent has been might be gathered from the facts that the tide in places measures nigh on fifty feet between high and low water marks and its velocity has been determined to exceed ten knots the hour.

Concomitant with a gradual subsidence, reef-building corals have established themselves around the outer fringe of islands and suitable shore lines. These may break to a certain extent the ferocity of monsoonal and cyclonic storms to which this region is subject, and so lessen the wave-action upon the shores, but, as against that, they increase the velocity of the currents. Submerged islands and reefs are a constant grave concern to mariners in North-Western waters.

* Official Year Book of the Commonwealth of Australia.

No direct evidence was found suggestive of a recent upheaval such as has been established for the Queensland and Northern Territory coastlines.*

Although many of the component "ranges" of the elevated area in the North-West are typical tablelands, and many of the "hills" typical "tables", one could not, except for general considerations, describe the whole formation as one grand plateau. Several facts must not be overlooked. In places where the sedimentary beds have been removed, or have never occurred, older crystalline rocks are found as chains of hills whose contour is evenly rounded. Along certain axes the overlying beds are sharply folded, which in the course of disintegration along the lines of no dip may give rise to a scarped face, whose aspect from one side resembles that of a tableland. When, however, the opposite side is approached the hill-top presents a uniform slope more or less in conformity with the tilted bedding planes. The dip in general might be classed as low or gently undulating.

Strictly speaking, therefore, the surface features of the mountainous tracts in the North-West, consisting of Palaeozoic formations, are those of an ancient peneplain which has been extensively cut up by subaerial erosion.† Here and there are remnants which have more stubbornly resisted the peneplanation; they tower as hills or tables above the general level, and indicate the lines of a by-gone topography. Thus a more or less terraced appearance is imparted to the elevated area which was long ago recognised by F. T. Gregory.‡

South-west and south of these ancient mountains lies an expanse of lowlands or rolling downs. Except along the river-courses, few outcrops of rocks are to be seen, the whole of the area being covered by superficial deposits of coarse siliceous sand and rubbly laterite. These produce the low forest lands known locally as the Pindan. The plains are broken only in places along the Fitzroy and its tributaries by table hills and ridges composed of horizontally bedded sandstone of Carboniferous

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*Compare: H. Basedow: Physical Geogr. and Geology; Proc. Roy. Geogr. Soc., Austr., S.A. Branch, Vol. XVI., 1915.

† E. T. Hardman refers to the ranges near Point Usborne as an old plain of marine denudation subsequently carved out by the action of subaerial denudation. —Report Geol. Kimberley District, W.A., 1884.

‡ C.f. A Handbook of Western Australia, 1881 (1896), by Rev. C. G. Nicolay.

age, which are the sole remnants of a once continuous and higher plateau. Swamps and clay flats occur within this stretch; and extensive tidal mud flats lie adjacent to the lower reaches of the several rivers passing through it. The lands are terminated seawards by low, red, lateritic escarpments, sandhills, or mud banks.

GEOLOGICAL FEATURES.

PRE-CAMBRIAN.

Sandwiched between the limestones of the Napier Range on the west and the King Leopold Ranges on the east, lies a belt of comparatively low hilly country whose smooth contour differs markedly from the steep and angular outlines of the aforesaid ranges. These hills are known as the Paterson Ranges; they consist of crystalline schists and slates now classed as Pre-Cambrian. E. T. Hardman* originally regarded the metamorphic beds of the Kimberley District as Lower Silurian or Cambro-Silurian, but A. Gibb-Maitland and other more recent observers consider them as probably of Pre-Cambrian age. Apart from their stratigraphical position, their lithological similarity to the crystalline slates and schists of the Northern Territory, Central and South Australia is undeniable. The general strike is north-westerly, the dip south-west. The beds are much shattered and crushed. The series consists of mica and quartz schist, phyllite, and clayslate. The schist is in certain zones intensely metamorphosed, and is studded with staurolite and garnets, which upon disintegration of the matrix are shed upon the hill slopes and washed into the creek sands. The beds are richly mineralized, and are traversed by numerous quartz reefs which contain gold, tinstone, and wolfram.† The crystalline schists pass southwards into the granite of Mounts Amy and Joseph.

On Sunday Island a graphitic quartz-schist occurs near the contact of quartzites with granite; its grains are coarse and covered with sericite, the graphite is interstitial.

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* Report on the geology of the Kimberley District, W.A., By Authority, Perth.

† Vide also: T. Blatchford: The King Sound Tin Mine, West Kimberley. Bull. Geol. Surv., W.A., No. 59 (1914), p. 232.

On Worla Island, in Whirlpool Pass, knotted chlorite- and sericite-schists cross the surface as low jagged outcrops trending north-west; the planes of schistosity are practically vertical. The weathered faces of the rock are covered with prisms and pyramids of secondary minerals up to a centimeter in diameter. Quartzite abuts against these beds near the shore, the contact being marked by a coating of secondary mica and iron-stone. For some distance north of Panga Cone, at the northern entrance of Whirlpool Pass, the eastern shores and adjoining islands consist of dark slopes of schist. Gonnore, and Terrilain (partly), and Yourlo Islands consist of similar beds; and they can be traced along the Kullo Peninsula, and in Lordenain Island, thence along the foreshore to Yerilli Island, south of Lordo Pass. The northern front of Kollan Island, and a few of the smaller islands south-east of it, bear also a schistose character, the rocks being richly impregnated with ironstone.

In the Cambridge Gulf country schists were only observed along the Forrest River, but it might be mentioned that through pressure of time the examination was very hurried.

CAMBRO-ORDOVICIAN.

So far as our researches went, practically the whole of the country lying between King Sound and Cambridge Gulf consists of one vast expanse of quartzites, sandstones, and silicified grits. A few intercalations only of clayslates and shales were noted. Point Cunningham in King Sound is the western boundary of the formation; from my previous explorations in North Australia I know the same beds to extend eastwards to beyond the boundary. In the Northern Territory they occur along the Victoria and Fitzmaurice Rivers and terminate in the Macadam Ranges. Limited exposures lie on the Adelaide River.* I previously regarded the formation as Ordovisian (?), basing my determination principally upon a lithological similarity to the fossiliferous beds of Central Australia. As a result of my recent investigations I now relegate this series, as it occurs both in the Northern Territory and in North-Western Australia, to the Cambro-Ordovician.

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* Vide: Proc. Roy. Geogr. Soc. Austr. (S.A. Branch), Vol. XVI., 1915, and Reports Government Geologist and Staff, Adelaide, 1905.

The evidence is entirely stratigraphical. Apart from some very doubtful impressions* on weathered faces of the quartzite no fossils have been definitely recorded. It is highly probable that they exist because among the collection of E. T. Hardman, who in 1883 accompanied the "Kimberley Survey Expedition," were two Cambrian fossils, *Salterella Hardmani* and *Olenellus* (?) *Forresti*, the former of which I subsequently discovered *in situ* on the Daly River.† The localities cited by Hardman were unfortunately too indefinite to be of much value.

The Geological Department in the Northern Territory has recently discovered Cambrian limestones on the Katherine River "made up principally of obscure tribolite casts."‡

When the Devonian limestone of the Napier Ranges was being deposited beneath the sea, the King Leopold and other ranges occupying the North-Western corner of our present Continent were land surfaces.

The quartzites of the latter Ranges, moreover, directly overlie the highly metamorphic schists classed as Pre-Cambrian, and their bedding planes as a whole are less steeply inclined than those of the fundamentals. Mineralised lodes occur within the formation.

A. Gibb-Maitland and other official geologists refer to these beds as Devonian.§ Perhaps in the near future Hardman's Cambrian fossils will be traced, when no doubt considerable light will be thrown upon the stratigraphy. H. B. Woodward's discovery, mentioned by Maitland, of a trilobite in a "dun-bluff coloured limestone" in the Collier Bay district is of no mean importance in this regard.

All ranges which define or fringe the coastline between King Sound and Cambridge Gulf, and all islands which lie off it, consist almost exclusively of quartzite and sandstone. In the southern Kimbolton Ranges, along the Robinson River, the quartzite is exceedingly fine-grained, and of a white or purplish colour; small

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* Vide Mr. Etheridge's remarks on page.

† Report Government Geologist and Staff, 1905.

‡ Bulletin of Northern Territory, No. 16, 1916, p. 16; also Bulletin No 14, 1915.

§ Recent Advances in the Knowledge of the Geology of Western Australia; Proc. Austr. Assoc. Adv. Science, 1907; also in Bulletin No. XXVI., Geol. Survey, W.A., 1907.

gliding planes within it are covered with silvery spangles of mica. Hand specimens are in parts semi-translucent, and resemble fractured porcelain; this class of stone is extensively used by the natives for manufacturing stone implements. The beds strike W.S.W. and dip 45° S.S.W. near the River, but farther north are more inclined. Across King Sound, the quartzite of Sunday Island is considerably coarser in texture, a feature which may in part be due to secondary recrystallizations brought about by contact metamorphism. At Worla Island, near Steep Head, the planes of the white siliceous rock are lined with grains of haematite and flakes of secondary mica.

Steep sea-scarps, square headlands, and barren ridges of quartzite are typical of the coast line between King Sound and Yampi. At the latter locality a noteworthy feature exists immediately south of Lordo Pass. The quartzite beds of a cliff section exhibit two perfect sigmoidal folds, and a sharp synclinal at Barragilla Point. The rock on Kollan Island is dense and highly metamorphosed, the grain being hardly visible to the naked eye. The stratification has disappeared, but a rough cleavage is apparent. The quartzite breaks up into flatly rectangular blocks. Intercalations of phyllite and clayslate, and extensive deposits of iron-ore are of particular interest in the local geology.

The scenery of the Raft Point Peninsula and that in Camden Sound and Success Strait is characterised by steep rugged bluffs of iron-stained quartzite. The shores of Port George IV. consist of rough and barren ridges of similar rock. Mounts King and Grey on the Glenelg, and Square Hill on Augustus Island, are table-tops, the last-named a monadnock indicating the extent of the present erosion.

There is no lithological difference between the quartzites above referred to and those of the Cambridge Gulf and Forrest River districts; a more or less continuous chain of hills and ridges along the whole length of coastline connects the two series.

R. Logan Jack* colours all the country east of Cambridge Gulf as Upper Carboniferous, but so far as

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* The prospects of obtaining artesian water in the Kimberley District: Bull. Geol. Surv. W.A., No. 25, 1906.

my observations went, the high quartzite ranges referred to above, occurring within the area, are Cambro-Ordovician.

IGNEOUS ROCKS.

A Gibb-Maitland has already pointed out that "associated with the quartzites, etc., are a series of bedded and intrusive igneous rocks, the prevailing types being andesite, dolerite, and diabase*." Especially in the Camden Sound district these igneous rocks are seen either underlying the quartzite along the sea-scarps, or as separate hills and ridges of the intrusive. A small collection of igneous rocks from this locality was submitted to Professor E. W. Skeats, who kindly determined the following types: Diabase from Marlemma Strait and Whirlpool Pass, and Serpentine from Berrial Bluff. Professor Skeats considers the former rock to be an intrusive or a lava-flow.

A gneissic granite occurs on Sunday Island consisting of large twinned crystals of felspar, black mica, and granular strings of quartz. The "eyes" of felspar measure up to an inch in length, and have their long axes parallel to the foliation. Large crystals of garnet occur as an accessory mineral. Dykes of pegmatite and greisen, with flakes of muscovite over two inches in diameter, have also been injected into the fissures of the quartzite.

DEVONIAN.

The only belt of country of older Devonian† (or perhaps Silurian) age met with on the expedition is the Napier Range; it occurs as a narrow strip which divides the Carboniferous in the western lowlands from the Pre-Cambrian and Cambrian formations of the Paterson and King Leopold groups of Ranges in the east. Hardman‡ and Jack § have referred to this "wall" or "barrier" which rises as a massive rampart precipitously from the general level of the Pindan-covered Carboniferous. It is most likely that this abrupt stratigraphical boundary

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* Proc. Austr. Assoc. Adv. Science, 1907.

† As a result of his palaeontological investigations Mr. R. Etheridge writes that he classes the crinoid limestones as Devonian provisionally; and that the question of exact age is still an open one, but most certainly not younger than Devonian.

‡ Report Geology Kimberley District, W.A., 1884.

§ Bull. No. 25, Geol. Surv., W.A., 1906.

represents an old fault scarp. The Napier Range is a long, narrow tableland trending west of north, on an average under a mile in width, but many miles in length. The steep faces are extremely rugged and weathered. The beds consist principally of a subcrystalline bluish fossiliferous limestone and calcareous sandstone. In parts the limestone is composed almost entirely of *crinoid* ossicles. Mr. R. Etheridge has discovered also a *Stromatoporoid* which he says will "relegate this limestone to a rather low position in the stratigraphical sequence." His deductions and references to previous observations appear in the palaeontological report. The stratification is as a whole not far from horizontal, but in places (e.g. Tarmonginnan, south of the Barker River Gorge) the slabby beds are tilted. The limestone has been extensively eroded and numerous caves exist throughout the range. Several were discovered whose surfaces were covered with stalactites and stalagmites, a new record since the visit of H. B. Woodward*. The formation is mineral bearing; the Narlarla lode occurs within it.

The formation in many respects resembles the Cambrian limestone, bearing *Salterella*, discovered in the Northern Territory by H. Y. L. Brown and me†, and subsequently traced east by Danes and Woolnough.‡

CARBONIFEROUS.

