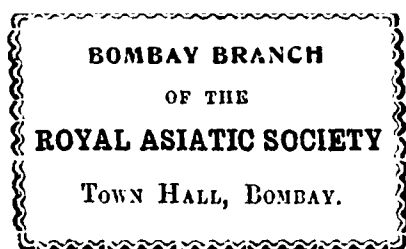




00085411



NATURALIST IN NORTH CELEBES

NARRATIVE OF TRAVELS IN MINAHASSA, THE SANGIR AND
MOUTSULANDS, WITH NOTICES OF THE FAUNA, FLORA
AND ETHNOLOGY OF THE DISTRICTS VISITED

BY SYDNEY J. HICKSON

M.A. (CANTAB.), D.Sc. (LOND.), M.A. (OXON.) HON. CAUS.

FELLOW OF DOWNING COLLEGE, CAMBRIDGE: FELLOW OF THE ZOOLOGICAL SOCIETY

85411

'To sit on rocks, to muse o'er flood and fell,
To slowly trace the forest's shady scene,
Where things that own not man's dominion dwell,
And mortal foot hath ne'er or rarely been;
To climb the trackless mountain all unseen,
With the wild flock that never needs a fold;
Alone o'er steeps and falling foams to lean;
This is not Solitude; 'tis but to hold
Converse with Nature's charms, and view her stores unrolled'

Childe Harold

WITH MAPS AND ILLUSTRATIONS

LONDON

JOHN MURRAY, ALBEMARLE STREET

1889

913-12
Hic/Hic
85411.



00085411



PERIOPHTHALMUS KOELREUTERI.

Natural size.

PREFACE

THE journey I took to the Malay Archipelago in the year 1885 with the object of investigating the anatomy and, if possible, the development of certain corals, afforded me opportunities of studying the general fauna of some of the small islands in the tropical seas, and of learning something of the races of human beings I came in contact with.

I have brought together in this volume some extracts from the journal of my wanderings in North Celebes, the Sangir and Talaut Islands, a more detailed account of the fauna of the small island called Talisse, situated in the Straits of Banka, and a summary of our knowledge of the ethnology of the district of Minahassa.

So much of the ground I travelled over during my visit to the Malay Archipelago has been made familiar to English readers by the works of Wallace, Forbes, and Guillemard, that I have but a small area left to describe from the pages of my own journal. But, though the area is small, it is from its geographical position one of striking interest alike to the biologist, the geologist, and the ethnologist.

In describing the fauna of the forests and coral

reefs at Talisse I have avoided as far as possible technical details of form and structure. The animals I call attention to are those I came across in my daily excursions in the forests and on the reefs. I have not attempted to give a complete list of species known to occur in Celebes of any order of the animal kingdom. Such lists may be found in the works of some of the eminent naturalists mentioned in the bibliography at the end of the book.

During the few months I was resident in any particular district, it was impossible for me to acquire more than a few words of the local dialects, and I could consequently learn but little of the various prevalent myths, songs, and customs directly from the natives. I am indebted to the kindness of many of the missionaries, officials, and Malay-speaking natives for the few scraps of information I am able to record as new. The greater part of the ethnological portion of the book is borrowed from the valuable writings to be found in many of the reports of missionary and other societies, and in Dutch periodicals.

Although many of the stories and poems have undoubtedly suffered considerably in the double translation from the local dialect into Dutch and from Dutch into English, I hope they remain sufficiently true to the originals to indicate to the reader their general characteristics.

For the convenience of students I have given a classification of all the animals and plants I have referred to in these pages, and a list of the more im-

portant books and papers from which I have borrowed materials. In the Index I have given translations of many of the Dutch, Malay, and local words and expressions to be found in the text.

The kindness and assistance I received from the Dutch officials and merchants, wherever I travelled, contributed greatly to my comfort and opportunities for research. It would be impossible for me to mention here the names of all those who directly or indirectly assisted me in my work, but I am more particularly indebted to the Jkhr. van der Wyck, formerly Resident of Manado; the Dominie Wielandt, the Controleur van Rouveroy van Nieuwaal, Mr. de Vries of Manado, and Mr. Rijkschroeff of Kelelonde.

In preparing this volume for the press I have been greatly aided by the valuable advice and assistance of many of my friends. Of these I am specially indebted to Dr. E. B. Tylor of Oxford, Professors Wilken and Riedel, Captain Maclear, R.N., the late Rev. Tenison-Woods, Dr. Guillemard, and Dr. G. H. Fowler.

I have also to thank many kind friends in the museums and libraries of Amsterdam, Rotterdam, Leiden, and Utrecht; the officials of the British Museum and the library of the India Office; and the Directors of the Moluksche Handels Vennootschap, for much valuable help and many useful suggestions.

CONTENTS

CHAPTER I

FIRST GLIMPSES OF CELEBES

	PAGE
Arrival at Makassar—Objects of my visit to Celebes—Area and physical features of the island—Makassar—Private theatricals—‘Running amuck’—Sail for Manado—Beauty of the coast scenery—Manado Bay—Interview with the Resident of Manado—Etiquette—News of H.M.S. ‘Flying Fish’—The Government of the district—The inhabitants—Start for Talisse—Unpunctuality of the Malay races—Whistling for the wind—Talisse coral reefs—Koa—H.M.S. ‘Flying Fish’	1

CHAPTER II

ON BOARD H.M.S. ‘FLYING FISH’

The characteristics of Talisse Sea—Babirusa hunt—Characters of the forest—The flora—The fauna—Luncheon on the sea-shore—Sand-pipers—Race with a native prau—Visit to Bohoi Promontory—The shore platform—The character of the coral reefs—Conditions favourable to coral growth—Practical importance of the knowledge of the conditions favourable to coral growth—Bohoi Bay—Flight of the natives—Jumping crabs and fishes—Periophthalmus—Limbé Island—Batu Kapal—Rooper Point—Wallace Bay—Manado	17

CHAPTER III

ON BOARD H.M.S. ‘FLYING FISH’—*continued*

Sail for Ruang—Visit to the Rajah and the missionary of Tagulandang—Return to Tindela—Back again to the Ruang—‘Loods’—Attempt to walk round the Ruang Island—Maleos—Ascent of the volcano—Fauna of the woods—The lip of the crater—Magnificent view of the neighbouring islands—Refusal of our guides to proceed to the	

	PAGE
highest point—Recent history of the Ruang—The lava roads—The descent—Difficulties of the collector—Biarro—Tanjong Aros—Caves—Edible birds' nests—The foam of the sea—Pollicipes—Distichopora—Farewell to the 'Flying Fish'	37

CHAPTER IV

TALISSE ISLAND

Reasons for settling in this island—Inhabitants and topography of the island—Every-day life in the island—Surface dredging—The 'Panchuran'—Work on the reefs—Food—Temperature and barometric pressure—Insect pests—Evening amusements—The coolies—Diseases of the natives—My house—Attap—The gardens—Deerkraal—Hill climbing—Mangrove swamps—Collecting orchids—The plantations—Planting coco-nuts—Ebony—Kinabohutan—Pirates—Banka, Tindela, and Ganga—Absence of coral reefs on shores exposed to the N.N.E.—Our visitors—The post prau—Native songs—The 'Minahassa'—An Arab	55

CHAPTER V

FAUNA OF TALISSE

Mammals—Babirusa and sapiutan both absent—The baboon—The cuscus—Bats—Parrots—Eagles—Kingfishers—Eurystomus—Swifts—Crows—Shrikes—Starlings—Nectar-birds—Pigeons—Maleos—Sandpipers—Egrets—Reptiles—Amphibia—Insects—Spiders—Centipedes—Phosphorescent millipede	81

CHAPTER VI

MARINE FAUNA OF TALISSE SHORES

Depth of Talisse Sea—Shore gradients—Fauna of the sea-bottom—Structure of corals—Principal types of corals—A ramble on the coral reefs—Fauna of the lagoon—Fauna of the mangrove swamp—The food of corals—The colour of corals	106

CHAPTER VII

TO SANGIR AND TALAUT

Arrival of the 'Ternate' at Talisse—Lirung—Saha Islands—The rajah of Pulutan—Nanusa Archipelago—Kampong Karaton—Raised coral reefs—Legend of Mengampit—Alaoruru—Mangarang—Abundance of butterflies—Béo—Terrible sickness—Glorious sunset—Sangir—

	PAGE
Coco-nut palms—Taruna—Manganitu—Mr. Steller's house and gardens—Koffo—Curious mode of keeping time—Visit to the coral reefs—Trip to the interior—Reception of the Resident at Manganitu—Siauw—Tagulandang again—Talissee	152

CHAPTER VIII

CHARACTERISTICS OF SANGIR ISLANDS

Holy islands—The islands between Celebes and the Philippines—Facilities for the distribution of animals—The avi-fauna—Legend of a former land communication with Sangir—History of Sangir—The Sangireserace—Slavery—Food—Diseases—Religions—Marriage customs—Funeral customs—Fishing implements—Weapons—Dress—Physiognomy—Language	187

CHAPTER IX

JOURNEY THROUGH MINAHASSA

Minahassa—The capital Manado—Heerendienst—Manado as a port—Exports—Start for the interior—Tondano—Condition of affairs a century ago—Ballottos—The Great Lake— <i>Atya Wyckii</i> —Kakas and Langowan—Arrival at Kelelonde—The coffee garden—Mapalus—The Tompusu pass—The forests of Minahassa	205

CHAPTER X

MYTHOLOGY OF THE MINAHASSERS

Stone implements—Cosmologies—Legend of the origin of sun, moon, and stars—Story of Wailan-wangko—Religion—Story of Warereh—List of the principal Gods—Spirits—Native Prayers—Demons—Priests—Holy Birds—Fossos—Shamans—Giants—Story of Parepej—Story of Utahagi	238

CHAPTER XI

CUSTOMS OF THE MINAHASSERS

Marriage customs—Infant betrothal—Courtship—Use of the betel-nut in courtship—The harta or dowry—Laws of inheritance—Shunning the parents-in-law—Teknonymy—Divorce—Adoption of children—Comparison of the marriage laws of Minahassa with those of other parts of the Archipelago—Birth customs—Makehet—Sickness—Death—Burial customs—Driving away the spirit	268

CHAPTER XII

SONGS AND ROMANCE IN OLD MINAHASSA

Love songs—Stories—Story of Maengkom—Story of Matindas—Story of Kawalusan—Stories [about apes—Hair stories—Riddles— Proverbs	PAGE 301

CHAPTER XIII

HISTORY OF AND USEFUL PLANTS IN MINAHASSA

Early history of European settlements in Minahassa—Account of the Dutch settlement—The Sagoweer palm—Coco-nut pearls—The Betel-nut palm—The <i>Corypha</i> palm—Woods—Kapok—The <i>Musa</i> <i>mindanensis</i> —Edible fruits—Rice—Legend of the rice—Art of the Alfûrs	323

CHAPTER XIV

MANADO

Every-day life in Manado—Chinese New Year's Day—The King's birth- day—A grand ball—An oath—The story of Makalew—Last visit to Talissee—Farewell to Celebes	339

LIST OF ILLUSTRATIONS

(Engraved by J. D. Cooper)

FIG.