The extensive plains lying west and south-west of the ancient ranges represent the eroded surface of the Carboniferous. Only a few ridges and table topped outliers on the Lennard and Fitzroy Rivers give an approximate idea of the extent of the denudation. The plains are covered with recent deposits, and the only knowledge of the underlying beds has been obtained from bores and wells. The elevated exposures referred to consist of sandrock and shales, richly fossiliferous at certain horizons. At Mount Marmion, an outlier of Carboniferous, the following section was traced from the base upwards:—(a) Grey fossiliferous shales; (b) soft, friable, brown and yellow, fossiliferous sandstones containing nodules

* Annual Progress Report, Geol. Survey, W.A., 1906, p. 11.

† Report Government Geologist and Staff: By Authority: Adelaide, 1906.

‡ Report on Geology of Northern Territory, Bull. No. 4, p. 19 and map.

of limonite; (c) micaceous shales, with curved laminated planes; (d) ferruginous grits with mammillary and rosette-like concretions of manganiferous iron-ore; (e) slabby ferruginous sandstones. Hawkestone Peak consists of friable sandrock and shales, with an indurated capping which protects it from a rapid decay. Mr. Etheridge has reported upon the palaeontology below.

Abutting against the base of the Bastion Range, off Cambridge Gulf, a soft, brown, rotten sandy shale exists which probably belongs to the Carboniferous*, but time did not permit of a closer examination of the field.

I noted a striking resemblance between the north-western Carboniferous beds and the Permo-Carboniferous of Fossil Head, Port Keats and other localities in the Northern Territory.† Perhaps when more palaeontological evidence is forthcoming and the terrain has been further explored, these formations will be correlated. A. Gibb-Maitland has already classed the western beds as Permo-Carboniferous.‡

MESOZOIC.

The evidence of Mesozoic rocks in the North-West was obtained in a well at Madinganarra, near Point Torment (King Sound). A reddish sandstone there occurs beneath the sand which contains numerous impressions of plants. Mr. Etheridge has determined these specimens as the cycad *Otozamites*, and another species, which he states supply sufficient evidence to "indicate the existence of Lower Mesozoic beds on King Sound." Vide Plate XXXVIII.

RECENT.

I shall not comment upon the sand, mud, and laterites, but only mention the deposits of comminuted shells regularly banked and consolidated above high-water mark at Worla Island, Whirlpool Pass, and other points along the coast. They are more of the nature of storm-beaches than such raised-beaches, as I have described from the Northern Territory coasts.§

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* Compare R. L. Jack: Bull. Geol. Survey, W.A., No. 25 and A. Gibb Maitland: Proc. Austr. Assoc. Adv. Science, 1907.

† Vide Reports Government Geologist: By Authority: Adelaide, 1895 and 1906. Also H. Basedow: Proc. Roy. Geogr. Soc., S.A. Branch, Vol. XV., 1915.

‡ Proc. Austr. Assoc. Adv. Science, 1907, Plate I.

§ Proc. Roy. Geogr. Soc. (S.A. Branch), Vol. XV., 1915, p. 66-71.

OBSERVATIONS ON CARBONIFEROUS AND OTHER FOSSILS.

Collected by Dr. Herbert Basedow at Various Localities in North-West Australia.

BY R. ETHERIDGE, JUNR.
Director and Curator of the Australian Museum, Sydney.

(Plates XXXIX.—XL.)

In 1889 I reported[1] on a collection of fossils made by Mr. W. W. Froggatt, on behalf of Sir W. J. Macleay, from various localities on the Fitzroy River, Napier and Oscar Ranges, and Mount Marmion in North-West Australia.

More recently appeared[2] an account of a much larger collection forwarded to me for descriptive purposes by Mr. A. Gibb Maitland, Government Geologist of Western Australia; these were chiefly from Mount Marmion.

Mount Marmion lies near the junction of the Lennard and Meda Rivers, and the strata comprising it form part of E. T. Hardman's lower subdivision of his Carboniferous formation, or "Carboniferous Limestone,"[3] covering a large area throughout the Kimberley District. The bulk of Dr. Basedow's fossils are from this horizon.

It is not my intention to re-describe the whole of the species, I shall, therefore, content myself by furnishing a list, with remarks or descriptions only where necessary.

FROM THE LOWER HORIZON AT MOUNT MARMION.

Palæachlya gigas, Eth. fil.—(Bull. Geol. Survey W. Austr., 58, 1914, p. 8.)—Infesting *Spiriferæ*.

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1. Etheridge—Proc. Linn. Soc. N. S. Wales, IV. (2), Pt. 2, 1889, p. 199, pl. XVII.

2. Etheridge—Bull. Geol. Survey W. Austr., 58, 1914.

3. Hardman—First Report on the Geology of the Kimberley District. Western Australia—W. Austr. Legislative Council Papers, No. 31, 1884, p. 8, Second Report—*Loc. cit. ibid*, No 34, 1885, p. 16.

There is a still further undescribed boring body permeating the shell substance of *Producti*, of remarkable delicacy, possibly a species of *Achilites*, with tube diameters of from 0.10 to 0.15 m.m.

PORIFERA.

Calceolispongia hindei, Eth. fil.—(*Loc. cit.* p. 9)—Plentiful.

Anthracosycon, sp. (Pl.XXXIX., fig. 1.)—In 1908, Mr. G. H. Girty proposed this name as the generic designation of a small sponge, possibly of Lithistid affinities, from the Guadalupian (Carboniferous) Fauna of New Mexico.[4] "These little bodies are turbinate or pyriform, attached by the smallest end, without a peduncle or with but a small, ill-defined one. Cloaca presented by a slight depression on the upper surface, from which descend several (three or four) tubular openings through the axial region of the sponge."

A single small elongately-ovate or bluntly spindle-shaped body, evidently a matrix replacement, as there is no trace of tissue whatever. It is sub-pedunculate below, and with a small apical hollow, or depression, above, resembling a contracted cloaca, on the exterior delicate concentric rings existed, perhaps representing an epitheca. Omitting all question of species, this little fossil so readily falls within Girty's description of his *Anthracosycon*, I am feign to place it there pending the discovery of further material. Little doubt can exist of its poriferous nature, the form and apical depression support this view in the absence of spicular structure. The outline is more or less that of *Aulocopium cylindracium*, F. Roemer,[5] a Silurian species, and the supposed apical cloacal opening quite as seen in a Devonian form *Scyphia constricta*, Sandberger.[6] One example.

ACTINOZOA.

Pleurophyllum australe, Hinde (Geol. Mag.. VII. (3), 1890, p. 196)—Single specimen.

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4. Girty—U.S. Geol. Survey—Professional Paper 58, 1908, 71, 72.

5. Roemer—Foss. Fauna Sil. Dil.—Geschiebe Sadewitz bei Oels in Nieder Schlesien, 1861, pl. III., fig. 2a.

6. Sandberger—Vers. Rhein. Schichten Syst. Nassau—Lief. 9, 1856, p. 420 pl. XXXVII., figs. 10a-c.

Stenopora, sp. a.—(Etheridge, *Loc. cit.*, p. 20). Three small specimens not yielding any further details of structure.

Stenopora, sp. c.—(Etheridge, *Loc. cit.*, p. 22). Common throughout the deposit in small fragments. The determination of this particular coral as a *Stenopora* must be regarded as tentative, for so far the distinguishing features of the genus on microscopic examination have not been satisfactorily detected.

Favosites marmionensis, Eth. fil. (*Loc. cit.* p. 13). Plentiful, two very beautifully preserved in every way confirm the description given, and demonstrate in the most marked manner, when in the perfect condition, the upstanding or sharp-edged nature of the calice margins. In this state the polygonal outline often becomes lost in favour of an almost entirely oval, partially lunate, or festoon-like outline.

Monilopora nicholsoni, Eth. fil. (*Loc. cit.* p. 14). Six examples, three of which tend to confirm the description of the single specimen already described with "extended bifurcate mode of growth," with the corallites opening either at the sides of the general corallum, or on the anterior and posterior aspects only. It is quite posible it may be necessary to transfer this species to some other genus, or even create a new genus for its reception. The typical mode of growth of *Monilopora*, it must not be forgotten is either epiphytic or parasitic, probably the former, forming a more or less confused mass of intergrown tubes. We know not what the initial stage of the present species was like; it may have been of independent growth, it certainly was erect (Pl.XXXIX., fig. 2 and 3.) Another feature not seen in previous specimens is visible in one of those now present, viz., the septal flutings.

Evactinopora, sps. (Etheridge, *Loc. cit.* p. 16). There are three specimens referable to this genus. One is a flat tabular expansion, but whether one of the rays of *E. crucialis*, Hudleston, or distinct, I am unable to say through the lack of sufficient material for the preparation of sections. The other two examples are in the form of a crumpled zoarium, which is quite a new feature in our Australian *Evactinoporae*. The usual polygonal areas, separated by raised lines or ridges, as in *E. dendroidea*, Hudleston, are present.

BRACHIOPODA.

Cleiothyris macleayana, Eth. fil. (*Loc. cit.* p. 23), plentiful.

Spirifera musakheylensis, Davidson (Etheridge, *Loc. cit.*, p. 23)—One specimen. This is a small, but very well preserved example, exhibiting the frills of decoration, particularly in the valleys, or inter-costal spaces, to be themselves microscopically longitudinally striate in a very beautiful manner.

Spirifera marcoui, Waagen (Etheridge, *Loc. cit.*, p. 23)—Portions of valves.

Spirifera byroensis, Glauert (Etheridge, *Loc. cit.*, p. 25)—Portions of valves.

Spiriferella (?) *australasica*, Eth. fil. (*Loc. cit.*, p. 30)—Plentiful.

Aulosteges baracoodensis, Eth. fil. (*Loc. cit.*, p. 33.)—Portions of valves.

Strophalosia, sp. (Etheridge, *Loc. cit.*, p. 34, pl. V., figs. 16-18.)—Several examples, all adherent.

On a previous occasion I hinted at the possible occurrence of a fifth *Strophalosia* in Australian rocks. Dr. Basedow has procured much more satisfactory examples of this suspected fifth species, enabling me to give the following description.

STROPHALOSIA COMPLECTEUS, *sp. nov.*

(Plate XL., figs. 11, 12.)

Sp. Chars.—Shell small, very thin and delicate, transversely oval, adherent both by the whole pedicle valve surface, and radiating delicate marginal spines. Cardinal margins straight, but rather shorter than the greatest width of the valves, with rounded angles; areas comparatively wide for so small a shell, occupying the entire length of the cardinal margins, and apparently flat; deltidium and chilidium very narrow; teeth project at right angles to the plane of the cardinal margin, the apices turned slightly upwards and wrinkled. Brachial valve very slightly concave, or hollowed around the margins, and flat in the centre.

Obs.—The surface of the pedicle valve accommodates itself to the surface of the body to which the shell becomes attached, but when room to assume its natural shape is afforded the valve is exteriorly rather convex. The nearest Australian ally is the Tasmanian *S. jukesii*,

Eth. fil.,[7] from which *S. complectens* differs by possessing a transversely oval, instead of sub-quadrate outline, and attachment to foreign bodies by the whole of the exterior of the pedicle valve instead of by the cardinal umbo, as in the first named. In outline and general appearance, particularly in the concentric lamination of the brachial valve, it resembles *S. lamelosa*, Geinitz[8] of the Permian. The supplementary method of attachment by means in radiating spines is equalled by the same character of *S. parva*, King,[9] again a Permian form. This *Strophalosia* is clearly distinct from the other Australian species, and the method of adherence is, I believe, specific.

Orthotetes crenistria, Phillips (Etheridge, *Loc. cit.*, p. 36.)—Portions of valves.

Productus, sp. (Etheridge, *Loc. cit.*, p. 36, pl. I., fig. 1, pl. V., figs. 14-15.)—Numerous. For some few years past I have been cognisant of a small elegant *Productus* in the Carboniferous rocks of Western Australia, but specimens sufficiently complete for description had not presented themselves. Dr. Basedow's specimens prove this to be a particularly fragile, delicate, and handsome little species.

PRODUCTUS BELLUS, *sp. nov.*

(Pl. XXXIX., figs. 4, 5.; Pl. XL., fig. 6.)

Sp. Chars.—Shell of small size, transversely oval, concavo—convex. Pedicle valve convex, with the cardinal margin rather less than width of the valve, with small and delicate alations; umbonal region, well rounded; cardinal slopes gradually falling away, and not otherwise greatly differentiated from the remainder of the surface; umbo acute, its apex reposing on the cardinal margin. Brachial valve of like concavity to the amount of convexity of the pedicle; septum, strong, and extending for nearly half the length of the valve; sculpture very characteristic. On the pedicle valve the costæ are very regular, closely adpressed one to the other depressed convex, and here and there bifurcate, giving support to many very fine outstanding downwardly curved spines, which, when broken have the appearance

7. Etheridge—Proc. R. Phys. Soc. Edinb., V., 1880, p. 307, pl. XIII., figs. 39-43.

8. Geinitz—Dyas, I., 1861, pl. XVIII., figs. 1-7.

9. King—Permian Foss. England, 1850, pl. XII., fig. 33.

of numerous delicate prickles; two alternating rows along the cardinal margin of the pedicle valve, one row exactly on the cardinal edge, the other a little below it. The costæ of the brachial valve are finer, more numerous than on the pedicle valve, and spineless; cardinal edge without spines.

Obs.—An exceedingly handsome little shell, quite distinct from anything of a similar nature, occurring in the Permo-Carboniferous rocks of Eastern Australia.

P. bellus is in close relation with the *P. muricatus* and *P. carbonarius* groups of the European Carboniferous Limestone, possessing the spinification of the former, and outline of the latter. It also possesses a strong affinity with a small Indian species, *P. asperulus*, Waagen.[10] There is, however, a well-marked feature by which this *Productus* can be at once recognised, two rows of spines along the pedicular cardinal margin, the individual spines of one row alternating with those of the other row, and usually projecting upwards; this is a constant character.

Chonetes prattei, Davidson (Etheridge, *Loc. cit.*, p. 36.) —Three specimens, two of which demonstrate a larger degree of growth than those previously figured.

Rhynchopora, King.—Four specimens. These little shells are without doubt the gems of the collection. A genus founded by Prof. W. King for plicate *Rhynchonellæ* with a perforate test. I have been unable to obtain access to a complete definition of *Rhynchopora*, and am, therefore, in some doubt as to the propriety of referring these little shells to that genus. Whether or no, the reference given below[11] is King's first enunciation, I am unable to say. Dr. Waagen gives a much earlier one, but his reference is erroneous.

Rhynchopora is variously defined as having "the internal structure of *Rhynchonella*, but its shell is coarsely punctate" (Waagen); plicate Rhyncchonellids with punctate shell structure" (Hall & Clarke); "plicate *Rhynchonellas* with the shell substance punctate" (Schuchert in Eastman's Zittel); or "resembles *Camarotœchia*, but differs externally in its punctate shell structure" (Grabau & Schimer). Not one of these authors makes

10. Waagen—Salt Range Foss. (Pal. Indica), Pt. IV., fas.. 4, p. 633, pl. LXXIX., figs. 3-6.

11. King—Ann. Mag., Nat. Hist., XVI (3), p. 124.

any mention of a delthyrium, or deltidial plates. As, however, Schuchert speaks of "plicate *Rhynchonellæ*", presumedly referring to the genus and not the family, one can only presume that *Rhynchopora* like *Rhynchonella* (s.s.) possesses deltidial plates. Now in the type of the former *Rhynchonella geinitziana*, De Verneuil, as figured both by De Verneuil and Geinitz, these structures are certainly not visible, but in King's Fig. 8 it is an open question if such are not intended to be present.

I have entered thus fully into the structure of *Rhynchopora*, because I have now to introduce a plicate Rhynchonellid, with a perforate test, but whether deltidial plates are present, or were so and became absorbed, the condition of the specimens does not permit me to say.

RHYNCHOPORA BASEDOWI, *sp. nov.*

(Pl. XL., figs. 7—10.)

Sp. Chars.—Shell small, sub-triangular; valves, low, bi-convex ; cardinal margins, gently arched; ventral margins, sub-semicircular. Pedicle valve low-convex, with a shallow and hardly perceptible sulcus; apical region prominent and upstanding; umbo truncated obliquely upwards, with an oval foramen, which is almost entirely excavated out of the pedicle valve, the deltidial plates taking but a very small part in its circumscription; delthyrium comparatively large. Brachial valve exceeding the pedicle in amount of convexity. About twelve costa in each valve, very sharp and regular, two in the sinus and three on the fold; traces of numerous concentric frills still in evidence; punctæ of the test, very minute, but visible with a hand lens.

PELECYPODA.

Deltopecten subquinquelineatus, McCoy (Etheridge, *Loc. cit.*, p. 58.)—One specimen.

FROM THE UPPER OR "SANDY" ZONE AT MOUNT MARMION.

A fine ferruginous and partially limonitic gritty shale with imperfectly preserved and quite indeterminable fossils.

FROM NAPIER RANGES—NAPIER DOWNS.

A white, almost crystalline limestone containing plentifully scattered small Crinoid stem ossicles. There is also one example of a Stromatoporoid, a species of

Stromatoporella. Its presence will relegate this limestone to a rather low position in the stratigraphical sequence.

Says Mr. A. Gibb Maitland[12]:—"The calcareous beds of the Lower Series form bold precipitous escarpments, such as those in the Geikie and Napier Ranges. The formation has yielded a suite of Carboniferous fossils." On the other hand, Dr. R. L. Jack remarked[13]:—"At Minnie Pool, near Mount Pierre, I observed some indication that the limestone region mapped as Carboniferous consists partly of limestone of an older date. . . . Some layers were almost entirely composed of corals in very bad state of preservation. . . . Mr. Etheridge writes that the corals are Stromatoporoids, and are therefore, either Silurian or Devonian, certainly not Carboniferous."

Mr. Maitland's opinion appears to have become modified since he wrote as above quoted in 1900. In 1912 he remarked[14]:—"In the Napier Range the Devonian rocks are represented by solid crystalline limestones, with, at the base of the formation, a calcareous breccia and conglomerate. These beds are seen in the Barker River Gorge."

FROM BARKER RIVER GORGE, NAPIER RANGES.

A white crystalline limestone like that referred to in previous paragraphs, also with Crinoid stem ossicles and sections of Brachiopod tests. One section I believe to be that of the pedicle valve of a Pentamerid.

FROM FORREST RIVER, CAMBRIDGE GULF.

A quartzite, on the weathered surfaces of which are hollows and vacuities of a brown colour that may be the impressions of decomposed plant tissue. Dr. Basedow says:—"Some of the bedding planes are entirely covered with similar marks."

FROM MADINGANARRA (NEAR POINT TORMENT), KING SOUND.

A ferruginous, mottled, friable, fine-grained grit with plant impressions. Some of the latter are portions of

12. Maitland—Bull. Geol. Survey W. Austr., 4, 1900, p. 30.
14. Maitland—Bull. *Ibid.*, 50, 1912, p. 16.
13. Jack—Bull *Ibid.*, 25, 1906, p. 11.

Cycadean foliage referable to *Otozamites*, a genus elsewhere ranging in geological time from the Lower Rhætic to the Coralline Oolite. Although only matrix impressions, one of the chief features of this Cycad are displayed—the obliquely set imbricating leaves inserted on the face of the rachis. In this instance the leaves are ovate, lanceolate, small, short (with an average length of ten millimetres), and with obtuse apices; the matrix is unfavourable for the preservation of the venation.

I cannot distinguish any difference between these impressions and the *Otozamites* figured by Feistmantel from Talgai, Queensland,[15] or from near Toowoomba by Tenison Woods.[16] With these frond fragments are three portions of stem impressions with node divisions. There is nothing left to assist precise determination, but all three *Phyllotheca*, *Equisetites*, and *Schizoneura* might put in an equal claim.

The evidence of these plant remains is sufficient to indicate the existence of Lower Mesozoic beds on King Sound.

APPENDIX.

The Stromatoporoids.

The organism collected by Dr. Basedow in the Napier Ranges is described below as *Stromatoporella kimberleyensis*. Those referred to by Dr. Jack were fortunately presented by him to the Australian Museum. One is a well-marked species of *Actinostroma*, Nicholson, a genus comprising a large number of forms, which previous to Prof. Nicholson's investigations were included in the old genus *Stromatopora*. The second form is a species of the rare genus *Stachyodes*, a dendroid Stromatoporoid.

Genus Actinostroma, *Nicholson*, 1886.
(Mon. Brit. Stromatoporoids, Pt. 1, 1886, p. 75.)

ACTINOSTROMA SUB-CLATHRATUM, *sp. nov.*

Sp. Chars.—Cœnosteum massive, possibly hemispherical, and evidently of large size. Skeletal

15. Feistmantel—Palaeontographica, 1879, Supl. Bd. III., Lief. 3, Heft. 4, p. 171, pl. XII., fig. 6.

16. Woods—Proc. Linn. Soc. N. S. Wales, VII., pt. 1, 1883, p. 151.

tissue of the "hexactinellid type," the component factors closely crowded together, hence the tissue is dense; latilamina are present, from 4.5 m.m. thick, separated from one another by distinct dark lines; concentric lamina gently curved, or at the most slightly undulate, averaging from four to five in the space of one millimetre. In radial section the radial pillars seem to be continuous, extending from lamina to lamina without interruption, as many as nine were counted extending through a space of four millimetres, or practically one latilamina. In a tangential section the angular meshwork, caused by the horizontal extensions of the radial pillars, given off with great regularity in radiating whorls so characteristic of the genus, is most marked; zooidal tubes in the radial pillars are sometimes visible. Astrorhizæ do not appear to have been developed, the surfaces of the latilamina would, therefore, have been devoid of mamelons.

Obs.—This form, so closely related to *Actinostroma clathratum*, Nicholson, a distinctly Devonian form, I distinguish simply by the name *sub-clathratum*. Vertical tubes, which resemble ordinary "Caunopora" tubes, in having definite walls, are here and there present.

Loc.—Hill at Minnie Pool, Margaret River (R. L. Jack)—Australian Museum.

Genus Stromatoporella, *Nicholson*, 1886.
(Mon. Brit. Stromatoporoids, Pt. 1., 1886, p. 92.)

STROMATOPORELLA KIMBERLEYENSIS, *sp. nov.*

Sp. Chars.—Coenosteum apparently forming a thick laminar expansion (25 m.m.), but whether incrusting, or attached by a peduncle evidence is lacking. Concentric laminæ gently undulated (thereby probably indicating the absence of mamelons on the surface), averaging from four to five in the space of one millimetre, and possessing a peculiar structure of their own, in that they are composed of parallel wavy fibres concentric around the interlaminar spaces, but without any median clear line; interlaminar spaces appear to be quite subordinate to the concentric laminæ, are oval or circular, without septa; radial pillars stout, short, and confined to their respective interlaminar spaces; zooidal tubes not observed. A tangential section displays the cut ends of radial pillars, or sections of

the concentric laminæ, thereby indicating a considerable degree of reticulation.

Obs.—The state of preservation of the tissues is very uneven. In one radial or longitudinal section the structure of the concentric laminæ is preserved, but in a second taken close to the first the whole of the tissues are obliterated, and represented by clear mineral matter, and in a tangential section the same occurs.

Nicholson's description of the structure of *S. eifelensis* so aptly fits that of this form I am feign to quote it:—"Owing to the thickness of the laminæ, the interlaminar spaces are comparatively narrow, and the correspondingly thick radial pillars usually run from lamina to lamina, but do not extend beyond the interlaminar space within which each originates."

There is another aspect of this fossil seen in longitudinal sections difficult of interpretation, viz., large branching canals, or tubes, vertical or oblique, often running through more than one concentric lamina, in fact passing four or five direct, and filled with clear mineral matter. For a long time I was much puzzled to account for these passages, and I can only do so now on the hypothesis of structural decay, whereby the tissue of certain of the radial pillars has decayed and the channels thus formed "ran together' with some of the interlaminar spaces, and so formed these unsymmetrical tubular spaces. Here and there it is possible to see one, or perhaps two superimposed replaced radial pillars combining with a similarly infilled interlaminar space.

Loc. Napier Range, Napier Downs (Dr. H. Basedow) —Australian Museum.

Genus Stachyodes, *Bargatsky*, 1881.

(Zeits. Deut. Geol. Ges., 1881, p. 688.)

Obs.—In this genus the coenosteum is dendroid—branched cylindrical stems terminating distally in rounded ends—or occurs in iregular masses. The skeletal fibre is minutely tubulated, the tubuli running parallel with the zooidal tubes, of which they are branches, whilst the zooidal tubes are offshoots from a principal central axial canal. Both this and the tubes, which open at the surface by rounded apertures, may be tabulate. Growth is affected by the addition of successively

formed convex layers, but there are no true concentric laminæ nor radial pillars.

At the time Prof. Nicholson wrote only one species was known, *S. verticillata*, McCoy, from the Devonian of England and Germany.

STACHYODES DENDROIDEA, *sp. nov.*

Sp. Chars.—Branches cylindrical and round, but of unknown length, averaging from five to six millimetres in diameter. Zooidal apertures at the surface in places run together to form short vermicular lines. Skeletal tissue very dense; zooidal tubes variable in size, and difficult to distinguish from the lateral branches of the axial canals; both may be tabulate.

Obs.—This is a distinctly marked species of *Stachyodes*, and judging from Nicholson's figures of the type, of smaller habit, and more shrub-like appearance. In tangential sections the tissue appears crowded with black dots, the cut ends of very delicate tubuli that run parallel to the zooidal tubes.

Loc.—Hill at Minnie Pool, Margaret River, associated with *Actinostroma subclathratum* (R. L. Jack)—Australian Museum.

EXPLANATION OF PLATES XXXIX. AND XL.

ANTHRACOSYCON (?), *sp.*

Fig. 1.—Lateral view of the supposed sponge, exhibiting the cloaca-like opening at the apex.

MONILOPORA NICHOLSONI, *Eth. fil.*

Fig. 2—Portion of a corallum with five callices.

Fig. 3—Portion of an erect corallum with four callices.

PRODUCTUS BELLUS, *Eth. fil.*

Fig. 4—Pedicle valve displaying the costæ and low prickle-like spines.

Fig. 5—Another pedicle valve; here the two series of cardinal spines are visible.

Fig. 6—A third pedicle valve.

RHYNCHOPORA BASEDOWI, *Eth. fil.*

Fig. 7—View of the brachial valve and pedical umbo and foramen; typical form.

Fig. 8—Side view of same specimen.

Fig. 9—Pedicle valve of a broader example.