- PERIOPHTHALMUS KOELREUTERI. (*Drawn from specimens by Miss A. W. Hickson*) *Frontispiece*
1. NATIVE DOUBLE OUT-RIGGED CANOE OR 'LONDI.' (*From a model: A. W. Hickson*) *page 22*
2. SCHEMATIC SECTION OF SHORE PLATFORM, SWAMP, AND REEF. (*The Author*) *24*
3. SKETCH OF BUTTERFLY BAY AND BATU KAPAL, IN LIMBÉ ISLAND. (*From a sketch by the Author: Mr. Percival Skelton*) *To face p. 33*
4. SKETCH MAP OF NORTH LIMBÉ. (*The Author*) *34*
5. THE RUANG VOLCANO. (*From a sketch by the Author*) *42*
6. CORAL REEFS OF PASSIAC AND TAGULANDANG. (*From a sketch by the Author: Mr. Percival Skelton*) *To face p. 45*
7. POLLICIPES. (*From a specimen: A. W. Hickson*) *51*
8. *Galacea Esperii*. (*From a photograph*) *58*
9. THE PANCHURAN AT TALISSE. (*From a photograph: Miss Lydia King*) *To face p. 59*

FIG.	PAGE
10. THE STRAIT BETWEEN TALISSE AND KINABOHUTAN. (<i>From a sketch by the Author: Mr. Percival Skelton</i>) . To face p. 75	
11. CYNOPITHECUS NIGRESCENS. (<i>From the Zoology of the Voyage of the 'Astrolabe' (78): A. W. Hickson</i>) To face p. 83	
12. DIAGRAM TO ILLUSTRATE THE AVERAGE SHORE SLOPES IN THE NEIGHBOURHOOD OF TALISSE PIER, MANADO, AND MANANINTA, COMPARED WITH THE INCLINATION OF TALISSE HILL. (<i>The Author</i>)	107
13. DIAGRAM TO ILLUSTRATE THE ANATOMY OF <i>Galacea Esper.</i> (<i>Dr. G. H. Fowler</i>)	120
14. DIAGRAM OF TRANSVERSE SECTIONS THROUGH A POLYPE OF <i>Galacea Esper.</i> (<i>Dr. G. H. Fowler</i>)	122
15. SCHEMATIC DRAWING OF A POLYPE OF A COLONIAL PERFORATE CORAL. (<i>Dr. G. H. Fowler</i>)	123
16. <i>Clavularia viridis.</i> (<i>A. W. Hickson</i>)	125
17. CORAL REEF AND LAGOON NEAR KOA. (<i>From photographs and sketches by the Author: Mr. Percival Skelton</i>) To face p. 137	
18. LARGE HOUSE IN KARATON. (<i>From a sketch by the Author: A. W. Hickson</i>)	161
19. TAMPAT GOT. (<i>From a specimen: A. Robinson</i>)	162
20. SAKIT CANOE. (<i>From a specimen: A. W. Hickson</i>)	164
21. WOODEN SPEARS FROM BÉO. (<i>From a photograph</i>)	171
22. WOODEN SHIELD FROM BÉO. (<i>From a specimen: A. W. Hickson</i>)	171
23. URŌ, A COCO-NUT FETICH. (<i>From the specimen: A. W. Hickson</i>)	176
24. CEREMONIAL SHIELD OF SENTRY AT TARUNA. (<i>From the specimen: A. W. Hickson</i>)	177

LIST OF ILLUSTRATIONS

xv

FIG.	PAGE
25. HAT OF SENTRY AT TARUNA. (<i>From the specimen: A. W. Hickson</i>)	177
26. NOTCHED STICKS FOR KEEPING TIME IN MANGANITU. (<i>From the specimen: A. W. Hickson</i>)	180
27. A SAGO CHOPPER. (<i>From the specimen: A. W. Hickson</i>)	195
28. FISHING FLOATS FROM SANGIR AND SANTA CRUZ. (<i>From photographs of specimens in the Pitt-Rivers Museum at Oxford</i>)	201
29. THE HEAD OF A MALAY FISHING SPEAR. (<i>From a photograph</i>)	
30. CLUB FROM TARUNA. (<i>From the specimen: A. W. Hickson</i>)	203
31. BÔTÔ. (<i>From the specimen: A. W. Hickson</i>)	216
32. ATYA WYCKII. (<i>Copied from the 'Annals and Magazine of Natural History' (38): drawn by A. W. Hickson</i>)	222
33. A SPEAR FROM BWOOL. (<i>From a photograph</i>)	326
34. PATTERN ON A LANGOWAN MAT. (<i>From the specimen: A. W. Hickson</i>)	334
35. TOMMY KWACK. (<i>From a photograph</i>)	357

MAPS

I. MINAHASSA	To face p. 13
II. THE ISLANDS BETWEEN THE PHILIPPINES AND CELEBES	157

A NATURALIST IN CELEBES

CHAPTER I

FIRST GLIMPSES OF CELEBES

Arrival at Makassar—Objects of my visit to Celebes—Area and physical features of the island—Makassar—Private theatricals—‘Running amuck’—Sail for Manado—Beauty of the coast scenery—Manado Bay—Interview with the Resident of Manado—Etiquette—News of H.M.S. ‘Flying Fish’—The Government of the district—The inhabitants—Start for Talisse—Unpunctuality of the Malay races—Whistling for the wind—Talissee coral reefs—Koa—H.M.S. ‘Flying Fish.’

EARLY in the morning of Friday, July 24, 1885, the passengers on board the *Nederland India* s.s. ‘Generaal Pell’ could see amid the purple mist of the horizon the conical summit of Mount Bonthain rising as it were out of the sea. It was a lovely morning; not a breath of wind disturbed the pond-like surface of the brilliantly blue sea; not a cloud broke the monotony of the equally clear blue sky above our heads; and as we gradually approached the coast of Celebes and the forest-clad hills and fertile plains exposed themselves to view, a feeling came over me that a veritable earthly Paradise lay before me in that beautiful island.

Before introducing the reader, however, to Celebes and the Celebeans, I must pause a while to explain the objects I had in view in visiting this island in the tropics. My main object was the investigation of certain problems connected with marine zoology.

Of all the branches of Natural History, not one has made so much progress within the last ten years as that of marine zoology. The vast improvements in the microscope, the new means for anatomical and embryological research, and the beautiful methods of killing and preserving the delicate inhabitants of the sea, have given a great stimulus to this branch of study; and it is needless to say that the results obtained by investigators have been of the greatest interest and importance. Having directed my attention for some years to questions connected with marine zoology, I determined to undertake, when time and opportunity served, a voyage to that most generous of hunting grounds—the coral reef—to devote some time to the study of such questions under the most favourable conditions.

It is perhaps unnecessary for me to relate the series of reasons which induced me to choose Manado, in North Celebes, for my head-quarters. The three conditions necessary for the continued and uninterrupted pursuit of my work—a calm sea free from serious typhoons and storms, a friendly and tolerably intelligent race of natives, and a reputation for general salubrity—were coexistent, I knew, in that region; and the writings of naturalists who had previously visited the spot are so full of glowing accounts of the beauty and luxuriance of land and sea that I longed to observe for myself the wonders they describe so well.

The long voyage from England, through the Mediterranean Sea, the Suez Canal, the Red Sea and Indian Ocean, full of interest and excitement as it was and ever must be to a lover and observer of nature, I must pass over without comment. Nor can I pause to relate my impressions of Java, with its densely populated towns, its wondrous forests, and its awe-inspiring volcanoes.

These parts of the world have been well described by other travellers far better acquainted with them than I am,

and I could add but little that would be of interest to the general reader or valuable to scientific men.

My own travels and researches were mainly carried on in the Minahassa district of North Celebes and the chain of little islands connecting it with Mindanao. To those regions, therefore, I will endeavour to confine myself in these pages.

Anyone glancing at a map of the Malay Archipelago must be struck with the curious spider-like shape of the island called Celebes. It is divided into four long peninsulas or arms and a central continent or nucleus by three deep bays—the Bay of Tomini and the Bay of Tomori, facing east, and the Bay of Boni, facing south. It has an area of 70,000 square miles, being in this respect rather larger than England and Wales. Its greatest length is 800 miles, rather longer than Great Britain, and it has the enormous coast line of 2,000 miles.

Its population—who can estimate its peoples? The central continent of the island has not yet seen the face of the white man, and by far the greater part of the four peninsulas is almost unknown and undescribed; in fact, the only parts which are thoroughly explored and utilised by Europeans are not much larger in area than the Isle of Wight and the Isle of Man.

It may seem strange to those who live in crowded cities, where the struggle for mere existence is ever keen and bitter, that there still exists a land nearly as large as Great Britain itself, famous for its healthy equable climate and capable of producing in abundance all the necessities and most of the luxuries of our life, still unknown, unclaimed, untilled.

It is true that the Dutch flag flies in name over the whole island, but the only parts which are really governed by the Dutch are a small region round Makassar in the south, Minahassa in the north, and the district of Gorontalo in the

Bay of Tomini. These parts are, however, as nothing compared with the wide acres of land still covered with virgin forest and calling no one master but the untutored savage.

Makassar is the first port the steamers call at in their passage to the Moluccas. It is a large and busy place, with a mixed population of Makassarese, Buginese, Dutch, Chinese, and Arabs. It is the centre of the trade with the Moluccas and by far the most important port east of Java. It has been aptly termed the 'Hong Kong' of the Dutch in the East Indies (25*).

The country round Makassar is low and swampy, and the distant range of mountains crowned by Bonthain (10,000 feet), famous for its coffee gardens, is frequently hidden in the dense mist which rises from the surrounding plains.

The water as we approached Makassar was of that milky green colour which so often betokens shallows and sandbanks, but the presence of several large ship buoys indicates to the mariner the course that must be taken to bring him safely to his destination.

As the 'Generaal Pell' cautiously picked her way through the shallows to take up her position alongside the little iron pier, we had ample opportunities of observing the various craft of steam and sail which lay at anchor in the roads. Drawn up along the beach were several of the curious sailing praus of about twenty to forty tons apiece belonging to the Buginese traders, a race of wandering Malays to be found in almost every port of the Eastern isles. When we were safely berthed, and the crowd of Orientals and Europeans who were awaiting our arrival had come aboard to hear the latest news and transact their business, I took the opportunity of going ashore to gain my first experience of Celebes.

[* These figures throughout text refer to Bibliography at the end of work.]

The principal street in Makassar, running parallel with the coast line, is nearly a mile in length and very narrow all the way. In the business quarter of the town it is lined by the warehouses of the European merchants, a few good general shops, and the smaller tokos of the Chinamen and Arabs. Here may be purchased to the greatest advantage all the products of the Moluccas, from such things as spice and copra, coffee and cocoa to living birds of Paradise and ethnological curios. For the traveller, too, who is bound for little-known parts, where the stolid Holland dollar ($2\frac{1}{2}$ f.) is valuable only as a lump of silver, there is no market like this; for here he may obtain the surest information about the form of 'trade' which is most likely to be favoured by the tribes with whom he comes in contact. Beads and looking-glasses, wooden combs, knives and cloths may be purchased in Makassar at a price but little higher than that which is charged for them in Birmingham or Manchester.

Makassar is the seat of the Governor of Celebes, whose substantial whitewashed palace forms a conspicuous object on the wide plain behind Fort Orange. Close by the palace is the club 'Harmonie,' where, after the heat of the day, the civil and official Dutchmen meet together to play a game of billiards or to gossip over their cigars and 'pijtjes.'

One of the most striking features of Makassar is a magnificent avenue of tamarind trees which throws a grateful shade over the long road running from the 'plein' through the 'villadom' of the town. On the evening of our arrival I was invited to attend a social entertainment at the Vereeniging Unitas, a large whitewashed hall in the tamarind avenue.