Fig. 10—Brachial valve and pedicle umbo and foramen of specimen Fig. 9.

STROPHALOSIA COMPLECTENS, *Eth. fil.*

Fig. 11—Four valves, three adherent to the brachial valve of *Productus*, the fourth, a brachial reposing in open opposition with its pedicle valve.

Fig. 12—Two valves, a pedicle and a brachial; the spines of attachment can be detected with a pocket lense.

The figures represent all the specimens enlarged two diameters.

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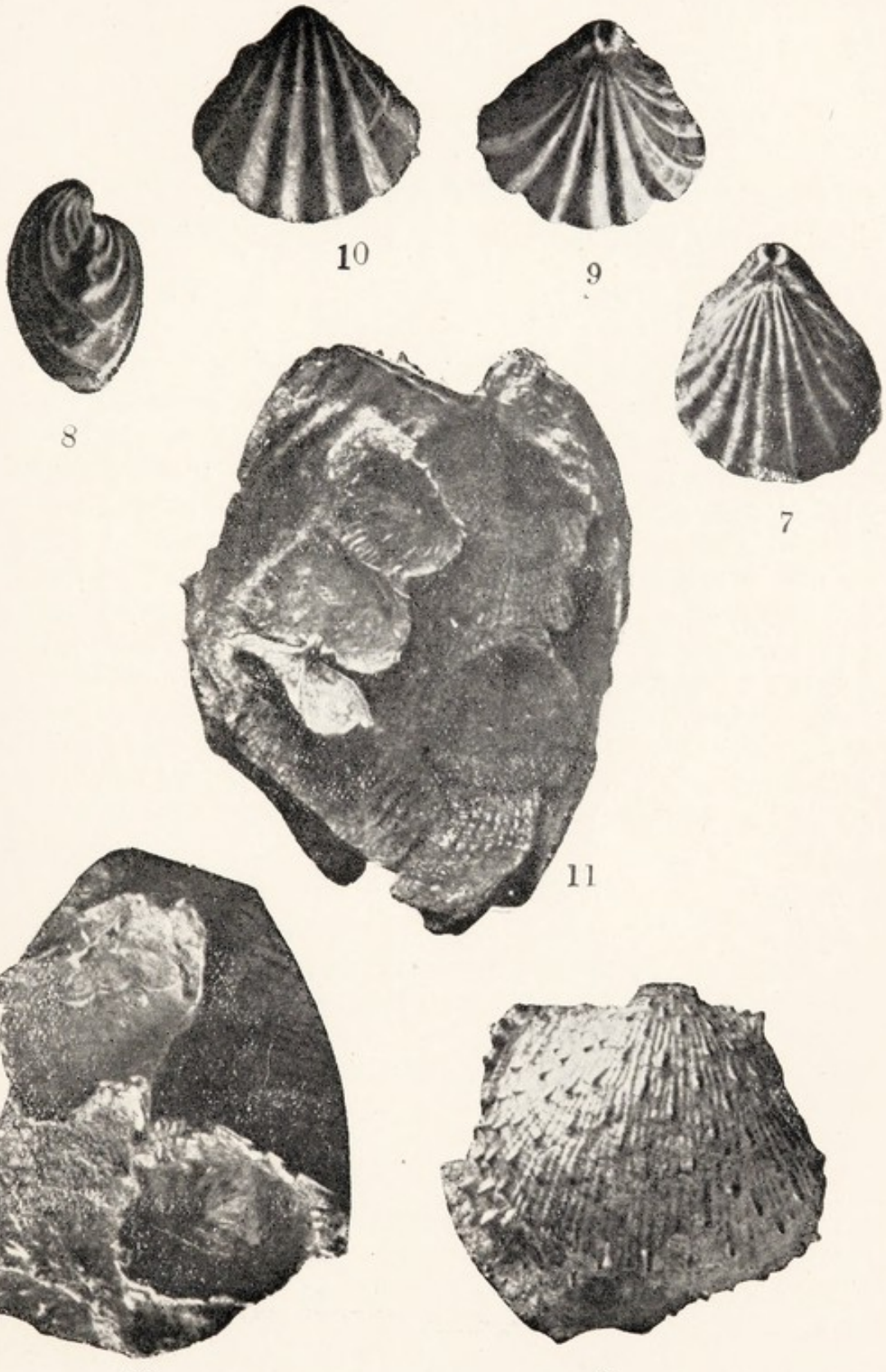
R. Etheridge, Jun.

NEW CARBONIFEROUS FOSSILS FROM NORTH-WESTERN AUSTRALIA.



. Etheridge, Jun.

NEW CARBONIFEROUS FOSSILS FROM NORTH-WESTERN AUSTRALIA.

MOLLUSCA.

By Charles Hedley, Assistant Curator, Australian Museum, Sydney (Plate XLI, Fig. I.)

During his travels in tropical Western Australia, Dr. H. Basedow, though preoccupied in other directions, found time to search for Mollusca. Unfortunately for his prospect of making discoveries, he was preceded on the rich limestone country by a particularly active and expert collector, Mr. W. W. Froggatt. Nevertheless a remarkable freshwater snail from the Paterson Range is now presented as new to science. A collection of marine Mollusca was made among the islands of the Buccaneer Archipelago. As a result nearly sixty species of Mollusca are now added to the fauna of this State.* Of these two are named as new to science. So that knowledge of the Molluscan fauna of Western Australia has been considerably enlarged by the efforts of Dr. H. Basedow.

FAMILY NUCULIDAE.

NUCULA SUPERBA, *Hedley.*

Nucula superba, Hedley, Austr. Mus.Mem., iv., 1902, p. 292. *Id.*, Rec. Austr. Mus., viii., 1912, p. 131, pl. 40, fig. 1, 2.

New to Western Australia. Two valves from the Buccaneer Archipelago.

FAMILY ARCIDAE.

ARCA ADAMSIANA, *Dunker.*

Arca adamsiana, Dunker, Novit. Conch., 1866, p. 88, pl. 29 fig. 4-6 *Id.*, Hedley, Proc. Soc. N.S. Wales, xli., 1917, p. 680.

New for Western Australia. One valve. Point Torment, King Sound.

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* A full catalogue of the species known to date from Western Australia has been pulished by the writer in the Journal of the Royal Society of Western Australia, i., 1916, pp. 152-226.

ARCA GRANOSA, *Linne.*

Arca granosa, Linne, Syst. Nat., x., 1758, p. 294. *Id.*, Lamy, Journ. de Conch., liv., 1907, p. 210.

Taken by Dr. Mjorberg in Western Australia, but not yet recorded for this state. Several odd valves from Port Hedland.

ARCA OLIVACEA, *Reeve.*

Arca olivacea, Reeve, Conch. Icon., ii., 1844, pl. xvi., fig. 113.

New for Western Australia. Two valves from the Buccaneer Archipelago.

ARCA TORTUOSA, *Linne.*

Arca tortuosa, Linne, Syst. Nat., x., 1758, p. 693.

A few odd valves from the Bucccaneer Archipelago.

ARCA VENTRICOSA, *Lamarck.*

Arca ventricosa, Lamarck, An. s. vert., vi., 1819, p. 38. *Id.*, Philippi, Abbild. Beschr., ii., 1847, p. 211, pl. iii., fig. 4, 5.

This is new to Western Australia, but perhaps earlier records of A. imbricata may refer to this. One valve from the Buccaneer Archipelago.

FAMILY PERNIDAE.

ISOGNOMON NUCLEUS, *Lamarck*

Perna nucleus, Lamarck, An. s. vert., vi., 1819, p. 142. *Melina nucleus*, Lamy, Bull. Mus. Hist. Nat. xii., 1906, p. 314.

Unrecorded for Western Australia. A pair from the Buccaneer Archipelago.

FAMILY OSTREIDAE.

OSTREA CUCULLATA, *Born.*

Ostrea cucullata Born, Test. Mus. Caes. Vindob., 1780. p. 114, pl. vi, fig. 11, 12.

A few specimens from the Buccaneer Archipelago.

FAMILY UNIONIDAE.

DIPLODON WILSONII, *Lea.*

Unio wilsonii, Lea, Proc. Acad. Nat. Sci. Philad., 1859, p. 153.

Diplodon wilsonii, Simpson, Proc. U.S. Nat. Mus., xxii., 1900, p. 892.

New for Western Australia. A few separate valves, Meda, May River.

FAMILY TRIGONIIDAE.

NEOTRIGONIA UNIOPHORA, *Gray.*

Trigonia uniophora, Gray, Voy. "Fly," ii., 1847, Append., p. 361, pl. ii., fig. 5. *Id.*, Bednall, Trans. Phil. Soc., Adelaide, i., 1878, p. 80.

This species seems to be unrecorded for Western Australia, though Bednall found it as near as Indian Island, Bynoe Harbour, N. Territory.

One small valve. Point Torment, King Sound.

FAMILY PECTINIDAE.

PECTEN MACASSARENSIS, *Chenu.*

Pecten macassarensis, Chenu, Illustr. Conch. Livr., xxxix., 1845, pl. xxxix., fig. 4. *Id.*, Dautzenberg & Bavay, Lamell. Siboga Exped., 1912, p. 21.

Unrecorded for Western Austarlia. One valve from Buccaneer Archipelago.

CHLAMYS SINGAPORINUS, *Sowerby.*

Pecten singaporinus, Sowerby, Thes, Conch., i., 1842, p. 74, pl. 13, fig. 55 *Id.*, Smith, Zool. Coll. Alert, 1884, p. 115.

Unrecorded for Western Australia. Several specimens from the Buccaneer Archipelago.

FAMILY SPONDYLIDAE.

SPONDYLUS COCCINEUS, *Lamarck*

Spondylus coccineus, Lamarck, An. s. vert., vi., 1819, p 190. *Id.*, Chenu, Illustr. Conch., Livr. 22, 23, 24. 1844, pls. xiv, xv.

Unrecorded for Western Australia. One specimen from Point Sampson, Port Hedland.

SPONDYLUS WRIGHTIANUS, *Crosse.*

Spondylus wrightianus, Crosse, Journ. de. Conch., xxi., 1872, p. 253, pl. ix., fig. 1.

One from Point Torment, King Sound.

PLICATULA IMBRICATA, *Menke.*

Plicatula imbricata, Menke, Moll. Nov. Holl., 1843, p. 35.

A few from the Buccaneer Archipelago.

FAMILY ANOMIIDAE.

PATRO ELYROS, *Gray.*

Anomia elyros, Gray, Proc. Zool. Soc., 1849 (1850), p. 118, pl. iv.,fig. 1, 2.

Some separate valves from the Buccaneer Archipelago.

FAMILY MYTILIDAE.

MODIOLA ELONGATA, *Swainson.*

Modiola elongata, Swainson, Exot. Conch., 2nd. Ed., 1841, p. 31, fig. 8.

Unrecorded for Western Australia. A single valve from the Buccaneer Archipelago.

MODIOLA PHILLIPINARUM, *Hanley.*

Modiola philippinarum, Hanley, Proc. Zool. Soc., 1844, p. 15.

A few dead valves from the Buccaneer Archipelago.

SEPTIFER BILOCULARIS, *Linne.*

Mytilus bilocularis, Linne Syst. Nat., x., 1758, p. 705.

Several dead valves from the Buccaneer Archipelago.

FAMILY CARDITIDAE.

CARDITA AVICULINA, *Lamarck.*

Cardita aviculina, Lamarck, An. s. vert., vi., 1819, p. 26.

One valve from the Buccaneer Archipelago.

CARDITELLA TORRESI, *Smith.*

Carditella torresi, Smith, Chall. Exped. Zool., xii., 1855, p. 217, pl. xv., fig. 8.

New for Western Australia. A few from the Buccaneer Archipelago.

FAMILY LUCINIDAE.

DIVARICELLA ANGULIFERA, *von Martens.*

Divaricella angulifera, von Martens, Fauna Mauritius, 1880, p. 321, pl. xxii., fig. 14.

One valve from the Buccaneer Archipelago.

LUCINA CORRUGATA, *Deshayes.*

Lucina corrugata, Deshayes, Mag. de Zool. Moll., 1843, pl. 82.

Cryptodon philippinarum, Smith, Ann. Mag. Nat. Hist., (6), xvi., 1895, p. 13.

New for Western Australia. Several odd valves from the Buccaneer Archipelago

FAMILY CARDIIDAE.

CARDIUM FLAVUM, *Linne.*

Cardium flavum, Linne, Syst. Nat., x., 1758, p. 680.

Several from the Buccaneer Archipelago.

CARDIUM LÆVIGATUM, *Linne.*

Cardium lævigatum, Linne, Syst. Nat., x., 1758, p. 680.
Id., Hanley, Ips. Linn. Conch., 1855, p. 51, pl. 1., fig. 8.

New for Western Australia. One from the Buccaneer Archipelago.

CARDIUM SETOSUM, *Redfield.*

Cardium setosum, Redfield, Ann. Lyceum Nat. Hist., New York, iv., 1846, p. 168, pl. v., *Id.*, Smith, Chal. Rep. Zool., xiii., 1885, p. 158.

New for Western Australia. A few odd valves from the Buccaneer Archipelago.

CARDIUM UNEDO, *Linne.*

Cardium unedo, Linne, Syst. Nat., x., 1758,, p. 680.

A few from the Buccaneer Archipelago.

OPISOCARDIUM SUBRETUSUM, *Sowerby.*

Cardium subretusum, Sowerby, Conch. Illustr., 1840, fig. 24.

New for Western Australia. Four valves from the Buccaneer Archipelago.

FAMILY TRIDACNIDAE.

HIPPOPUS HIPPOPUS, *Linne.*

Chama hippopus, Linne, Syst. Nat., x., 1758, p. 691.

One specimen from Sunday Island, King Sound.

TRIDACNA ELONGATA, *Lamarck.*

Tridacna elongata, Lamarck, An. s. vert., vi., 1819, p. 106.

One from Sunday Island, King Sound.

FAMILY VENERIDAE.

DOSINIA LUCINALIS, *Lamarck.*

Cytherea lucinalis, Lamarck, An. s. vert., v., 1818, p. 572.

A few valves from the Buccaneer Archipelago.

GAFRARIUM TUMIDUM, VAR MENKEI, *Jonas.*

Circe menkei, Roemer, Monog. Venus, 1869, p. 177, pl. 48., fig. 1, *Id.*, Smith, Zool. Coll. Alert., 1884, p. 506.

The species in chief has already been recorded under the synonym of *G. gibbium*, but this variety is new to Western Australia. Three specimens from Sunday Island, King Sound. Native name "Banderra."

GAFRARIUM CUNEATUM, *Lamarck.*

Cytherea cuneata, Lamarck, An. s. vert., v., 1818, p. 578.

Half a dozen odd valves from the Buccaneer Archipelago.

GAFRARIUM UNDATINUM, *Lamarck.*

Cytherea undatina, Lamarck, An. s. vert., v., 1818, p. 575.

One valve from the Buccaneer Archipelago.

LIOCONCHA FASTIGIATA, *Sowerby.*

Cytherea fastigiata, Sowerby, Thes. Conch., ii., 1851, p. 643. pl. 135, fig. 159-9.

New for Western Australia. Numerous valves from the Buccaneer Archipelago.

PAPHIA GALLUS, *Gmelin.*

Venus gallus, Gmelin, Syst. Nat. xiii., 1791, p. 3277. *Id.* Chemnitz, Conch. Cab., vi., p. 323, pl. xxxi., fig. 158-9.

New for Western Australia. Several valves from the Buccaneer Archipelago.

ANTIGONA TIARA, *Dillwyn.*

Venus tiara, Dillwyn, Descript. Cat., I., 1817, p. 162.

Several valves from the Buccaneer Archipelago.

ANTIGONA CHEMNITZII, *Hanley.*

Venus chemnitzii, Hanley, Proc. Zool. Soc., 1844, p. 160.

A pair from the Buccaneer Archipelago.

CLEMENTIA CRASSIPLICA, *Lamarck.*

Lutraria crassiplica, Lamarck, An. s. vert., v., 1818. p. 471. *Id.*, Lamy, Bull. Mus. Hist. Nat., 1917, p. 342.

New to Western Australia. Two valves from the Buccaneer Archipelago.

FAMILY GLAUCONOMYIDAE.

GLAUCONOMYA CHINENSIS, *Gray.*

Glauconome chinensis, Gray, Spicilegia Zoologica, pt. i., 1828, p. 6. *Id.*, Hanley, Descript. Cat. Rec. Biv. Shells, 1842, p. 17, pl. x., fig. 4.

Unrecorded for Australia. On a tidal mudflat at the Obagooma, on the Robinson River. Numerous separate valves.

FAMILY TELLINIDAE.

TELLINA PIRATICA, *sp. nov.*

(Plate XLI., fig. 1, 2, 3,; and text fig. 1.)

Shell triangular-ovate, sublenticular. Colour buff either uniform or irregularly suffused or zoned with flesh tint. Beak a little prominent, anterior and ventral margins rounded, posterior side straight and abruptly truncate. In both valves but more developed in the right, a straight sharp and narrow fold, distant about its own breadth from the posterior margin, the end of it slightly projects from the ventral margin. Right valve more convex than the left and slightly clasping it at the sides. There is no trace of radial sculpture, the whole disk is covered with fine concentric, sharp and regular hair riblets. These grow gradually wider apart and higher towards the ventral margin and on the fold, and end suddenly at the posterior margin. In the interstices of the riblets are a few microscopic, concentric striae. In the hinge there are the usual posterior and anterior laterals, which are feebler in the left valve. The cardinals are a small lamellate tooth and a strong prominent bifid tooth, which is anterior in the left valve and posterior in the right. The beak in notched, more so in the left valve Length, 27; height, 22; and depth of conjoined valves, 9 mm.

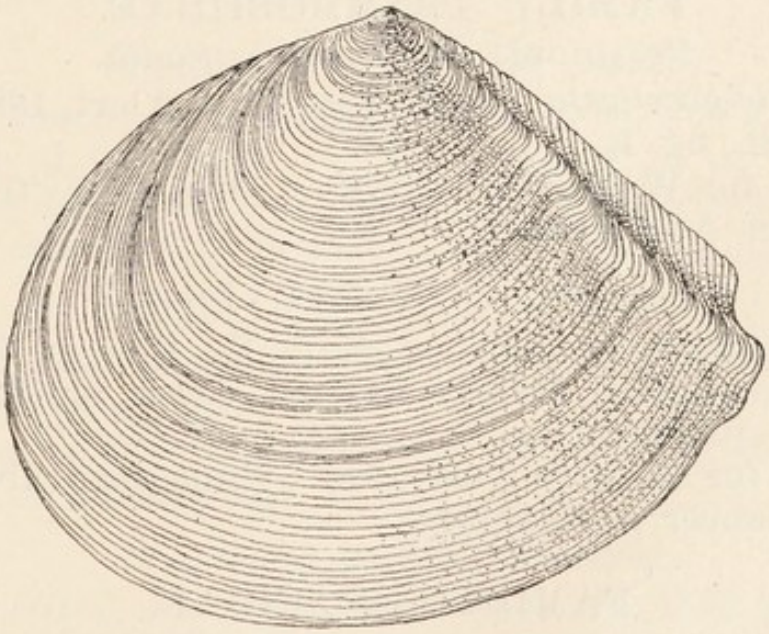


Fig. 1. TELLINA PIRATICA.

In respect of the hinge and muscular impressions, this seems to be nearer to *Pseudarcopagia* than to *Tellina*, as typified by *T. virgata*. It approaches *T. ostracea*, Lamk. (Encyl. Meth,, pl.290, fig. 13) but is rounder with a narrower fold. It is also near *T. perplexa*, Hanley (Thes. Conch., I., pl. 60., fig. 139.) but is much shorter.

One complete shell and several separate valves were gathered by Dr. Basedow in the Buccaneer Archipelago.

TELLINA VIRGATA, *Linne.*

Tellina virgata, Linne, Syst. Nat., x., 1758, p. 674.

Three valves from the Buccaneer Archipelago.

ARCOPAGIA ELEGANTISSIMA, *Smith.*

Tellina elegantissima, Smith, Chall. Rep. Zool., xiii., 1885, p. 105, pl. iv., fig. 3.

New to Western Australia. One valve from the Buccaneer Archipelago.

METIS SPECTABILIS, *Hanley.*

Tellina spectabilis, Hanley, Proc. Zool. Soc., 1844, p. 141. *Id.*, Thes. Conch., I., 1846, p. 323, pl. 65., fig. 254.

New for Western Australia. A few valves from the Buccaneer Archipelago.

FAMILY PSAMMOBIIDAE.

PSAMMOBIA GRACILENTA, *Smith.*

Psammobia gracilenta, Smith, Zool. Coll. Alert, 1884, p. 98, pl. vii., fig. b.

New for Western Australia. One valve from the Buccaneer Archipelago.

ASAPHIS DEFLORATA, *Linne.*

Venus deflorata, Linne, Syst. Nat., X., 1758, p. 687. *Id.*, Lynge, D. Kgl. Danske Vidensk. Selsk. Skrifter 7, t.v. 1909, p. 209.

New for Western Australia. Numerous valves from the Buccaneer Archipelago.

FAMILY DONACIDAE.

DONAX FABA, *Gmelin.*

Donax faba, Gmelin, Syst. Nat., xiii., 1791, p. 3264.

Many specimens from the Buccaneer Archipelago.

HEMIDONAX DONACIFORME, *Schroeter.*

Cardium donaciforme, Schroeter, Einl. Conch., 1786, p. 68, pl. vii., fig. 14. *Id.*, Lamy., Journ. de Conch., lxii, 1917, p. 264.

New for Western Australia. One valve from the Buccaneer Archipelago.

FAMILY MACTRIDAE.

ATACTODEA STRIATA, *Gmelin.*

Mactra striata, Gmelin, Syst., Nat., xiii., 1791, p. 3257. *Mesodesma striata*, Reeve, Conch. Icon., viii., 1854, pl. iv., fig. 10.

This common species has not before been recorded from Western Australia. Several specimens from the Buccaneer Archipelago.

MACTRA ALTA, *Deshayes.*

Mactra alta, Deshayes, Proc. Zool. Soc., 1854 (1855), p. 347. *Id.*, Smith, Proc. Malac. Soc., xi., 1914, p. 139, text fig.

New for Western Australia. A few valves from the Buccaneer Archipelago.

MACTRA DEPRESSA, *Spengler.*

Mactra depressa, Spengler, Skrift. Selsk., v., 1802, p. 118. *Id.*, Lamy, Bull. Mus. Hist. Nat., 1916, p. 242.

New for Western Australia Two valves from the Buccaneer Archipelago.

CORBULA FORTISULCATA, *Smith.*

Corbula fortisulcata, Smith, Proc. Zool. Soc., 1878, p. 819, pl. 50, fig. 23.

New for West Australia. Several specimens from the Buccaneer Archipelago.

CORBULA MACGILLIVRAYI, *Smith.*

Corbula macgillivrayi, Smith, Chall. Rep. Zool., xiii., 1885, p. 30, pl. x., fig. 8.

New for Western Australia. Several specimens from Buccaneer Archipelago.

MARTESIA OBTECTA, *Sowerby.*

Pholas obtecta, Sowerby, Thes. Conch., ii., 1849, p. 496, pl. 108., fig. 80-81.

Found boring in Mangrove wood in Marlemma Strait, Camden Sound.

FAMILY CHITONIDAE.

Squamopleura hirtosus, *Blainville.*

Chiton hirtosus, Blainville, Dict. Sci. Nat., xxxvi., 1825, p. 546.

Acanthopleura georgiana, Thiele, Faun. Sudwest Austr., iii., 1911, p. 399, pl. vi., fig. 3.

Scelerochiton hirtosus, Iredale, Proc. Malac. Soc., xii., 1916, p. 105.

This adds a tenth to the list (Hedley, Proc. Linn. Soc. N.S. Wales, xxxviii., 1913, p. 271) of marine Western Australian species misreported from Tasmania. Several specimens. Camden Sound, Buccaneer Archipelago, and Point Torment, King Sound.

Acanthopleura gemmata, *Blainville*

Chiton gemmatus, Blainville, Dict. Sci. Nat., xxxvi., 1825, p. 544.

Acanthopleura gemmata, Iredale, Proc. Zool. Soc., 1914, ii., p. 668.

Numerous specimens. Buccaneer Archipelago.

Acanthopleura spinosa, *Bruguiere.*

Chiton spinosus, Bruguiere, Journ. Hist. Nat. i., 1792, p. 25, pl. 2., fig. 1, 2.

Acanthopleura spinosa, Iredale, Proc. Zool. Soc., 1914, ii., p. 668.

One specimen, Buccaneer Archipelago.

FAMILY FISSURELLIDAE.

Diodora jukesii, *Reeve.*

Fissurella jukesii, Reeve, Conch. Icon., vi., 1849, pl. vii., fig. 45.

New to Western Australia. One from the Buccaneer Archipelago.

Hemitoma rugosa, *Quoy & Gaimard.*

Emarginula rugosa, Quoy & Gaim., Zool. "Astrolabe", iii., 1834, p. 331, pl. 68, fig. 17, 18.

One from the Buccaneer Archipelago.

Hemitoma variegata, *A. Adams.*

Emarginula variegata, A. Adams, Proc. Zool. Soc., 1851, p. 84. *Id.*, Thes. Conch., iii., 1862, p. 215, pl. 245, fig. 9, 10.

New for Western Australia. One from the Buccaneer Archipelago.

HALIOTIS ASININUS, *Linne.*

Haliotis asininus, Linne, Syst. Nat., x., 1758, p. 780, *Id.*, Reeve, Conch. Icon., iii., 1846, pl. vi., fig. 18.

Unrecorded for Western Australia. Three from the King Sound.

HALIOTIS VARIA, *Linne.*

Haliotis varius, Linne, Syst. Nat., x., 1758, p. 780.

Three from the Buccaneer Archipelago.

FAMILY TROCHIDAE.

TROCHUS NILOTICUS, *Linne.*

Trochus niloticus, Linne, Syst. Nat., xii., 1767, p. 1227. *Id.*, Hedley, Australian Zoologist, i., 1917, pl. v.

Native name "Madin," Sunday Island, King Sound.

TROCHUS HANLEYANUS, *Reeve.*

Trochus hanleyanus, Reeve, Proc. Zool. Soc., 1842, p. 184. *Id.*, Conch. Icon., xiii., 1862, pl. i., fig. 2.

Trochus lineatus, Lamark, as figured by Delessert, the name of which was preoccupied by Da Costa, is also present in this collection and contrary to the opinion of Fischer (Coq. Viv., p. 101), intergrades with *T. hanleyanus*, of which it is a smooth form.