Two short farces were performed by amateurs with much spirit and no little dramatic force. They were en-

titled 'Lente's eerstelingen' and 'Eens gekocht blijft gekocht.' When the curtain fell on the last of these the chairs were cleared away and the company began to dance. 'Na afloop bal,' as the programme curtly put it. These entertainments in Dutch East India usually go on until the early hours of the morning; but, as I was a perfect stranger in a crowd of people who were very well acquainted with one another, I soon grew tired of the gay and festive throng and left a little after midnight. I was accompanied by a young officer of artillery, a fellow-passenger of the 'Generaal Pell,' who soon afterwards, I was told, fell a victim to the fever in Amboyna. As we made our way through the quiet and deserted thoroughfares towards the pier, we were challenged at intervals by the villainous looking 'djagas' or night watchmen, who, armed with long forked 'thief-catcher' spears, dodged in and out like bogeys from pitch-dark corners and recesses. I must confess that at the time I experienced a creepy feeling of insecurity in those lonely streets, brought on perhaps by exaggerated or untruthful rumours of the dangers of Makassar streets at night.

Makassar has an unenviable reputation for that strange form of religious frenzy known as 'running amuck.' I dare say this reputation is undeserved, and there are no more 'Amooks' in Makassar than in other large Eastern towns with a Mohammedan population; but, nevertheless, the possibility of the thing occurring is apt to come forcibly before one on a dark moonless night, and remind one of the insecurity of human life even when accompanied, as I was, by a military officer with a glittering sword.

Although this form of religious fanaticism, which leads the fanatic to murder indiscriminately every one he comes across until he himself is captured or shot down, is undoubtedly of the greatest possible interest to the anthro-

pologist, I felt it was too dark perhaps that night to welcome an Amook as a subject for scientific study.

We stayed two days in Makassar, and then, shortly after sunrise on Sunday, July 26, we sailed for the northern coasts of Celebes.

This, the last part of my long journey from Europe, was in many ways the most interesting and enjoyable, due in no small degree to the clearness and calmness of the atmosphere, which, free from mist and cloud, enabled us to see with perfect ease the bold and beauteous scenery of the coast.

As we threaded our way through the thousand little islands of the Straits of Makassar, we were able to gain some idea of the great extent and extreme fertility of this beautiful country. The lofty mountains standing out in bold relief against the clear blue sky are covered with dense forest from their summits to the level of the sea. Scarcely a rock or field of grass can be discovered to break the monotony of the sea of trees from Makassar to Manado. Everywhere, on island or on strand, on mountain, plain, and dale, are signs of a richness and fertility of soil unsurpassed perhaps in any part of the habitable world.

The little islands of the coast through which we pass add considerably to the beauty of the scene. The little patch of forest with which each one is covered is bordered in some cases by rows of coco-nuts or banana plantations, and the huts of a few families of wandering fishermen may be seen nestling in their shade. Around each island is a narrow strip of sand formed of coral and shell detritus, which glistens and sparkles in the sunshine, and then the shallow milky green water covering the coral reefs blends with the blue waters of the deeper sea beyond it.

The traveller cannot fail to be impressed, on such a trip as this, with the clearness and brilliancy of colours in

tropical nature. The blue of sea and sky, the various shades of green of the forest, the glistening whiteness of the coral strand, and the glowing shades of gold and red of a fine sunset in the tropics, are colours that we rarely see in our sober temperate climes.

I cannot linger now to describe the passing glimpses I obtained of the little villages of Pari-pari, Toli-toli, Dongola, and the more important Amurang, for the steamer stayed but long enough to leave the mails and a little cargo, and was off before I had a chance to go ashore.

Three days after we left Makassar we steamed into Manado Bay. There can be no question that Manado Bay is extremely beautiful, and upon this morning of July 29, as we cut our way through the perfectly calm and glassy water, leaving a long streak of placid foam in our wake, we saw it to the best advantage.

To the north, like a sentinel at the gate, stands Manado-tuwa, one of those perfectly conical island mountains not unfrequently met with in volcanic regions, and in its immediate neighbourhood lie one or two perfectly flat coral islands covered with swamp and morass. The coast of the bay is flat, but the land gradually rises a short distance from the sea and slopes away to form the mountainous backbone of the peninsula. In the distance stands the Klabat (6,694 feet), one of the most beautiful and imposing peaks in the island. In the middle of the bay the Manado River brings its muddy sulphurous waters to the sea.

But where is Manado? By carefully scanning the coast with a field glass, a few poor native huts may be seen on the north bank of the river mouth, and on the south of it, with greater difficulty, a small wooden pier and a fort. The town itself, with its residency, prison, Government offices, church, and warehouses, lies buried amongst the lofty trees and dense ground foliage of the strand.

There is unfortunately no iron pier at Manado for the steamers to come alongside as at Makassar, and the anchorage in the roads is not of the best. When the anchor was dropped, the ship swung round with her stern shorewards, and two stout iron hawsers were sent off to make her fast to the shore. This precaution is necessary at Manado on account of the steepness of the anchorage and the insecure character of the sandy bottom. At one end of the ship there may be sixty fathoms of water, and at the other only twelve, so that, unless special precautions are taken, a stiff breeze from the shore may drag the anchor into deep waters; and leave the ship to the mercy of the winds and tides.

As soon as the ship was snug, I sent a letter to the Resident, announcing my arrival, and requesting an interview with him for the purpose of presenting my papers and permits.

Having received a favourable reply, I was put ashore in the steam-cutter attached to the steamer, and made my way to the Residency, where I found the Resident van der Wyck entertaining some of his friends in the verandah. Having introduced myself and presented my papers, I joined the little party of gentlemen and ladies and entered (so far as my limited knowledge of the Dutch language permitted me) into the conversation.

Let me pause a moment here to give a slight sketch of the etiquette of visiting in the Dutch East Indies. When a stranger comes to settle in a town, he must first of all call upon the residents with whom he wishes to become acquainted. It is as well to send a note at once to say that Mr. X. will give himself the pleasure of calling upon Weledelgestreng. Heer This or Weledelen Heer van That on such a day, and then, if he receives in reply a letter saying that he will be received, the visitor must assume a

black tail-coat, a white shirt with a black tie, a white pair of pants, and, *pro forma*, a hat. The visit should take place between six and seven o'clock in the evening, when it is presumed the ladies and the gentlemen of the household have put aside the usual *déshabille* in which they spend a considerable portion of the day, and are 'dressed' in the more civilised but uncomfortable European costume. On arrival at the house he will probably find his host sitting in the 'voorgallerij' or verandah; if not, he must shout 'Spada,' a contraction of 'Siap'ada' (Who's there!) until some one comes. In the verandah is a round table bearing a number of wine decanters and a box of cigars. The decanters contain Geneva, port wine, Madeira, and bitters. To any one accustomed to English ideas of diet, it does not seem quite natural to partake of these strong drinks and smoke cigars immediately before dinner, but the Dutchman looks upon his 'pijtje' before dinner as one of the necessities of life in the East, and seems none the worse for it.

I never became quite naturalised to 'gin and bitters,' nor could I believe that it is a prophylactic against fever and other tropical diseases, as some of its admirers wished me to, nevertheless I think it is quite as wholesome as any other form of spirits imported into the East. The first visit should not last longer than an hour, and is usually brought to a conclusion by a friendly shake of the hands and a stiff German bow. A few days after the introductory visit, the gentleman, if he wishes to maintain the acquaintance, returns the call, and then the friendship is cemented by card parties, drives, or other entertainments.

To return now to my introductory visit to the Resident of Manado. He talked English correctly, but with some difficulty, and I was then unable to maintain a conversation in Dutch, so that we were some little time in understanding one another. However, I soon learnt that

he was willing to help me to the best of his ability, and was himself a man of some powers of observation and fully interested in many of the scientific problems afforded by the district over which he ruled. Subsequent experience fully confirmed my anticipations, and his kindness, help, and hospitality to me was far in excess of anything I had a right to expect. He was a type of the Dutch official in Malayia—kind and courtly, intelligent and hospitable.

When my visit should have terminated—I was inexperienced then—he warmly welcomed me to dinner and afterwards conducted me to the ‘Pasangrahan,’ or hotel, if it might be dignified by such a name, where I was temporarily to reside. Upon my arrival in Manado I received a very welcome piece of intelligence. A letter was presented to me by the Resident from Captain Maclear, R.N., telling me that H.M.S. ‘Flying Fish’ had just arrived in Banka Strait for surveying purposes, and that I should be heartily welcomed if I could find an opportunity to join her. The chances that were thus open to me of choosing a suitable locality for my work and investigating a large extent of coral reef before I finally settled down were such as any naturalist in these regions might dream of for years without realising, and consequently I took the earliest opportunity that offered of joining the ship at Banka.

Among my letters of introduction was one to the chief agent of the Molucca Trading Company (Moluksche Handel-vennootschap), a company which owns the little island called Talisse, in the Banka Straits. He was about to pay a visit to the coco-nut plantations in the island, and very kindly offered to take me and my luggage with him in his barkas (long-boat), an offer I thankfully accepted. During the two days that I spent in Manado previous to my departure for Talisse I was able to form but an imperfect idea

of the beautiful country lying round the town and of the society of the little colony of Europeans in this remote corner of the globe. I will leave, therefore, what I have to say about Manado and the Minahassers to a later chapter, mentioning only a few facts which are necessary for a proper understanding of the extent and management of the colony.

The district which comes under the jurisdiction of the Resident of Manado includes the whole of the northern peninsula of the island, the coasts and islands of the Tomini Bay, a portion of the south-east peninsula, and the islands which lie between Celebes and Mindanao. Of this enormous territory the only parts which have yet been brought under the 'direkt bestuur' of the Dutch Government are the province of Minahassa and a small district round the port of Gorontalo in the Tomini Bay. The rest of the country is governed by native rajahs and chiefs, some of whom are appointed by the Resident of Manado and pay a small annual tribute to the Government.

Minahassa itself is in many respects a perfect specimen of the well-governed, peaceful, and contented Dutch colony.

In addition to the Resident, who is supreme in the district, there are four Controleurs stationed at Manado, Tondano, Kema, and Amurang, who act as magistrates, collectors of the taxes, and overseers of the Government plantations.

Several European missionaries, schoolmasters and mistresses are resident in different parts of Minahassa, and the religious training and secular education are sound and simple. The natives are as a general rule well-dressed, clean, respectful, honest, sober, and contented; they live in tidy little wooden houses in well-regulated villages, and are diligent in their attendance at both church and school. When young, both men and women are often very handsome,

but they soon begin to look crabbed and wizened as they advance in age. Of a pale yellowish brown complexion, perhaps paler than the majority of the Malay races, with high cheek bones and oval eyes, long straight jet black hair, and, when she does not indulge in the practice of betel chewing, perfect pearl-like teeth, the young Minahassa girl is sometimes very pretty, and even among the older people there are types occasionally seen which may be called quite handsome. There is nothing repulsive or offensive to European taste about the ordinary inhabitants of Minahassa. In matters of adornment they are simple-minded: no hideous grotesque rings, bracelets, clothes, or coiffures mar their personal appearance; no revolting malformations or mutilations of lips, ears or nostrils shock the European's sense of what is right and proper.

I am never likely to forget the first few days I spent in this fascinating region—the first glimpses of the warm luxuriant scenery, the neat and well-regulated villages and streets, or the quiet and respectful inhabitants. My impressions of the place were extremely pleasant, and though in later days I came across some customs, habits, laws, and regulations open to serious criticism, I still believe that this little Dutch colony is fully worthy of the praise and admiration it has excited in every traveller who has visited it and written down his experiences there.

I had arranged to start with the agent for Talisse at six o'clock in the morning of August 4, but for some reason or another the boat was not ready for us until nine o'clock in the evening.

Coming straight from European cities, where trains and boats, engagements and appointments, are timed to the minute, the traveller is often much annoyed by the unreasonable unpunctuality of the Eastern races; but a few months' experience teaches him that no man's word can be

relied upon in the tropics as far as appointments are concerned, and he becomes accustomed to it. There is no word for 'punctual' in the Malay language. That we did succeed in leaving Manado only fifteen hours late was something to be thankful for.