A series from the Buccaneer Archipelago.

TROCHUS ARCHITECTONICUS, *A. Adams.*

Pyramis architectonicus, A. Ad., Proc. Zool. Soc., 1851 (1853), p. 152.

One from the Buccaneer Archipelago.

MONODONTA LABIO, *Linne.*

Trochus labio, Linne, Syst. Nat., x., 1758, p. 750.

A series from Berrial Bluff, Port George IV. Native name "Lanarelli."

MONODONTA DIMINUTA, *Hedley.*

Monodonta diminuta, Hedley, Rec. Austr. Mus., viii., 1912, p. 137, pl. xli., fig. 2.

Unrecorded for Western Australia. Three from the Buccaneer Archipelago.

CANTHARIDUS STRIGATUS, *A. Adams.*

Thalotia strigata, A. Adams, Proc. Zool. Soc., 1851 (1853), p. 172.

A few worn specimens from the Buccaneer Archipelago.

ISANDA CORONATA, *A. Adams.*

Isanda coronata, A. Adams, Proc. Zool. Soc., 1853, p. 189.

Id., Smith, Zool. Coll. Alert, 1884, p. 71, pl. v., fig. P.

New to Western Australia. A series from the Buccaneer Archipelago, which vary in sculpture and colour. Some have fine, oblique, plicate ribs, others are smooth, save for the crown of tubercles. Some are uniform dark purple, others striped with buff and pink, either spaced and zig-zag, or crowded and linear.

ANGARIA DELPHINUS, *L.*, VAR. LACINIATA, *Lamarck.*

Delphinula laciniata, Lamarck, An. s. vert., vi., 1822, p. 230.

One from Norngi Cove, Mollogul Island, Collier Bay.

FAMILY TURBINIDAE.

TURBO PORCATUS, *Reeve.*

Turbo porcatus, Reeve, Conch. Icon., iv., 1848, pl. xi., fig. 52.

Five from Berrial Bluff, Port George IV. Native name "Dijuparadodi."

ASTREA CHEMNITZI, *Valenciennes.*

Trochus chemnitzi, Valenciennes, Voy. "Venus," 1846, pl. ii., bis., fig. 1.

Two from Port Hedland.

FAMILY NERITIDAE.

NERITA LINEATA, *Gmelin.*

Nerita lineata, Gmelin, Syst. Nat., xiii., 1791, p. 3684.

Two from Berrial Bluff, Port George IV. Native name, "Narreram."

NERITA POLITA, *Linne.*

Nerita polita, Linne, Syst. Nat., x., 1758, p. 778.

Five from the Buccaneer Archipelago.

NERITA UNDATA, *Linne.*

Nerita undata, Linne, Syst. Nat., x., 1758, p. 779.

A large number of beach worn specimens from the Buccaneer Archipelago.

THEODOXIS CREPIDULARIA, *Lamarck.*

Neritina crepidularia, Lamarck, An. s. vert., vi., 1822, p. 186.

Two from the Buccaneer Archipelago.

FAMILY ACMEADAE.

PATELLOIDA SACCHARINA, *Linne*, var.

Patella saccharina, Linne, Syst. Nat., x., 1758, p. 781.
Id., Iredale, Proc. Zool. Soc., 1914, ii., p. 670.

Several specimens of the variety noticed from this coast by Mr. Iredale were taken in Camden Sound, Buccaneer Archipelago.

FAMILY PALUDINIDAE.

VIVIPARA AMPULLAROIDES, *Reeve.*

Paludina ampullaroides, Reeve, Conch. Icon., xiv., 1863, pl. vi., fig. 30.

Balmaningarra Creek below Mt. Marmion; Meda, May River. A few specimens.

FAMILY LITTORINIDAE.

PAGODUS BULLATUS, *Martyn*, var. SUBINERMIS, *Philippi.*

Litorina papillosa, Lam., var. *subinermis*, Philippi, Abbild. Besch., ii., 1846, p. 141.

A few specimens from Kollan Island.

MELARHAPHE SULCULOSA, *Philippi.*

Littorina sulculosa, Philippi, Proc. Zool. Soc., 1845 (1846), p. 142.

One from the Buccaneer Archipelago.

TECTARIUS MALACCANUS, *Philippi.*

Litorina malaccana, Philippi, Abbild. Beschr., iii., 1847, p. 51, pl. vi., fig. 17.

New to Western Australia. A series of small specimens from the Buccaneer Archipelago.

FAMILY PLANAXIDAE.

PLANAXIS SULCATUS, *Born.*

Buccinum sulcatum, Born, Test. Mus. Caes. Vindob., 1780, p. 256, pl., 10, fig. 5, 6.

A series from the Buccaneer Archipelago.

FAMILY RISSOIDAE.

Diala flammea, *Pease.*

Rissoa flammea, Pease, Am. Journ. Conch., iii., 1867, p. 297, pl. xxix., fig. 33.

Alaba albugo, Watson, Chall. Rep. Zool., xv., 1886, p. 568, pl. xlii., fig. 3.

Unrecorded for Western Australia. One from the Buccaneer Archipelago.

FAMILY TRUNCATELLIDAE.

Acmea scalarina, *Cox.*

Truncatella scalarina, Cox, Mon. Austr. Land Shells, 1868, p. 93, pl. 15., fig. 10.

Five from the Buccaneer Archipelago.

FAMILY CAPULIDAE.

Amathina tricarinata, *Linne.*

Patella tricarinata, Linne. Syst. Nat., xii., 1767, p. 1259. *Id.*, Watson, Chall. Rep. Zool., xv., 1886, p. 456.

New for Western Australia. One from the Buccaneer Archipelago.

FAMILY CERITHIIDAE.

Cerithidea kienerii, *Hombron & Jacquinot* (emend).

Cerithium kennerii, Hombron & Jacquinot, Voy. au Pole Sud., 1847-1853, Moll., pl. xxiii., fig. 4-5.

C. kienerii, Forbes, Voy. "Rattlesnake," ii., 1852, p. 362. *Id.*, Rousseau, Zool. Voy. Pole Sud., 1854, p. 96. *Id.*, Brazier, Proc. Linn. Soc. N. S. Wales, i., 1876 (1877), p. 321. *Id.*, Brazier, Journ. of Conch., ii., 1879, p. 196. *Id.*, Martens in Weber, Zool. Ergb. Niederland, Ostindien, Bd., iv., 1897, p. 188 (not *C. kieneri* of Sowerby or Kobelt).

Cerithidea obtusa, Sowerby (not Lamarck), Conch. Icon., xv. 1866, pl. i., fig. 4.

This species was originally reported from Raffles Bay in the Northern Territory, and has not been previously noticed from Western Australia. A single specimen from the Buccaneer Archipelago.

Pyrazus palustris, *Linne.*

Strombus palustris, Linne, Syst. Nat., xii., 1767, p. 1213.

Several specimens from the Buccaneer Archipelago.

Pyrazus cingulatus, *Gmelin.*

Murex cingulatus, Syst. Nat., xiii., 1791, p. 3561.

A few from the Buccaneer Archipelago.

FAMILY STROMBIDAE.

LAMBIS LAMBIS, *Linne.*

Strombus lambis, Linne, Syst. Nat., x., 1758, p. 743.

One from Sunday Island, King Sound.

FAMILY CYMATIIDAE.

CYMATIUM PFEIFFERIANUM, *Reeve.*

Triton pfeifferianus, Reeve, Conch. Icon., ii., 1844, pl. iv., fig. 14.

New for Western Australia. One from the Buccaneer Archipelago.

GYRINEUM PULCHELLUM, *Forbes.*

Ranella pulchella, Forbes, Voy. "Rattlesnake", ii., 1852, Append. p. 382, pl. iii., fig. 6.

New for Western Australia. Nine from the Buccaneer Archipelago.

FAMILY TONNIDAE.

FICUS TESSELLATUS, *Kobelt.*

Ficula tessellata, Kobelt, Conch. Cab., iii., 1881, p. 12, pl. ii., fig. 3.

Four from the Buccaneer Archipelago.

FAMILY NATICIDAE.

NATICA ALBULA, *Bolten.*

Cochlis albula, Bolten, Mus. Bolt. (2), 1789, p. 146.

Several specimens from the Buccaneer Archipelago.

FAMILY CYPRAEIDAE.

CYPRAEA DECIPIENS, *Smith.*

Cypraea decipiens, Smith, Proc. Zool. Soc., 1880, p. 482, pl. 48., fig. 8.

One from the Buccaneer Archipelago.

CYPRAEA EGLANTINA, *Duclos.*

Cypraea eglantina, Duclos, Mag. de Zool., v., 1833, pl. xxviii.

New for Western Australia. Two from Buccaneer Archipelago.

CYPRAEA EGLANTINA, VAR. COUTURIERI, *Vayssiere.*

Cypraea arabica, var. *couturieri*, Vayssiere, Journ. de Conch., liii., 1905, p. 13, pl. i., fig. 3.

Probably this is the *C. arabica* of early notices, but under the present name it is unrecorded for Western Australia. Two from the Buccaneer Archipelago.

CYPRAEA PUNCTULATA, *Gmelin.*

Cypraea punctulata, Gmelin, Syst. Nat., xiii., 1791, p. 3404. *Id.*, Hidalgo, Mon. Cypraea, 1906, p. 484.

Unrecorded for Western Australia. One from the Buccaneer Archipelago.

CYPRAEA PYRIFORMIS, *Gray.*

Cypraea pyriformis, Gray, Zool. Journ., i., 1824, p. 371. *Id.*, Sowerby, Thes. Conch., iv., 1870, p. 26, pl. 310, fig. 146.

New for Western Australia. Two faded specimens from the Buccaneer Archipelago, which perhaps belongs to Mrs. Kenyon's var *kaiseri.*

CYPRAEA SUBCYLINDRICA, *Sowerby.*

Cypraea subcylindrica, Sowerby, Thes. Conch., iv., 1870, p. 21, pl. xxvii., fig. 269.

Half a dozen from the Buccaneer Archipelago.

FAMILY VOLUTIDAE.

SCAPHELLA DAMONI, *Gray.*

Amoria damoni, Gray, Ann. Mag. Nat. Hist., 1864, p. 237.

One from the Buccaneer Archipelago.

CYMBIUM FLAMMEUM, *Bolten.*

Cymbium flammeum, Bolten, Mus. Bolt. (2), 1789, p. 151.

Native name "Naliga." One from Sunday Island, King Sound.

FAMILY MARGINELLIDAE.

MARGINELLA AUSTRALIS, *Hinds.*

Marginella australis, Hinds, Proc. Zool. Soc., 1844, p. 75.

Three from the Buccaneer Archipelago.

CONUS ANEMONE, *Lamarck.*

Conus anemone, Lamarck, Ann. du. Mus., xv., 1810, p 272.

Two from the Buccaneer Archipelago.

CONUS GEOGRAPHUS, *Linne.*

Conus geographus, Linne, Syst. Nat., x., 1758, p. 718. *Id.*, Reeve, Conch. Icon, i., 1843, pl. xxiii., fig. 130. *Id.*, Hallen, Nautilus, xxvii., 1914, p. 117.

One specimen 115 mm. long, from the Buccaneer Archipelago. New to Western Australia.

CONUS TEXTILE, *Linne.*

Conus textile, Linne, Syst. Nat., x., 1758, p. 717. *Id.*, Sowerby, Thes. Conch., iii., 1858, p. 42, pl. 209, fig. 567. *Id.*, Shaw, Quart. Journ. Micros. Sci. lx., 1914, p. 4-6.

One specimen from the Buccaneer Archipelago.

CONUS TRIGONUS, *Reeve.*

Conus trigonus, Reeve, Conch. Icon., i., 1848, pl. Suppl. 5, fig. 286.

Two from the Buccaneer Archipelago.

CONUS VEXILLUM, *Gmelin.*

Conus vexillum, Gmelin, Syst. Nat. xiii., 1791, p. 3397. *Id.*, Reeve, Conch. Icon., i., 1843, pl. i., fig. 3.

A fine example, 145 mm. long, and 80 mm. broad from the Buccaneer Archipelago. New to Western Australia.

FAMILY TURRIDAE.

EUCITHARA BASEDOWI, *n.sp.*

(Plate XLI., fig. 4.)

Shell very solid, biconical, ventricose. Colour, buff on the periphery and terra cotta above it and below it, with a separate narrow terra-cotta line running along the horizon of the lip insertion.

Aperture, pale lilac; Whorls, seven; Protoconch a smooth glossy subulate shell of two and a half whorls. Radial sculpture stout arcuate undulations ceasing at the base, and diminishing towards the suture, of these the penultimate has eleven which diminish by one each on the earlier whorls. They vanish for a space behind the aperture. On the earlier whorls there are five or six spirals, and on the last whorl twenty-four, these become coarser as the anterior end is approached. Latterly they are broad, flat-topped lyrae parted by furrows of corresponding breadth and depth.

The last whorl rises slightly at the aperture and expands into a thick and prominent varix. The outer lip is shaped somewhat like a mark of interrogation (?) having a well developed sinus above, and a short broad canal below. Between these two points it is armed with eight

large and prominent tubercles. The inner lip has a larger tubercle opposite the sinus, and seven smaller ones on the columellar margin. Length 15, breadth 9 mm.

Eight specimens from the Buccaneer Archipelago.

FAMILY TURBINELLIDAE.

MELONGENA COCHLIDIUM, *Linne.*

Murex cochlidium, Linne, Syst. Nat., x., 1758, p. 753. *Id.*, Chemnitz, Conch. Cab., x., 1788, pl. 164, fig. 1569.

New for Western Australia. Six from the Buccaneer Archipelago.

FASCIOLARIA FILAMENTOSA, var. FERRUGINEA, *Lamarck.*

Fasciolaria ferruginea, Lamarck, An. s. vert., vii., 1822, p. 120 *Id.*, Keiner, Coq. Viv., 1840, p. 12, pl. ix., fig. 2

Unrecorded for Western Australia. Lamarck's own specimen in the Geneva Museum is labelled "Australie," so Western Australia was perhaps the source of the type of *F. ferruginea.*

FAMILY MITRIDAE.

MITRA PLICARIA, *Linne.*

Voluta plicaria, Linne, Syst. Nat., x., 1758, p. 732. *Id.*, Chemnitz, Conch. Cab., iv., pl. 148, fig. 1362.

New for Western Australia. One from Port Hedland.

FAMILY BUCCINIDAE.

POLIA ERYTHROSTOMA, *Reeve.*

Buccinum erythrostoma, Reeve, Conch. Icon., iii., 1846, pl. iii., fig. 14.

Three from the Buccaneer Archipelago.

FAMILY PYRENIDAE.

PYRENE ESSINGTONENSIS, *Reeve.*

Columbella essingtonensis, Reeve, Conch. Icon., xi., 1859, pl. xxvii., fig. 174.

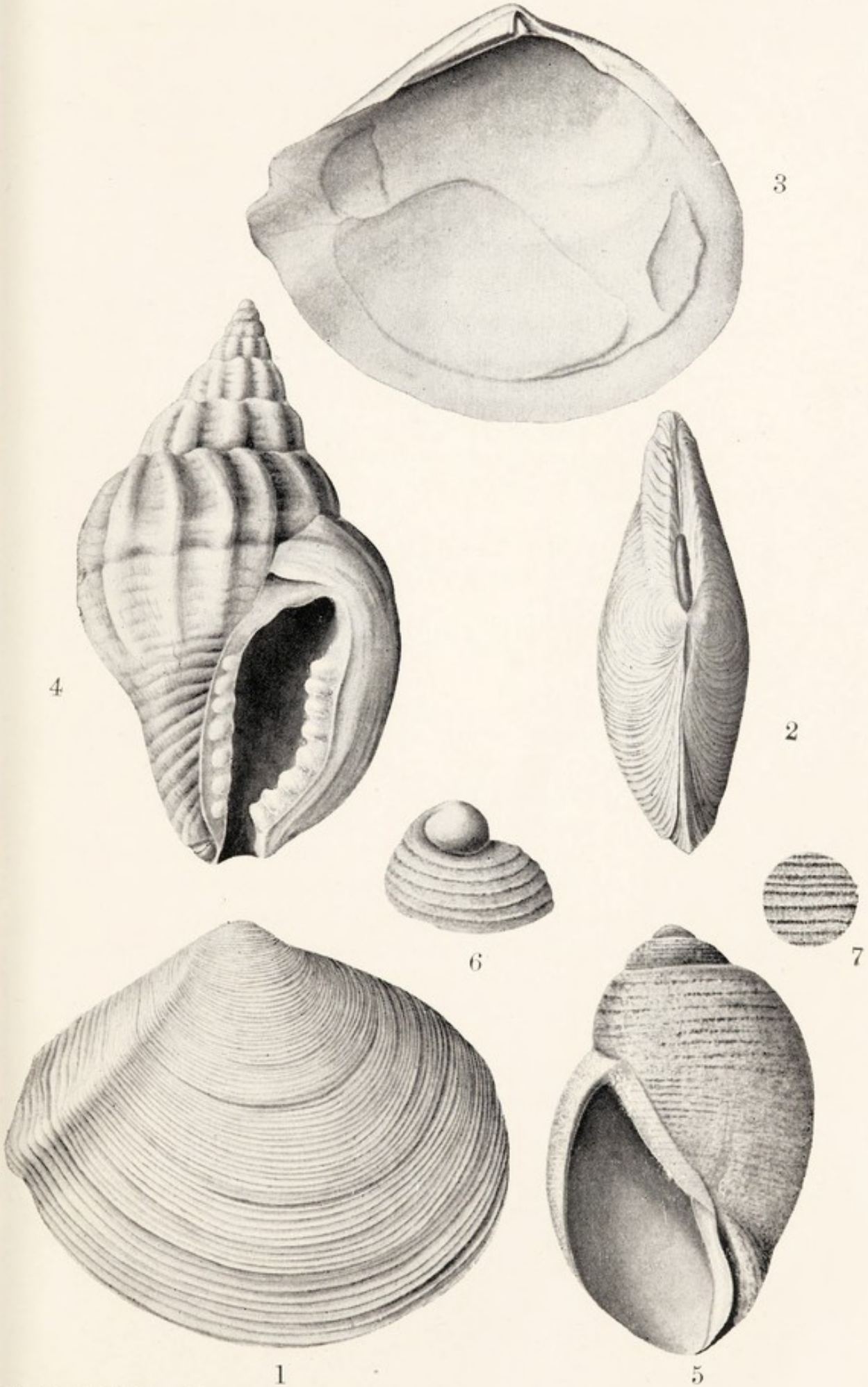
New for Western Australia. Four from the Buccaneer Archipelago.

FAMILY MURICIDAE.

MUREX ACANTHOPTERUS, *Lamarck.*

Murex acanthopterus, Lamarck, An. s. vert., vii., 1822, p. 165.

Three from Point Torment, King Sound.



Phyllis F. Clarke, del.

NEW SPECIES OF MOLLUSCS FROM NORTH-WESTERN AUSTRALIA.

MUREX COPPINGERI, *Smith.*

Murex coppingeri, Smith, Alert Zool. Coll., 1884, p. 42, pl. v., fig. A.

New to Western Australia. Four from the Buccaneer Archipelago.

MUREX PERMAESTUS, *Hedley.*

Murex permaestus, Hedley, Proc. Linn. Soc. N. S. Wales, xxxix., 1915, p. 745, pl. lxxxv., fig. 91.

One from the Buccaneer Archipelago.

FAMILY THAIDIDAE.

THAIS ACULEATA, *Deshayes.*

Purpura aculeata, Deshayes, An. s. vert., x., 1844. p. 104.
Id., Hedley, Proc. Linn. Soc. N. S. Wales, xxxix., 1915, p. 748.

New for Western Australia. Native name "Ninga Ninga." One from Berrial Bluff, Port George, IV.

DRUPA TUBERCULATA, *Blainville.*

Purpura tuberculata, Blainville, Nouv. Ann. du Museum, i., 1832, p. 186, pl. 9, fig. 3.

A new record for the State. Two specimens from the Buccaneer Archipelago.

FAMILY AURICULIDAE.

ELLOBIUM AURISJUDAE, *Linne.*

Bulla aurisjudae, Linne, Syst. Nat., x., 1758, p. 728.

One from the Buccaneer Archipelago.

MELAMPUS FLEXUOSUS, *Crosse.*

Melampus flexuosus, Crosse, Journ. de Conch., xv., 1867, p. 448.

One from the Buccaneer Archipelago.

FAMILY HELICIDAE.

CHLORITIS MICROMPHALA, *Gude.*

Chloritis micromphala, Gude, Proc. Malac. Soc., vii., 1907, p. 231, pl. xxi., fig. 6.

Numerous specimens from rock crevices, Limestone Caves, Napier Range. The original locality was quoted as the "Barrier Range," a local term for the Napier Range.

RHAGADA BURNERENSIS, *Smith.*

Helix (Hadra) burnerensis, Smith, Proc. Malac. Soc., i., 1894, p. 91, pl. vii., fig. 18.

Kaularre, Barker Gorge.

RHAGADA OSCARENSIS, *Cox.*

Helix (Hadra) oscarensis Cox, Proc. Linn. Soc. N. S. Wales, xvi., 1892, p. 565, pl. xx., fig. 6, 7.

In the Barker Gorge (Kaularre), and on trees near the Limestone Caves.

RHAGADA REINGA, *Reeve.*

Helix reinga, Reeve, Conch. Icon., vii., 1852, pl. cxxviii., fig. 772.

Rhagada reinga, Ancey, Proc. Linn. Soc. N. S. Wales, xxii., 1898, p. 776.

Napier Range. Dr. Basedow's specimens correspond to those obtained in this neighbourhood by Mr. W. W. Froggatt and determined by Ancey as above. But they are toothless and more depressed than Reeve's picture. They approach but do not coincide with, *H. elachystoma*, von Martens (Ak. Wiss. Monats Berl., 1877, p. 273, pl. i., fig. 8-9.)

FAMILY LIMNAEDAE.

AMPHIPEPLEA AFFINIS, *Kuster.*

Limnaeus affinis, Kuster, Conch. Cab., i., 1862, p. 55, pl. 12, fig. 5-6.

A species unrecorded for Western Australia. A few specimens. The Barker River Gorge.

BULLINUS SISURNIUS, *sp. nov.*

(Plate XLI., fig. 5, 6, 7.)

Shell small, rhomboid-ovate, rather gibbous, spire depressed, the shoulder rounded, the base finished with a low broad funicle, umbilicus a narrow crevice. Colour cinnamon. Whorls four, rapidly increasing. Apex heterostrophe, half turned over. Epidermis dense, developing about sixty fine spirals threads, wider apart on the shoulder, closer on the base. These carry minute close-set bristles.

Shell, with fine dense spiral striae, matching the lines on the epidermis. Aperture elliptical, subangled above and below. Outer lip not sinuate above, slightly reflected at the base. Inner lip with a sheet of callus on the previous whorl. Columella expanded below, deeply inserted. The left side of the aperture appears as if notched above the entrance of the basal ridge.

Height, 6 mm., breadth, 3-5 mm.

Hab.—Paterson Range, Western Australia. Coll., Dr. H. Basedow.

Obs.—This seems very distinct from any of the numerous species of the genus already described from Australia. It approaches nearest to *Physa* (*Ameria*) *cumingii*, H. Adams, Proc. Zool. Soc., 1861, p. 144, a form which E. A. Smith (Journ. Linn. Soc., Zool., xvi., 1882, p. 292), thought to include with others as varieties of *P.carinata*, H. Adams. From that group of species, it is amply distinguished by the basal funicle and sculpture. The name of one thus associated by Smith, *Physa truncata*, H. Adams, 1861, is preoccupied by *Physa truncata*. Bourguignat, 1856, but since *Physa* (*Ameria*) *reevei*, A Adams & Angas, 1863, seems to equally apply to *P. truncata*, no new name is required for the Queensland shell.

After discussing the features and affinitities of the so-called Australian Physa, Mr. A. H. Cooke (Proc. Zool. Soc., 1889, p. 142) decided to adopt *Bulinus*, Adamson, 1757, as their correct generic name. Unfortunately that nomenclature was non-binomial and prelinnean, so that *Bulinus* is inadmissable. Recent authors, writing on this group,* have employed the substitute *Bullinus*, Oken (Lehrb. d. Natgsch., iii., 1815, p. 303.)

*Hedley. Rec. Austr. Mus., XII., 1917. p. 3.

INSECTA AND ARACHNIDA FROM NORTH-WEST AUSTRALIA.

By

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The following is a list of Insects and Spiders collected by Dr. H. Basedow in North West Australia during 1916, with notes thereon. By his efforts, many species not hitherto represented in our Cabinets have been added to the Collection of the Australian Museum.

One of the principal features of the collection is the absence of many species which might be expected to occur in the district. This is particularly noticeable in the Family CARABIDAE, many desert forms such as *Carenums* being entirely absent.

In 1887 Mr. W. W. Froggatt made extensive collections in the King Sound District of North West Australia for the Macleay Museum. Reports upon his material appeared in 1887-1888,[1][2][3] the COLEOPTERA in particular being dealt with by Macleay in the latter year. He also noted the absence of species which one might naturally expect to find.

We are indebted to Messrs. Sloane, Lea, and Carter for much assistance in the determination of certain species.

Class ARACHNIDA.

Order ACARINA.

Family IXODIDAE.

Amblyomma triguttatum, C. L. Koch.

Obs.—The native name for this species is "Mordul", Europeans know it as the "Kangaroo" Tick.

1.—Macleay—Proc. Linn. Soc. N. S. Wales (2), ii., 1887, p. 1017.
2.—Macleay—Proc. Linn. Soc. N. S. Wales (2), iii., 1888, p. 443.
3.—Macleay—Proc. Linn. Soc. N. S. Wales (2), iii., 1888, pp. 896, 1,227.

Order ARANEIDAE.

Family PHOLCIDAE.

Trichocyclus nigropunctatus, E. Sim.

Family THERIDIIDAE.

Theridion decoratum, L. Koch.

Family ARGIOPIDAE.

Tetragnatha mandibulata, Walck.
Nephila maculata, Fab.
Argiope aemula, Walck.
Cyrtophora molluccensis, Dol.
Araneus theis, Walck.
Gasteracantha minax, Thor. var.

Family CLUBIONIDAE.

Olios calligaster, Thor.

Family LYCOSIDAE.

Lycosa godeffroyi, L. Koch.

CLASS INSECTA.

Order ORTHOPTERA.

Family BLATTIDAE.

Periplaneta australasiae, Fabr.

Obs.—This insect is known to the Aborigines of the Kimberley District as "Marrega".