When we left the river mouth that night it was pitch dark in Manado Bay, and I wondered how it was possible for our captain, a Manilla man who could talk a little broken English, to direct our course.

For the first few hours we were favoured by the so-called land-wind, a rush of cold air from the highlands to the sea which blows with great constancy from sunset to midnight at this time of the year, and we made rapid progress towards Tanjong Piso, or Knife Cape, at the northern extremity of Manado Bay. No sooner had we rounded the cape than the wind dropped and we nearly came to a standstill. Our 'kamudi'—i.e. captain and steersman—did the best he could for us, but in vain; we were doomed to drift about for some hours without much progress. He would whistle softly and enticingly, or would change his tone and with pouted lips whistle angrily and viciously for the wind that would not come to help us on. I have often wondered what can have been the origin of this almost universal custom of whistling for the wind. That the custom is of undoubted practical utility is the firm belief of many races of seafarers, from the English sea-captain to the humble Malay kamudi. I was on one occasion very roughly spoken to by a captain in the Irish Channel for casually whistling in a gale of wind. He thought it a piece of gross carelessness on my part which might lead to serious consequences. Here in Celebes, too, I was warned to be careful not to laugh when the kamudi screwed his face up into an intensely ludicrous expression of feigned passion and whistled angrily for the wind to come, for the

Malay seaman's belief in the efficacy of this mode of raising the wind is a serious one and will not brook being made an object of derision.

Soon after midnight a favourable breeze sprang up, and by sunrise we were passing the little islands of Ganga and Tindela. A little later we struck the strong current running through the straits which separate Tindela from Talisse, at the time in our favour, and soon after we were bumping on the coral reefs which fringe the shores of the latter island. This was my first introduction to a coral reef, and, notwithstanding the fatigue of a sleepless night journey and an intense desire to reach my destination, I could not help gazing with wonder and admiration on the marvellous sight that was to be seen at the bottom of the transparent shallow waters of the reef. I had expected to see a wonderful variety of graceful shapes in the branching madrepores and the fan-like, feather-like alcyonarians, for these may be seen in any large museum which possesses a collection of such things, but I was not prepared to find such brilliancy and variety of colour on the reefs.

The madrepores, which in the dried collections are uniformly white, in the living state are of a bright olive brown colour, with growing points and polypes of bright emerald green or violet, and the pale-yellow or white starfishes of our museums seem to be studded here with rare jewels which shine and sparkle with all the colours of the rainbow. Soon after we struck the reef of Talisse, the tide turned with a current of some five or six knots against us; our kamudi wished to drop an anchor until the following tide, but as we could already see the steamcutters of the 'Flying Fish' taking off the surveying parties to different points upon the straits, we urged our men to further exertions with the paddles and succeeded in reaching the little wooden pier at Koa before midday. The

place, which is called Koa in the map, is not, as might be supposed, worthy of the name of village. It consists simply of the house of the Opzichter or overseer, the mandurs or foremen, a gudang or store for rice and other things, and some half-dozen houses of the labourers in the plantations. It is, however, if I might so call it, the port of Talisse, for here the passing praus and sailing vessels stop for water and for shelter on their way from Sangir to Manado. Unimportant as it is to the world at large, it was of considerable interest and importance to me, for here I lived for some months when I commenced my studies of the fauna of the forests and the reefs.

There was, at the time of my arrival—it has tumbled down long since—a rickety wooden pier which stretched from the shore to a distance of some fifteen or sixteen yards beyond the edge of the coral reef.

H.M.S. 'Flying Fish,' a composite sloop of 950 tons, carrying two guns instead of her complement of four as she was on surveying service, was lying at anchor two or three cables from the pier at Koa; and as soon as I had enjoyed a refreshing bath in the beautiful little stream that issues from the mountain-side and breakfasted at the Opzichter's house, I went on board.

I was most heartily and kindly welcomed by all on board, and soon became involved in a running conversation on English politics in general and my own adventures in the past and plans for the future in particular. My subsequent connection with this vessel was in every way a very happy and particularly fortunate one for me, and I cannot more appropriately close this my introductory chapter than by recording my heartfelt thanks to Captain Maclear and the other officers of the 'Flying Fish' for their great hospitality and kindness and for the hearty assistance they gave me in my work.

CHAPTER II

ON BOARD H.M.S. 'FLYING FISH'

The characteristics of Talisse sea—Babirusa hunt—Characters of the forest—The flora—The fauna—Luncheon on the sea-shore—Sandpipers—Race with a native prau—Visit to Bohoi Promontory—The shore platform—The character of the coral reefs—Conditions favourable to coral growth—Practical importance of the knowledge of the conditions favourable to coral growth—Bohoi Bay—Flight of the natives—Jumping crabs and fishes—Periophthalmus—Limbé Island—Batu Kapal—Rooper Point—Wallace Bay—Manado.

THE little sea which I shall call Talisse sea is enclosed by the islands of Banka on the north-east, Kinabohutan, Talisse, Tindela, and Ganga on the north and north-west, and the coast of the northern peninsula of Celebes on the south. In many respects it is a particularly favourable locality for the marine naturalist, for its waters are only on the rarest occasions too rough for an open boat, and frequently as smooth as a mill-pond and as clear as glass. The shores being of three kinds—namely, coral reefs, steep rocks, and river-sand—present every variation of the tropical shallow-water fauna; and, as the bottom is fairly smooth and even, and the water nowhere more than twenty fathoms deep, trawls and dredges may be used with impunity. Outside, the sea is very deep, 200 fathoms being found quite close to the reefs on the west side of Talisse, and 560 fathoms close to the rocks on the east side of Banka, so that the naturalist, if he be fortunate enough to possess the necessary appliances, can investigate the mysteries of the deep seas within an easy distance from his home.

During the first few days I was busily engaged unpacking my trunks and arranging all my bottles and reagents as conveniently as I could for future use, but I also had several opportunities of cursorily examining the reefs and shores in the immediate neighbourhood of the place I afterwards chose to be my head-quarters.

On August 9 the 'Flying Fish' lay at anchor off Likupang, and the chief agent of the company engaged a party of hunters from the village to serve as guides on a babirusa hunt in the neighbouring forests.

We left the vessel early in the morning and rowed towards a little bay which lies about half way between Likupang and Cape Coffin, and then, dividing into three parties, we searched the forests for our game; but babirusas were not to be seen that day, and we returned to the coast with an empty bag. I must confess to a certain feeling of disappointment at our bad fortune, for I was curious to see a specimen of this interesting pig, whose enormous tusks curl back over its head, in a wild state, and I was anxious to solve the difficult problem of the use they may be to the animal in his native jungle. Nevertheless I was glad to have had an opportunity of visiting this particular part of the Celebean forest, for the accounts of its grandeur and magnificence given by Wallace and Guillemard, both of whom had visited it for the purpose of hunting the babirusa, had made a great impression on my mind.

Had we only shot a babirusa, I might say that in no respect was I disappointed. The enormous size of many of the ordinary timber trees, the handsome *Livistonias* palms, the graceful loops of the unending rattans as, stretching from tree to tree, they carried with them endless varieties of other climbers, or supported in their folds large ferns and orchids, formed a framework for the scene which was as

interesting for its richness and variety as it was impressive in its size and grandeur.

One might suppose that, having once seen a small portion of the forest, one has, as it were, sampled the forests of the low-lying districts of the country; but this is by no means the case. The more of the forest I visited, the more I became impressed with the fact that it varies in detail in different places almost as much as the coral reefs, and that to sample it is an impossibility.

This particular part, for example, differs in some important respects from any other part of the forests of the continent or the islands I visited. The trees are finer and taller, and the undergrowth of shrubs and herbs is, comparatively speaking, more poorly developed here than in Talisse. That most beautiful palm, the *Livistonia rotundifolia*, whose leaves are so useful to the Malay for making umbrellas, fans, baskets, and a hundred other things, is abundant here, but in other parts of the forest I have wandered for hours without finding a single specimen.

One of the commonest of the climbing plants here is the well-known 'tali ayer' of the Malays, and probably the *Uncaria lanosa* of botanists, which invariably contains in its internodes a delicious draught of clear pure water. I cannot remember finding it anywhere else.

On the other hand, the ebony tree and the Sagoweer palm (*Arenga sacchariferum*), so abundant in some of the forests, are here but rarely seen.

Of the animal kingdom in this spot I do not feel competent to speak. A naturalist who visits a place in the tropics only for a few hours in the middle of the day may come away with the impression that it is singularly poor in animal life, whereas another visiting it in the early hours of the morning, or an hour before and after sunset,

may find the whole forest alive with birds and insects and the air filled with their songs and cries.

The only birds I remember to have seen were the Hornbills (*Buceros exaratus*). These heavy awkward creatures, aroused by our visit from their midday slumbers, shrieked at us through their long yellow beaks and flapped about from bough to bough in short clumsy flights. There were a few pigeons also far away and almost out of sight in the highest branches of the trees.

Several of the large handsome baboons (the *Cynopithecus nigrescens*) were to be seen. These baboons are peculiar to the northern part of Celebes and some of the neighbouring islands, where they are very common and abundant. This region may be considered to be an outpost of monkeyland, for no monkeys are found either east or south of this district.

After wandering through the forest for some hours, our guides brought us together at the sea-shore, where we spent a welcome hour of rest after our toilsome march up-hill and down-dale in the stifling heat of the forest. The spot we chose for our lunch was one of those beautifully clean white tracts of sand so frequently met with on the shores of coral islands and coasts with fringing reefs. The fine white sand was composed of coral detritus, foraminiferous shells and larger lumps of water-worn madrepores and tubiporas, with a litter of mangrove fruits, catapang nutshells, husks of coco-nuts and other forest *débris* left by the last spring tides.

Whilst we were at lunch the tide was slowly ebbing, and when the waters of the lagoon became sufficiently shallow, numerous little sandpipers appeared to seek their prey.

These little birds afterwards proved good friends to me, for whenever my supply of chickens ran short in Talisse I

could always rely upon a brace of them to help me through with my meal of rice and curry. They should have had a more sentimental claim upon my attention than this, for they are also inhabitants of the British Isles.

Two Celebean birds—and I believe I am right in saying only two—can hardly be distinguished by ornithologists from British species. One is the common sandpiper (*Tringoides hypoleucus*), and the other the cuckoo (*Cuculus canorus*).

Of the cuckoo, Guillemard says (24): 'Its skin cannot be distinguished from European skins in plumage.' Nothing is at present known of the nesting habits of the bird in Celebes, so that we cannot yet assert that it lays its eggs in the nests of other birds. Although it was abundant in Talisse, I never heard the familiar cry of 'cuckoo,' which is so welcome to us in spring in England. It is possible that it utters this cry in the breeding season and is silent for the rest of the year.

On our way back to the ship we were participators in an exciting and interesting race. The lunch, provided for us by the agent of the company, had arrived from Talisse in one of the Malay double-outrigged canoes called by the natives 'londi.' This canoe and the two whalers of the 'Flying Fish' crossed the reefs and hoisted sails almost simultaneously. The Malay sail is oblong in shape, stretched by two yards and hoisted by means of a halyard attached towards the foremost end of the upper yard. Two ropes attached to the port and starboard ends of the upper yard are made fast to branched wooden belaying pins fixed to the outriggers. In sailing, the rope on the windward side is used as a main sheet and hauled fast, so that the sail comes to stand nearly upright almost parallel with the mast, while the other rope is used as a tack to keep the sail steady.

The starboard and port sides are called 'lakki-lakki,' or man, and 'perampuan,' or woman, respectively.