Family PHASMIDAE.

Clemacantha regale, Rainbow.

Obs.—This species was originally described by the Senior Author from specimens collected at Narribri, New South Wales, and Wide Bay, Queensland. The specimen collected by Dr. Basedow comes from Derby, North West Australia, and therefore considerably extends our knowledge of the distribution of this species.

Family LOCUSTIDAE.

Gastrimargus musicus, Fab.
Chortoicetes terminifera, Walk.
Acrida conica, Fab.
Pseudacanthacris exacta, Walk.

Order NEUROPTERA

Family MYRMELEONTIDAE.

Brachyleon darwini, Banks.
Acanthaclisis subfasciata, Banks.

Order HYMENOPTERA.

Family FORMICIDAE.

Odontomachus ruficeps, Sm.
Oecophylla smaragdina, Fabr.

Family EUMENIDAE.

Eumenes latreillei, Sauss.
Abispa ephippium, Fabr.

Order COLEOPTERA.

Family CICINDEDIDAE.

Megacephala australasiae, Hope var. *humeralis*, Macleay.

Family CARABIDAE.

Clivina pectonada, Sloane.
Darodilia castelnaui, Macleay.
Abacetus thouzeti, Cast.
Oodes froggatti, Macleay.
Gnathaphanus pulcher, Dej.
Pediomorphus macleayi, Sloane.
Phorticosomus edeli, Cast.
Phorticosomus nuytsi, Cast.
Hypharpax kreffiti, Cast.

Family DYTISCIDAE.

Eretes australis, Erich.

Family HYDROPHYLLIDAE.

Sternolophus nitiducus, Macl.

Family DERMESTIDAE.

Dermestes cadaverinus, Fab.

Obs.—This species has been introduced into Australia.

Family HISTERIDAE.

Saprinus laetus, Erichs.

Family SCARABAEIDAE.

Onthophagus consentaneus, Har.
Aphodius lividus, Oliv.
Trox crotchi, Har.
Calloodes grayanus, White.
Chiroplatys pecuarius, Reiche.
Horonotus optatus, Shp.
Hemipharis insularis, Gory and Perch.

Family BOSTRYCHIDAE.

Bostrychus jesuita, Fabr.

Family MALACODERMIDAE.

Laius major, Blkb.

Family TENEBRIONIDAE.

Gonocephalum meyricki, Blkb.
Gonocephalum walkeri, Champ.
Tribolium ferrugineum, Fabr.
Obs.—A common European species which has been introduced into Australia.
Helaeus approximatus, Carter.
Saragus opacipennis, Macl.
Hypaulax ampliata, Bates var. *parryi*, Bates.
Chalcopterus superbus, Black.

Family CURCULIONIDAE.

Leptops horni, Blkb.
Polyphrades ampliata, Pasc.
Syarbis fasciculatissimus, Lea.
Desiantha malevolus, Lea.
Haplonyx mucidus, Lea.

Family CHRYSOMELIDAE.

Paropsis lachesis, Stal.
Dircema australis, Boh. var. *maculicollis*, Bl.

Family COCCINELLIDAE.

Coccinella arcuata, Fab.

Order LEPIDOPTERA.

Sub Order RHOPALOCERA.

Family NYMPHALIDAE.

Euploea corrina, Fab.

Sub Order HETEROCERA.

Family ARCTIIDÆ.

Utetheisa (Deiopeia) pulchella, Linn.

Family AMATIDÆ.

Amata tunneyi, Roths.

Family HELIOTHIDÆ.

Plusia argentifera, Gm.

Family QUADRIFIDÆ.

Encyclomma (*Calliodes*) *orbigeri*, Guer.

Family OPHIDERIDÆ.

Ophideres materna, Linn.

Order HEMIPTERA.

FAMILY PENTATOMIDÆ.

Phília senator, Fab.

Alcaeus varicornis, Westw.

FISHES AND CRUSTACEANS FROM KING SOUND, NORTH-WEST AUSTRALIA.

Identified by ALLAN R. MCCULLOCH, Zoologist, Australian Museum.

The Fishes and Crustaceans obtained by Dr. Basedow prove to be well-known species, most of which have already been recorded from North-Western Australia.

FISHES.

FAMILY MURAENIDAE.

GYMNOTHORAX WOODWARDI, *McCulloch.*

Gymnothorax woodwardi, McCulloch, Rec. W. Austr. Mus., i. 2, 1912, p. 80, fig. I.

A specimen secured in the Robinson River, at Stokes Bay, King Sound, extends the known range of this species northward.

FAMILY THERAPONIDAE.

THERAPON UNICOLOR, *Gunther.*

Therapon unicolor (Gunther) Ogilby & McCulloch, Mem, Qld. Mus., v., 1916, p. 109, pl. xi., fig. I.

A number of young specimens were collected in the Patterson Ranges.

FAMILY AMBASSIDAE.

AMBASSIS (PRIOPIS) MULLERI, *Klunzinger.*

Ambassis mulleri, Klunzinger, Sitzb. Akad. Wiss. Wien, lxxx. i, 1879, p. 346, pl. i., fig. 3.

Four specimens. Lennard River, King Sound.

FAMILY PERIOPHTHALMIDAE.

PERIOPHTHALMUS KOELREUTERI, *Pallas.*

Periophthalmus koelreuteri (Pallas) Gunther, Brit. Mus. Cat. Fish., iii., 1861, p. 97.

Six examples. Sunday Island, King Sound.

CRUSTACEA.

FAMILY OCYPODIDAE.

OCYPODE CERATOPHTHALMA, *Pallas.*

Ocypoda ceratophthalma (Pallas) Ortmann, Zool. Jahrb., x., 1897, p. 364.

Three young examples. Kollan Island, King Sound.

FAMILY GRAPSIDAE.

METOPOGRAPSUS MESSOR, *Forskal.*

Metopograpsus messor (Forskal) Alcock, Journ. Asiatic. Soc. Bengal, lxix. 2, 1900, p. 397.

One specimen. Kollan Island, King Sound.

FAMILY MENIPPIDAE.

MYOMENIPPE LEGUILLOUI, *A. Milne Edwards.*

Myomenippe leguilloui (A. Milne Edwards) Ortmann, Zool. Jahrb., vii., 1893, p. 432.

One specimen. Point Torment, King Sound.

FAMILY COENOBITIDAE.

COENOBITA SPINOSA, *M. Edwards*, var. VARIABILIS, *McCulloch.*

Coenobita spinosa, var. *variabilis*, McCulloch, Rec. Austr. Mus., vii. 4, 1909, p. 305, pl. lxxxviii., fig. 2.

Six young examples from Point Torment, King Sound.

FAMILY PAGURIDAE.

CLIBANARIUS PADAVENSIS, *de Man.*

Clibanarius padavensis, de Man, Journ. Linn. Soc., Zool. xxii., 188, p. 242 pl. xvi., fig. 1-5.

One specimen. Kollan Island, King Sound.

CORALS AND POLYZOA FROM NORTH-WESTERN AUSTRALIA.

Determined by E. A. Briggs, B.Sc., Zoologist, Australian Museum.

Family ASTRÆIDÆ.

Genus TRACHYPHYLLIA, *Milne-Edwards and Haime.*

TRACHYPHYLLIA AMARANTUM (*Dana*).

Manicina amarantum, Dana, U.S. Expl. Exped., Zooph., 1846, p. 189, pl. IX., fig. 1.

Trachyphyllia amarantum, Milne-Edwards, Hist. Nat. Corall., II., 1857, p. 341.

One specimen.

Loc.—Berrial Bluff, Camden Sound, North-Western Australia.

Family FUNGIDÆ.

Genus CRYPTABACIA, *Milne-Edwards and Haime.*

CRYPTABACIA TALPINA (*Lamarck*).

Fungia talpina, Lamarck, Anim. sans. Vert., 1801, p. 370.

Cryptabacia talpina, Milne-Edwards, Hist. Nat. Corall., III., 1860, p. 22.

One specimen.

Loc.—Sunday Island Reef, King Sound, North-Western Australia.

Five specimens in the collection are dead and weathered fragments from an uncharted island in Collier Bay. They are referred to the following genera:—

Astraea spp.	2 specimens.
Coeloria sp.	1 specimen.
Halomitra sp.	1 specimen.
Tridacophyllia sp.	1 specimen.

From Sunday Island Reef, King Sound, North-Western Australia:—

Fungia sp.	1 specimen.

POLYZOA.

Family CELLEPORIDÆ.

CELLEPORA, *Fabricius.*

CELLEPORA LAEVIS, *Haswell.*

Cellepora laevis, Haswell, Proc. Linn. Soc. N. S. Wales, V., 1881, p. 40, pl. II., fig. 3, 4.

One specimen.

Loc.—Sunday Island Reef, King Sound, North-Western Australia.

SEQUENTIAL LIST OF DR. BASEDOW'S PLANTS FROM NORTH-WEST AUSTRALIA.

By J.H. Maiden, I.S.O., F.R.S., F.L.S., (with the assistance of Messrs. Cheel and A. A. Hamilton).

[Mr. W. V. Fitzgerald made two important journeys to the Kimberleys, and to the adjacent coast, some years ago, and his botanical manuscripts, through various circumstances, have not yet been published. They are in my keeping as a trust, and it is expected that they will be published during the next few weeks by the Royal Society of Western Australia. They are important, and include descriptions of a large number of new species. Inasmuch as these manuscripts deal with part of the areas covered by Dr. Basedow's journeys, I took the responsibility of advising Dr. Basedow to postpone a fuller botanical account of his work until the publication of Mr. Fitzgerald's plants, and to this proposal he has unselfishly consented.]

FAM. POLYPODIACEÆ.

Adiantum capillus-veneris, L.

FAM. PINACEÆ.

Callitris robusta, R.Br.

FAM. GRAMINEÆ.

Heteropogon contortus, Roem & Schult.
Sorghum Mjobergii, Cheel.
Aristida arenaria, Gaud.
Eriachne obtusa, R.Br.
Dactylotenium aegyptiacum, Willd.
Eragrostis Dielsii, Pilger.
Eragrostis falcata, Bth. (non Gaud.)
Pappaphorum nigricans, R.Br.

FAM. CYPERACEÆ.

Cyperus squarrosus, L.
Cyperus difformis, R.Br.
Cyperus albo-marginatus, Nees.
Cyperus conicus, Boeck.
Cyperus castaneus, Willd.
Fimbristylis diphylla, Vahl.
Fimbristylis Schultzii, Boeck.
Fimbristylis tetragona, B.Br.
Fimbristylis autumnalis, Vahl. var. ***microcarya***, F. v. M.
Fimbristylis cymosa, R.Br.
Fuirena glomerata, Vahl.
Rhynchospora longisetis, R.Br.
Lipocarpha microcephala, Kunth.

FAM. FLAGELLARIACEÆ.

***Flagellaria indica*, L.**

FAM. CASUARINACEÆ.

***Casuarina lepidophloia*, F. v. M.**

FAM. PROTEACEÆ.

Grevillea angulata, R.Br.
Grevillea Wickhami, Meissn.
Grevillea dimidiata, F. Muell.

FAM. LORANTHACEÆ.

Loranthus pendulus, Sieb. *var. canescens*, Mueller & Tait.
Loranthus exocarpi, Behr.
Loranthus acacioides, A. Cunn.

FAM. AMARANTACEÆ.

Trichinium obovatum, Gaud.
Trichinium abovatum, Gaud, *var grandiflorum*.
Trichinium corymbosum, Gaud.
Trichinium exaltatus, Benth.
Alternanthera nodiflora, R.Br.

FAM. AIZOACEÆ.

***Trianthema pilosa*, F. v. M.**

FAM. CARYOPHYLLACEÆ.

***Polycarpæa longiflora*, F. v. M.**

FAM. NYMPHACEÆ.

Nymphœa stellata, Wild.

FAM. CRUCIFERÆ.

Lepidium Desvauxii, Thell.
Lepidium fasciculatum, Thell.

Fam. Droseraceæ.
Byblis liniflora, Salisb.

Fam. Pittosporaceæ.
Pittosporum phillyræoides, D.C.

Fam. Leguminosæ.
Acacia tetragonophylla, F. v. M.
Acacia ramulosa, W. V. F.
Acacia brachystachya, Benth.
Acacia Oswaldii, F. v. M.
Acacia suberosa, A. Cunn.
Acacia Burkittii, F. v. M.
Acacia sp. probably *A. rigens.*
Acacia sp.

Fam. Zygophyllaceæ.
Tribulus terrestris, L.

Fam. Euphorbiaceæ.
Euphorbia Drummondii, Boiss.

Fam. Tiliaceæ.
Grewia polygama, Roxb.

Fam. Sterculiaceæ.
Sterculia sp.

Fam. Myrtaceæ.
Eucalyptus microtheca, F. v. M.
Melaleuca uncinata, R.Br.
Melaleuca minutifolia, F. v. M.
Calythrix microphylla, A. Cunn.
Xanthostemon paradoxus, F. v. M.

Fam. Labiateæ.
Teucrium racemosum, R.Br.

Fam. Solanaceæ.
Solanum ellipticum, R.Br.?
Solanum quadriloculatum, F. v M.?

Fam. Myoporaceæ.
Eremophila scoparia, F. v. M.

Fam. Cucurbitaceæ.
Momordica balsamina, L.
Cucumis myriocarpus, Naud.

Fam. Campanulaceæ.
Wahlenbergia gracilis, A. DC.