The canoe itself is simply a 'dug-out.' It is sometimes twenty-five or thirty feet long, with a beam of only thirty inches.

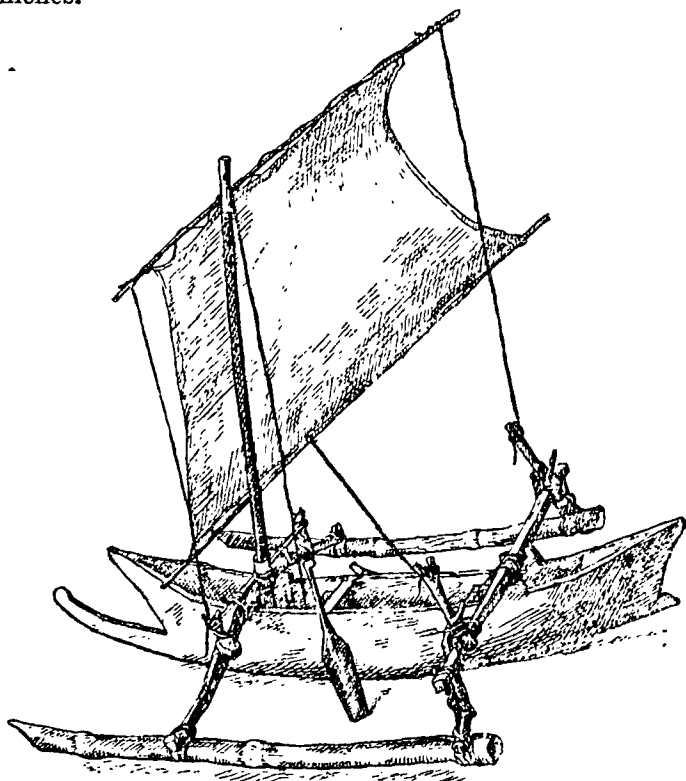


FIG. 1.—Model of a native double-outrigger canoe or 'londi.'

The outriggers are generally made of two or three pieces of thick bamboo firmly lashed together and attached to cross pieces of some light strong wood which run right across the canoe.

With a fair wind, these canoes carry a great deal of sail and can go very fast; but they are awkward to tack and cannot sail very close to the wind.

On this occasion the race ended somewhat in favour of the canoe, but had the wind been a little more abeam the result would have been very different.

The following day I accompanied one of the surveying officers to a promontory on the north coast to the west of Likupang. This promontory is flat and bordered by a belt of mangrove swamp. I cannot give an accurate estimate of the breadth of this swamp, for it stretched away inland far beyond our sight, and none of the maps nor charts give any plan of the true coast line.

The occurrence of a broad shore plain bordered by a broad belt of mangrove swamp is by no means a rare one in these climates. It is, in fact, such a common feature that it deserves a few words of explanation.

In the first place it cannot for a moment be supposed that these broad level plains on the sea-coast represent the true bearing of the hill rocks. It is inconceivable that broad plains of the primitive volcanic rocks should be found at precisely the same (sea) level in so many places. We are bound, therefore, to believe that they were built up of some secondary formation at a much later period. What, then, is the probable nature of this formation?

In nearly every case where we find a dense mangrove swamp on the sea-coast we find a vigorous coral ree beyond it. Taking for granted at present—for I shall return to argue this point in a later chapter—that coral reefs under certain favourable circumstances have a tendency slowly to grow out seawards, we must believe that the soil between the reef and the rising slopes of the hills is composed of coral sand and *débris* resting on a substratum of coral rock. This area is covered with water at all times except at low water of the spring tides, but on the shore side banks of sand are formed by the continual ebb and flow of the tides. The mangrove trees flourish best in such a soil

of coral detritus, where they are washed by a perpetual flow of shallow water.

On the shore side, the heavy rains bringing down from the mountain slopes an abundance of vegetable mould and soil by degrees raise the shore banks above the level of high-water mark, and then the mangroves are replaced by ordinary forest trees and jungle. In this manner a shore plain never submerged and covered with ordinary forest is gradually formed.

Upon examining the reefs at this promontory, I found a very marked difference between the vigour of coral life upon

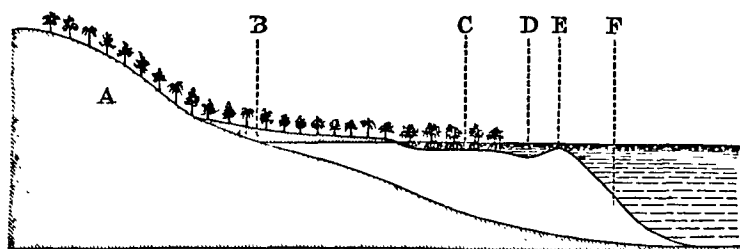


FIG. 2.—Schematic section of shore platform, swamp, and coral reef.

A, primitive rock; B, shore platform covered with ordinary forest trees; C, mangrove swamp; D, lagoon; E, edge of coral reef; F, talus of reef.

the extreme seaward point and the sides of the promontory. Where the reefs projected furthest into the sea the corals were few in number, small in size, and separated by considerable intervals of sand. On the northern and southern sides, however, I found the reefs in a very vigorous condition. Madreporas, tubiporas, sarcophytums, and sponges were growing in such abundance and profusion that it was impossible to put one's foot down on anything save living zoophytes.

This condition of affairs at the time astonished me, for I had supposed that those corals which grow upon the most projecting reefs would be likely to receive the greatest

quantity of food, and in consequence would thrive the best, and I thought that some exceptional and unexpected flow of the tides and currents must cause the languishing condition of the projecting reefs of the Bohoi Promontory and the prosperity of the reefs of its sides.

Before I had been long at work, however, at Talisse, I came to the conclusion that what I had observed at Bohoi was rather a rule than an exception, for I never found in any single instance that the most vigorous coral growth was to be found upon those points of the coast line which project furthest into the sea.

The vigorous growth of reef-corals seems to be dependent upon a great many conditions, the absence of any one of which causes very obvious modifications in the number of specimens, the number of species, and the size and vigour of corals found upon the reef.

First, as is well known, reef-building corals will only grow in the warm waters of the tropical seas; secondly, they will only grow in water which is less than twenty or twenty-five fathoms deep; and, thirdly, in flowing water which is neither too swift nor too stagnant, and bears the kind of food which is necessary for their proper nourishment.

Unfortunately we have at present but little information upon the rapidity of the flow of water which is most favourable for the growth of corals and but few observations on the character of the food which the coral polypes like best.

At Tanjong Aros, at the north of Talisse Island, I found that, although a few *Astræas* could be seen growing at a depth of two or three fathoms, no true reef was formed. At this point the tide race sometimes runs at six or seven knots an hour. At a point upon the reefs of Talisse opposite the island of Kinabohutan, where the tides flow at

times with considerable rapidity, the corals are not growing vigorously and well, and in many other places I could refer to I found that luxuriant coral growth is not consistent with very lively water.

Again, in deep bays or inlets, where tidal and ocean currents are scarcely felt, there is but little vigour in the reef, and the presence of fresh-water streams entirely destroys all the coral life upon it. The best places for the collector and observer of these forms are always to be found at the sides of reefs or promontories which project some distance into the sea.

It is not difficult to find an explanation of the fact that corals will not grow in very rapid water. In the first place, their food, whatever it may be, cannot be easily captured when it is rushed past them as in a millstream; and in the second place, the embryos which they discharge are carried away by the currents into less lively waters, where they can fix themselves upon the reef and grow.

It would not, I think, be a very difficult thing to determine with some considerable accuracy the rapidity of the current most favourable for coral growth, but, to be trustworthy, the observations must be undertaken by a naturalist who is familiar with the fauna of the coral reefs, assisted by practical seamen who are competent to determine the rate of tidal currents, and have the command of steam.

The result of such an investigation would not only be of considerable interest to scientific men, but would in all probability lead to several important cautions to the navigators of coral seas.

Vessels are constantly being lost upon coral reefs in different parts of the world,¹ and many accidents are due to

¹ Two sailing-ships were lost on the coral reefs near Manado during the eleven months I was in Celebes.

the inaccuracy of our charts and the want of knowledge about the tides which sweep the reefs.

We have abundant evidence to show that charts of coral reefs made one year are almost valueless twenty years afterwards; and nevertheless we have at present absolutely no experimental results to indicate to the navigator or the naturalist in what places the reefs are growing seaward, and where they are gradually breaking down.

In such a passage as Banka Strait, the force of the tide is strongest near the middle of the channel, and feebler towards the shores. Let us now suppose that at some point upon the coast the average tidal rate was the most favourable one for coral growth. This particular point would have a tendency, I believe, to grow out slowly into the strait. The rate of growth would be more rapid in shallow water than in deep water, but under all conditions it would grow until it reached that part of the current which was too strong to be favourable to coral growth, and there it would stop; while the sides of the projecting reef thus formed would grow until they reached the same strong currents. A change in the force or direction of the tides of the strait due to the change of reef in other places, or volcanic disturbances, might cause this reef to progress still further into the strait, or, on the other hand, to completely die and become diminished by solution and erosion.

My object in referring at such length to the subject of the supposed growth of coral reefs has been to endeavour to show that, apart from any movements of elevation and subsidence of the earth's crust, the coral reefs should be looked upon not as simple stationary structures, but as living moving things, ever changing their form and aspect. Sometimes they obtain a mastery over the waves and encroach upon the domains of the sea; sometimes they are beaten back by the tides, eroded and dissolved; whilst at

times the water and the reef seem to assume a position of armed neutrality towards one another, and each one holds his own for years together.

Whilst the surveying officer was engaged in taking his observations, I wandered about upon the slimy muddy shores and coral reefs, watching the active little squillas darting about amongst the corals, admiring the gorgeous colours with which the polypes are painted, and selecting a number of rare or interesting creatures for future examination. It was an immense pleasure to be at last upon a living coral reef, to be able to see for myself hundreds of the forms of animal life I had read about in books at home, and to correct by personal observation some of the many erroneous impressions I had gained by arm-chair work. I think that the fact which most astonished me was the extreme variety to be seen about me, the immense number of things of all kinds and of every description which lie about in such a spot as this. If the accounts given of coral reefs fail to convey a true conception of what a coral reef is like, it is, perhaps, because they are more accurate in certain details than comprehensive. There are many animals quite unknown to the average reader, and I might say the ordinary traveller, bearing no names that convey any concrete idea to any one who is not a specialist in the particular branch of Natural History to which they belong. A long list of the Latin names of the corals of a reef, for example, conveys no impression even to many zoologists of the infinite variations of form, structure, and colour which those corals actually present in the living state; and the same might be said of the members of every other group of the animal kingdom. A coral reef cannot be properly described. It must be seen to be thoroughly appreciated.

Our work upon the promontory finished, we started in

the steam-cutter for a little inlet hard by called Bohoi Bay. The two sides of the bay are very different in appearance. On the north side there is a steep, rocky shore without any trace of coral reef. On the south a broad belt of mangrove swamp and a typical fringing reef. At the base of the inlet, which receives a little mountain stream, there was an elaborate arrangement of bamboo fishing-stakes, and, nestling amongst the trees on the northern shore, a few small houses.

No wonder that when the natives saw our little 'skuchi api,' or fire-boat, ploughing through the water towards their home, they thought discretion was the better part of valour and retired into the bush. It must have seemed to them passing strange that a party of apparently sane Europeans should find it worth their while to pay a visit to Bohoi Bay.

We landed upon the northern shore and walked along towards a huge basaltic boulder which marked the entrance to the bay.² Between the volcanic rocks and boulders along the shore is a fine white foraminiferous sand, mainly composed of *Calcarina* shells and *Orbitolites*. The rocks which lie below high-water mark are covered with a fine layer of acorn shells. Upon them may be seen a number of brilliant little green and yellow crabs and jumping fishes. The crabs are called by naturalists *Grapsus varius*. They are curiously marked with dark olive-green stripes alternating with bright yellow stripes and spots, and they are capable of making the most extraordinary leaps and bounds I have ever seen in crab-life. They would spring from rock to rock with the greatest skill and precision, and when a broad expanse of bare rock allowed it they would scamper along at such a rate that I found it impossible to catch them.

² The rocks of the volcanic regions of North Celebes belong to the augite-andesite series.

Not being endowed with the wisdom of the crab, I wondered why, to escape from such an enemy as they evidently took me for, they did not immediately plunge into the water and hide beneath the rocks. Perhaps they have found that it is safer to trust to their powers of flight from rock to rock, which were, it is true, good enough for such an enemy as I was, than by plunging in the waters, to run the risk of falling victims to larger crabs and other foes that lurk in the rocky pools.

The little jumping fishes (*vide* Frontispiece) are well known upon the shores of all the Indian seas. They, like their crab-comrades, appear to consider that their safety lies above the water rather than in it, for they never attempt to save themselves when disturbed by plunging into the sea.

Their position is usually one of clinging to the edge of the rocks or mangrove roots by their fins, with their tails only in the water. When alarmed they make a spring by means of their bent, muscular, pectoral fins, and then skim across the water by a succession of short jumps until they reach a place of safety.

The fact that they live the greater part of their lives with their head and gills out of water suggested to me an investigation of their respiratory organs, as I thought it possible that they might possess some interesting modifications of the swim-bladder to enable them to breathe the air. It was not, however, until the Meeting of the British Association at Manchester in 1887 that an explanation of the mystery of their respiration occurred to me—namely, that the respiration is mainly performed by the tail. Since then Professor Haddon has been carrying on some experiments in Torres Straits and has shown that this explanation is correct (29).

It seems at first sight a very extraordinary thing that a fish should have become so modified by change of habit as

actually to have transferred the chief part of its respiratory functions from its gills to its tail. It is a well-known and generally recognised fact, however, that in all the Amphibia the skin plays a very important part as an organ of respiration, and it is quite possible that the thin skin between the fin-rays of many fishes also acts as an accessory to the gills and performs the same function. If this is proved to be the case we should have to look upon the tail of *Periophthalmus* as an example of an organ discharging a function which is performed in a lesser degree by the tails of many if not of all fishes.

Perhaps the most extraordinary feature of *Periophthalmus* is the curious pair of goggle-eyes. They stand up out of their sockets in a very uncouth manner, and are capable of very extensive rotatory movements. I have examined the anatomy of these eyes in some detail, and can say they are, in accordance with their supra-aquatic existence, more like the eyes of frogs than of ordinary fishes.

Periophthalmuses feed upon small crabs and other crustacea, but I have also frequently found in their stomachs flies and mosquitoes.

From the fact that they live almost invariably upon uneven, broken ground, and are extremely active and shy, they are exceedingly difficult to catch, and I may as well acknowledge that on this the first day of my acquaintance with them I failed to make a single capture.

Some weeks afterwards, when I was at work in Talisse, I tried again. The butterfly-net method failed, however, and so did my attempt to catch them fly-fishing, and at last I was obliged to say to my boy severely, 'Go, Manuel, and catch me fifty ikan chicchak,' as the natives call them. 'Tida boleh tuan' ('It can't be done, sir'), replied Manuel, who had been an eye-witness of all my failures; and there-

upon I assumed my most serious tone and said, 'Manuel, I shall be very angry with you if you do not bring fifty ikan chicchak to-morrow morning.' Manuel left me, and by breakfast time on the following day he brought me fifty *Periophthalmuses* alive in a large glass vessel.

The secret of his success is soon told. When he left me he consulted another boy of mine named Marcus, who, having been born and bred in the country districts, was well acquainted with all the snares and dodges used by boys for catching every living thing that flies, runs, or swims. Now Marcus always had at hand a small bamboo blow-pipe, and in a moment he could manufacture a little dart out of a piece of stick and a plug of cotton wool.

In the early morning the two boys sallied out armed with this weapon, and in an hour or two they had succeeded in capturing some fifty specimens. They were all slightly wounded, it is true, but still they lived for some time in a glass bowl upon my table. They are, of course, excellent and rapid swimmers, but nevertheless they preferred to fix themselves to the sides of the bowl with their heads above the water and stare about them with their extraordinary goggle eyes.

Having finished our work in Bohoi Bay, we returned to the little village, and found that some of the native men had ventured from their retreat. We presented the chief with a handful of tobacco for having thus unceremoniously intruded upon his property, and then steamed away to rejoin the ship.

Two or three days after our visit to Bohoi Bay the 'Flying Fish' anchored off the northern point of Limbé Island.

It is a wild, inhospitable spot, with a strong tide running in and out of the Straits of Limbé. Steep cliffs of basalt rise almost perpendicularly from the water

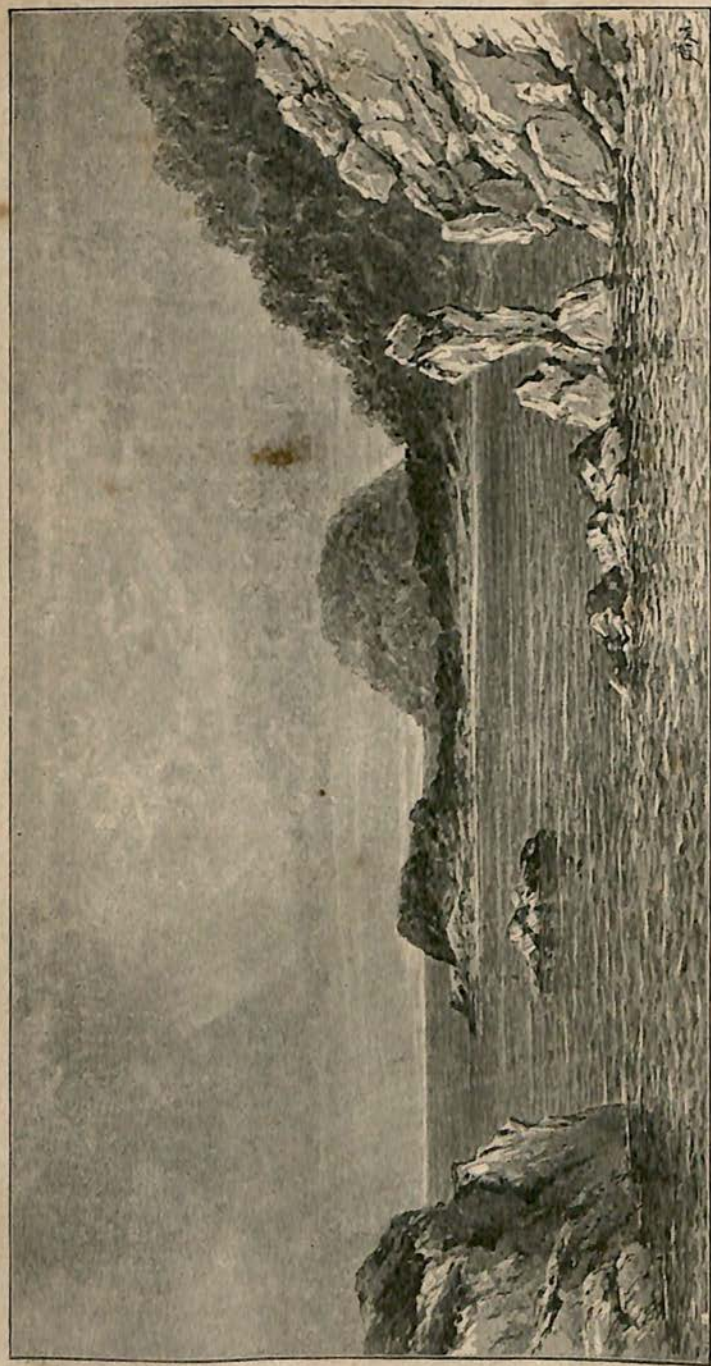


FIG. 3.—SKETCH OF BUTTERFLY BAY AND BATU KAPAL, IN LIMBÉ ISLAND.

on the coast of the island facing us, and a reef of sharp steep rocks project from the promontory into the sea. At a distance of a couple of cables from this rises a great rock, called the Batu Kapal, or Ship Rock, white with the guano of numerous sea-birds. As the sun slowly sank on the horizon that night a crowd of frigate birds and boobies flew round and round the ship, making the evening hideous with their shrieks and screams. When darkness set in, however, they gradually became quiet, and went away to roost, we believed, on Batu Kapal.

The following morning, when Lieutenant Rooper³ and I scrambled up the almost precipitous sides of the rocks to take some observations and plant the little white surveying flag upon its summit, the birds were all gone. Not a single one remained behind to guard their island home.

We found the rock to be covered with guano, but with the exception of half an old egg-shell I could see no other signs of nests or eggs.

The only plant I could find upon the island was a small species of *Ficus* (*F. nitida*),⁴ and it was a wonder to me how it could possibly keep a foothold in the crevices and holes of such a barren and inhospitable soil.

After seeing all that there was to be seen on the rock, I put off in the whaler for a low sandy beach which lies to the south of it, and spent the morning in wandering through the forest and on the hill-sides. In the afternoon Rooper joined me, and we lunched together in a grove of screw pines near the beach. Among the screw pines there were a few young palm trees and some large aroids. The midrib of the leaf of one of these aroids was thirty-six inches

³ This gallant officer soon afterwards lost his life by the accidental discharge of a pistol whilst surveying off Murray Island, in Australia. His sad loss was keenly felt by all who knew his open-hearted amiable character and sterling abilities.

⁴ *Ficus nitida*, Bl. = *Urostigma microcarpa*, Miq.

in length. During our meal we noticed a rustling among the leaves near us, and, for a moment only, saw the head of an enormous lizard. Before we could seize our guns the beast had disappeared. This was the largest lizard I came across during my travels. At a rough guess it was probably five or six feet long, the largest one I shot in Talisse being only 3 ft. 6 in. I believe it was a *Varanus bivittatus*, one of the monitor lizards, so called because they are supposed to give warning of the approach of crocodiles.

After lunch we started together upon a little exploring expedition along the coast. When we had crossed the little

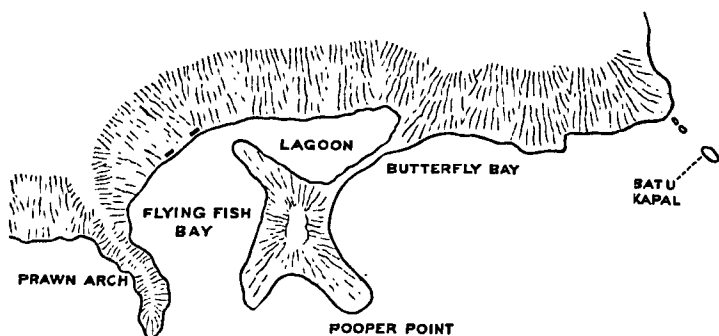


FIG. 4.—Sketch map of the Northern portion of the East Coast of Limbé Island.

point which I have called Rooper Point, we came to a broad sandy bay left almost dry by the ebb tide, and this we found communicated with a wide marshy lagoon, which, running in a northerly direction, was only separated from the sea of Butterfly Bay by a narrow sandy bar.

There can be no doubt, I think, that at one time Rooper Point was an island, that some years ago the northern end of the connecting strait was blocked by a sand-bank, and that, now, the rest of the channel is gradually filling up. In time, perhaps, the lagoon and 'Flying Fish' Bay will become dry land covered with dense forest.

In many respects the most interesting part of the expedition was the walk across the great sandy flat of 'Flying Fish' Bay. It was composed of a mixture of coral detritus and a black stinking mud. Running across it were a number of shallow streamlets draining the water from the lagoon. Where the sand was dry a few Calappa crabs, a few starfishes and gelatinous hydroids, were the only representatives of the animal kingdom; but in the channels of running water there were some large pale green or yellow lumps of the sponge-like Alcyonarian Sarcophytum, a few corals, and here and there a large Fungia, while above our heads a huge fish-eagle (*Haliæetus leucogaster*) circled around. In one of the little channels Rooper shot a good-sized conger, probably Bleeker's *Conger anagoides*.

On the opposite side of the bay we came across a magnificent natural arch in the rocks, and under it lay a little pool of beautifully clear water in which I caught a pair of brilliantly coloured prawns (*Stenopus hispidus*). The broad bands of bright red across the cephalothorax and abdomen, the remarkably long striped antennæ, and the tiny little thorns with which the whole body is beset, give these animals a most gaudy and grotesque appearance. Like many of the brilliantly coloured fishes of the coral reefs, when removed from their proper environment they seem as if they were specially attired to be seen; but in reality their colours are their protection, because they make them *inconspicuous*. Amongst a crowd of wedding guests it is the unfortunate man without a wedding garment who is conspicuous; and so amongst the gay colours and strange forms of the coral reef, the sombre-coloured fish or prawn would be most readily observed and fall a prey to its enemies.

When we returned to the whaler, which lay off Butterfly

Bay, the ship was already flying signals for our recall, so we started immediately and went on board. We anchored for the night in Wallace Bay.

August 14.—I stayed on board to-day, owing to a slight injury to my foot, and thus missed the only opportunity I had of visiting the black sandy beach where the maleos lay their eggs. These birds and their strange habits have already been so well described by Wallace and Guillemard (25 and 83) that I must refer the reader to the works of these authors for an account of them. We anchored for the night in Banka Strait.

August 15.—Early this morning we left the Banka Strait for Manado, sounding occasionally on the way.

CHAPTER III

ON BOARD H.M.S. 'FLYING FISH'—*continued.*

Sail for Ruang—Visit to the Rajah and the missionary at Tagulandang—Return to Tindela—Back again to the Ruang—'Loods'—Attempt to walk round the Ruang Island—Maleos—Ascent of the volcano—Fauna of the woods—The lip of the crater—Magnificent view of the neighbouring islands—Refusal of our guides to proceed to the highest point—Recent history of the Ruang—The lava roads—The descent—Difficulties of the collector—Biarro—Tanjong Aros—Caves—Edible birds' nests—The foam of the sea—*Pollicipes*—*Distichopora*—Farewell to the 'Flying Fish.'

August 17.—We left Manado this morning for Tagulandang, a small island about fifty miles distant in an easterly direction. Close to the island, and separated from it only by a narrow channel, lies the Ruang volcano, whose slopes, now partially covered with vegetation, are marked by great roads of black lava and *débris* stretching from the lip of the crater to the sea-shore. On our arrival, some of the principal natives came off in a canoe to meet us, and they seemed very much astonished when, instead of coming as near as possible to their village, we anchored for the night close to the foot of the Ruang.

August 18.—I went ashore this morning on Tagulandang with Mr. de Vries, a Dutch merchant who had accompanied us from Manado. We were received upon the beach by the Rajah of the islands and his principal officers attired in the correct costume of a black frock coat and white trousers, and by a crowd of natives beating little drums. The Rajah's house, to which we were forthwith invited, is built

entirely of wood and raised on wooden piles about five feet above the level of the ground. It consists apparently of one large room, which may be temporarily divided into several smaller ones by great cotton sheets stretched across it. As we sat and talked to the Rajah, the room gradually began to fill with native men and boys, who squatted upon the floor or crowded along the walls silently watching our every movement with the greatest interest. After a little, finding that we could not get much information from the Rajah, we left his house and walked through the village to pay a visit to the missionary. The houses of the village are situated on either side of a pretty broad road, and with their little garden patches and banana groves have a very neat and tidy appearance.

We found Mr. Kelling, the missionary, at home in his little house at the other end of the village. He is a German by birth, but at an early age he left his home and native country to take service under the Dutch as a pioneer of Christianity in the far East. Long past the prime of life now, he has buried two faithful companions who came to share his labours and anxieties; he has suffered terribly from the effects of insufficient nourishment and the malarious climate; a witness of the terrible eruptions of 1871 and 1874, by which he lost many of the faithful members of his congregation, he nevertheless seems willing and contented to pass the rest of his days in solitude and hardship for the sake of the sacred cause he has at heart. No one who has seen these faithful men at the scenes of their labour can fail to admire the simple-minded courage and determination with which they spread the first principles of a higher civilisation amongst a savage people. It is true that there are some black sheep even in this noble flock who do an immense amount of mischief amongst the people they are sent to minister unto; but, as a rule, the traveller

can see in a moment both in the bearing of the natives and the regularity of their homes and villages the beneficent influence of the minister they are fortunate enough to have in their midst.

An hour spent with Mr. Kelling, who talked to us in German both of the troubles and anxieties in his work and of the natural history of his highland home, passed pleasantly enough, and then he took us through a grove of screw pines and another of coco-nut palms to a little hill from which we were able to obtain a magnificent view over part of the island, the Ruang volcano, and the sea.

Returning to the shore, we found our time was up, so, bidding good-bye to Mr. Kelling, we hurried on board the 'Flying Fish' and were soon under way again for our observation island, Tindela.

We stayed less than twenty-four hours at Tindela, the object of that flying visit to our observation spot being only to correct by it the determination of the longitude of the Ruang volcano. The spot that Captain Maclear had chosen was a low sandy spit on the southern side of Tindela. It combined the advantage for astronomical work of a considerable sea horizon with an uninterrupted view of many of the most important islands, capes, and headlands in the Straits.

It was an interesting place in many other respects, and I have often wandered up and down the sandy shore when the officers were taking observations, watching the crowds of hermit crabs crawling along the sand at high tide or picking up the lumps of water-worn coral and other *débris* with which the beach is littered.

When the observations were concluded, we hastened back to Tagulandang, and once more we dropped our anchor off the Ruang as the sun was setting.

Before leaving Manado we had taken on board a native of the Gulf of Tomini, named Motiara, who from his knowledge of the navigation of all these islands was employed to make himself as useful as he could as a pilot. He came on board with a large leaf hat, which was painted red all over and had the word 'Loods' (pilot) printed in large white letters in front. This man, whose utility as a pilot was very slight, mainly amused himself while on board by painting and repainting his wonderful hat with any of the ship's paints he could get hold of, and, under the guidance of the blue-jackets, who were much more adept with the needle than he, in mending the many rents in his scanty garments.

As I was anxious to see if the eruption of the Ruang in 1874 had completely destroyed all traces of coral reef round the island, I asked Motiara if it were possible to walk all round the island, and he told me that it was. With the permission of Captain Maclear, he and I started in the afternoon to attempt the walk, but before we had got half way round we came to a low cliff standing well out into the sea. Motiara thereupon calmly informed me that it was impossible to cross that cliff before sunset, and that we must go back. Before finally abandoning the attempt, however, I made the ascent of this cliff alone, leaving my guide contentedly smoking a pipe on the trunk of a tree that had been washed ashore. I struggled on for some distance through a dense growth of leguminous herbs and Cyperaceæ, but at last, finding that my progress was very slow and that the vegetation, already up to my waist, was becoming deeper and denser as I advanced, I was obliged reluctantly to retrace my steps. Although I did not succeed in my attempt, I gained some insight into the character of the shore of this remarkable island volcano, and I can pretty confidently assert that no coral reef has,

as yet, formed on any part of it. The beach is composed of a fine black volcanic sand, upon which may be seen scattered lumps of water-worn tubiporas, astræas, fungias, and other corals. In many places I found the footprints of the maleos, and several little pits where they may have deposited their eggs, but as the island had quite recently been visited by a number of natives from Tagulandang, none of the eggs were to be found.

On the following morning (August 21), accompanied by two of the officers of the 'Flying Fish,' a small party of blue-jackets, two native guides and the schoolmaster of Tagulandang, I made the ascent of the Ruang. Plunging at once into the thick undergrowth of leguminous herbs which seems to form a belt surrounding the island just above high-water mark, we soon came to a small thicket of young trees profusely festooned with creepers. Then we came to a broad bare lava road consisting of large lumps of dried mud which broke into a fine black dust as we trod upon them. Leaving this lava road, we plunged again into a wood of young trees with a profuse undergrowth of ferns and grasses.

As our guides were frequently occupied for some minutes in cutting a way through the undergrowth, we had ample opportunity of looking around us at the various natural objects that presented themselves. The maleos seemed to be here quite tame, for they would calmly watch us from the branches of the trees until we got within thirty or forty yards of them, and then only, slowly and clumsily flew on a few yards further. Pigeons were in the woods, too, in great numbers. There was the handsome bronze-winged pigeon, *Carpophaga paulina*, and the beautiful little green dove with a bright red tail. Large and brilliant *Epeira* spiders hung in the centre of their huge coarse webs. Butterflies and diurnal moths flitted in countless

numbers through the dense foliage, and brilliantly coloured flies fed upon the greenish-white umbels of a small shrub. Now the ascent became steeper and steeper, the undergrowth became less dense, the trees farther apart, and at last we emerged upon the bare black rocks and stones of the crater-lip. Five or six minutes more of hard climbing over loose and difficult ground, by far the most tiresome part of the journey, and at last, footsore and weary, we were able to look into the great crater of the Ruang, and rest awhile after our exertions.

The crater-cup is not particularly deep, and only a

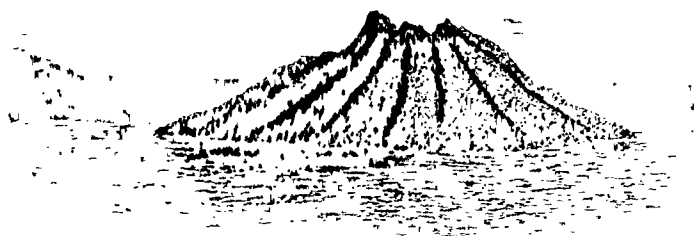


FIG. 5.—The Ruang Volcano.

dozen small jets of smoke were issuing from its sides, but there is a restless and uncanny look about it, which seems to suggest the evil deeds it has done in the past and is capable of doing in the future. The little jets of smoke flicker and spurt from time to time, and, without warning, great slices of the friable walls of the crater dash down the slopes into the cup-shaped bottom accompanied by a dull rushing sound and a cloud of dust. Turning from this scene of restless volcanic energy to the peaceful sea at our feet, a magnificent view rewarded us for the toils of the morning.

Just across the strait lay the forest-clad slopes of Tagulandang, and close by it the little island of Passiac, while in the same direction we could see in the far distance the summit of the Siauw volcano, with the ever-present cloud of smoke hovering over its conical peak. We could not see, however, from that position the mountains of Celebes, for the opposite walls of the crater hid them from view. Our barometers told us that we had reached the height of approximately 1,700 feet, but there was a peak a little to the southward of our position, some 500 feet higher, which rose like the pinnacle of a temple from the edge of the cup. From this point and this alone could we hope to obtain our true bearings with the mountains and islands of Celebes, and consequently we called upon our guides to lead the way to this summit. The guides, however, who imagined that they had already fulfilled their mission, refused, and by telling us that it was not possible, and then that it was not lucky to go there, tried to dissuade us from the attempt. This they did not succeed in doing, for very shortly they had the mortification, or disappointment shall I say, of seeing our little white surveying flag floating upon the highest point of the volcano. It was by no means an easy task to attain this summit, for nearly every step we took sent showers of sand and stones down the slopes of the mountain, and the heat caused by the midday sun shining upon this black soil was intense. On hands and knees we scrambled up, here surmounting a great black boulder, and there crossing a small patch of soft white ash, but at last we reached the summit, a small plateau not more than fifty square yards in area, with all the sides precipitous except the one by which we had approached it. We were, in all probability, the first who had ever reached the summit of this peak, for the natives have neither the courage nor the curiosity to make the ascent, and white visitors are

almost unknown in these parts. But even if we were not the first, we were at any rate to be the last, for upon visiting the Ruang a month afterwards I noticed that the greater part of the turret-shaped peak had given way and rolled down into the crater.

From this plateau we obtained a view of the sea in all directions, and were able to make such observations as were necessary of the relative positions of the neighbouring islands. It is impossible for me to describe the beauty of the view from this commanding position, for no words of mine can do justice to the richness and variety of the colouring or the tone and boldness of the outline. The clearness of the atmosphere in the dry summer months of this tropical region not only renders objects at a distance remarkably clear and distinct, but seems also to exaggerate the intensity of colouring of sea and forest. The wide expanse of the sea at our feet, of that deep sapphire blue colour which is only met with in the deep waters of the great oceans, framed by the greenish blue water of the shores and coral lagoons, the great expanse of the blue heavens, broken only by a single cloud stationary over the distant Siauw volcano, the infinite variety of green and brown foliage on the forest slopes of the neighbouring island, and then in the far distance the azure mountains of Minahassa in one direction and of the Sangir Islands in another, presented one of those magnificent panoramic pictures which it has rarely been my good fortune to see, and which once seen can never be forgotten.

The little island of Passiac, which, as may be seen by reference to the chart, lies only about four miles from the Ruang, was of particular interest to me. The part above water and covered with trees is only a small arc of the rim of a large almost ring-shaped atoll stretching out towards a very wide barrier or fringing reef on the coast



FIG. 6. — CORAL REEFS OF PASSIAC AND TAGULANDANG, FROM THE SUMMIT OF THE RUANG.
The strait between the two islands has been purposely reduced in breadth to bring them into the same illustration.

of Tagulandang. The presence of atolls and barrier reefs in the neighbourhood of active volcanoes is by no means a common occurrence, and Darwin was inclined to believe that, as volcanoes are usually situated in regions of elevation, this fact was consistent with his famous theory that atolls and barrier reefs are only formed during subsidence of the land. For many reasons which I cannot enter into now I am persuaded that the subsidence theory is not sufficient to account for all the facts, and that the presence of such an atoll as the Passiac so close to a region of quite recent and considerable volcanic activity is difficult to account for under this theory.

But, as I have spoken so frequently of the volcanic energy of the Ruang, I may be allowed to digress here a little, to relate the story of the recent eruptions as told me by Mr. Kelling, the missionary at Tagulandang. The first recorded eruption was in the year 1811, but that and another in 1835 seem to have done but little damage. On March 3, 1871, there was a terrible explosion, the top of the mountain being blown into a thousand atoms. This was accompanied by a terrible seaquake, the water rising over fourteen fathoms, sweeping away several villages on the coasts of the islands, and followed by a shower of stones and ashes which destroyed many lives and the greater part of the crops. It was said that over 400 persons lost their lives by drowning and by the showers of hot stones and ashes. Finally, there was an eruption in 1874, when another fall of stones ruined many of the trees and huts, but no lives were lost.

It is very probable that during the eruption of 1871 the whole of the forest on the Ruang was completely destroyed, for there are now none of the large forest trees standing, such as those found growing over every one of the neighbouring islands. The stones and ashes thrown out by the volcano, upon falling again on the mountain slopes, were arranged by the

action of gravity into broad streaks or roads radiating from the crater outwards to the sea-coast. These roads are composed either of large blocks, big stones or lumps as big as a man's fist, or of a fine powdery dust. Now those composed of the last material retained the moisture on the surface longer than the others, and consequently seeds brought by the wind, by birds, and other agencies, germinated upon them first and in a very short time the beginnings of a new forest made their appearance. The roads made up of blocks and lumps are, however, not so favourable for the germination of seeds, because the rain soon soaks through them and the sun quickly dries them up again. They thus remain barren for several years after the forest has become established upon the finer soil. In 1885 the slopes of the Ruang were mapped out as in a crude pattern with stripes of young forest and stripes of stones and blocks, presenting a very curious and strange appearance when viewed either from the summit or from the sea (see fig. 5).

For some reason, the vegetation ceased about 200 feet below the lip of the crater, and I could find nothing growing there but a few blades of a grass (*Imperata arundinacea*) and here and there a fern (*Blechnum orientale*). The wonder is, however, that anything could grow there at all, for the heat of the soil at midday is intense. Many of the lumps of rock were so hot that it was impossible for me to keep my hand upon them for any length of time. Notwithstanding the intense heat, the absolute dryness, and the absence of vegetation, these higher regions were simply alive with insects of all kinds, whose brilliant colours were very conspicuous against the black rocks and stones. These insects were preyed upon by numerous swifts, whose shrill cries alone broke the absolute silence of that desolate spot. The condition of the summit of the Ruang seems to be characteristic of the peaks of the volcanic islands in these regions.

Professor Moseley records the same abundance of insect life on the heights of the Gunong api of Banda and the volcano of Ternate (49).

I was on the point of leaving the officers, whose work was not concluded by the time I had finished all that I wished to do, when we saw a little way below us the showers of dust and stones which marked the footsteps of a visitor. Strange as it may seem, the visitor was no other than one of our guides who, braving the wrath of the spirits of his ancestors who dwell for ever at the summit of the mountain, had come to beg a drop of water to quench his thirst. Unfortunately, our own throats were in the same condition as his, and we had not the wherewithal to satisfy them, so that it did not require much pressure upon my part to persuade him to return with me to the ship.

The descent was quickly accomplished, and a plateful of good soup prepared by the excellent Chinese cook soon relieved me of my thirst and fatigue. Two hours later the rest of the party arrived, none the worse for the hard day's work.

When I look back upon this visit to the Ruang I feel that in many ways I had greater opportunities for collecting specimens of botany and terrestrial zoology there than I had in the same space of time at any other period of my stay in the tropics. The absence of any old forest trees and the presence of a considerable undergrowth bring the flowers, the birds, and insects, and in fact all objects of natural history, much closer to the hands of the naturalist than they are usually in tropical forests.

I regret now exceedingly that my collections from the Ruang are not more extensive, but I admit that at the time I did not appreciate the value of my opportunity, and my anxiety not to be separated from the party during the ascent and the cravings of my flesh for water during the descent

rather cooled, I am afraid, my enthusiasm for adding to my collections. I had hoped before leaving Celebes to have another opportunity of visiting the Ruang and making some collections more at my leisure, but the opportunity never came, and my investigations were consequently never concluded. Such feelings as these, however, are common to the travelling naturalist. He always feels, I imagine, dissatisfied with what he has done upon any particular coast or island, and always hopes that fate will bring him there again to complete his work. He forgets in his contemplations the difficulties and hardships he laboured under and the thousand trifling details which absorbed his time and attention, and perhaps he does scant justice in blaming himself for things he has left undone.

It takes a great deal of time and energy to collect plants and birds, butterflies and shells, flies and spiders in a new and difficult country, and one who makes but a rapid march through it cannot expect to obtain many specimens. The feelings of the naturalist upon leaving such a country must be something like those of the visitors to King Solomon's mines, who left with only one pocketful of diamonds.

August 22.—After cruising about all day taking soundings we arrived at about five o'clock off the island Biarro. We found a very good anchorage on the northern side in about twelve fathoms.

The time was now fast approaching when the 'Flying Fish' was to leave these waters for the South, and, in the interval, Captain Maclear very kindly gave me several opportunities of dredging in the Talisse Sea from one of the steam-cutters. I propose in a later chapter to give a slight sketch of the results I obtained from these investigations, but I have still to describe before concluding this chapter one other little expedition we made to Tanjong Aros,

or Stream Cape, the northernmost extremity of the island Talisse.

Starting at five o'clock on the morning of August 28, we reached the extreme point of the island before six o'clock. The rugged rocks stand straight up out of the sea, and are capped by a low forest of screw pines and other trees, in which numbers of black baboons were disporting themselves. Although the water is not particularly deep, there is no reef off Tanjong Aros, and this may be accounted for, I believe, by the very strong tide which rushes past and gives the name to the point. It must not be understood, however, that because there is no reef there are no corals, for, in the beautifully clear water I could easily distinguish clumps of sarcophytum, brain corals, astræas, and others resting, at intervals, on the white sandy bottom. All that I wish to imply is that the strong tides prevent the corals from growing in such luxury and abundance as to form a reef. The same may be said of the coast from this point to the Kinabohutan Straits, where the upright basaltic cliffs and the great caves and grottoes tell the story of the scouring action of the tides and waves.

Immediately to the east of Tanjong Aros there is a little bay, at the side of which are two splendid caves. The one to the north must be about fourteen feet in height, and its walls are whitewashed with the excreta of the bats and birds inhabiting it. The other one is much lower, and we had some difficulty in getting into it in the dingy. It was inhabited by countless swifts of two species of those which build the edible nests (*Collocalia esculenta* and *fusca*). These delicate little creatures, terribly agitated by our visit, flitted about in a perfect cloud around our heads. The walls of the cave were simply lined with their nests; and if I had been so disposed I could have gathered thousands of them in a very short

space of time. Contenting myself, however, with a dozen nests and eggs, and two or three specimens of the birds for future identification, I was glad to get away from the stifling atmosphere of the cave, and the heart-rending shrieks of the terrified parents, into the purer air outside. I found that the nests were of a very inferior quality—from a commercial point of view—that is to say, they were composed of a very large proportion of vegetable fibre and feathers, and a very small proportion of the consolidated saliva of the bird. These nests were in bygone times of some value, and the cave used to be the 'property' of the Rajah of Manado. Of recent years, however, there has been some dispute as to the ownership of this cave, and I believe that at the present time no one actually claims the sole right to take the nests. As the approach to the cave is not without danger, and the Chinese in Manado now import large quantities of the nests from Borneo and the Philippines, where they can be obtained of very much better quality, the value of this cave has very much diminished, and I believe it is now worth very little. At any rate, I tried to persuade myself that I had not been guilty of committing the heinous crime of poaching on another man's preserves.

There has been a considerable discussion as to the way in which these little birds manufacture their nests; but there can be no doubt now that they are formed by the consolidation of the mucous secretion of the salivary glands. The belief that the little bird makes them by the mastication of a particular kind of sea-weed is now known to be erroneous. The natives, however, have an explanation of the formation of this material which is novel, if not plausible. They pointed out to me that in July and August, when the birds are building, the waves of the sea are frequently capped with crests of foam. Thousands of the

little swifts may be seen skimming over the waves, and as they go they are said to collect a certain quantity of the foam in their mouths, from which they manufacture the mucilaginous material which helps to consolidate their nests.

It is strange how many things have been supposed by the unlearned of every race and clime to have been born of the sea-foam. I suppose its graceful, ever-changing beauty, both of form and colour, has induced the poetical and fanciful mind to believe that it must contain something that is more than air and water. In our own country it



FIG. 7.—Pollicipes.

was generally believed that the *Alcyonium digitatum*, or Dead-men's fingers, of our coasts is formed by the churning of the waves, as butter is produced from milk; and the eggs of the common whelk, the eggs of cuttle-fishes, and many other objects which are thrown upon the sand by heavy seas, were said to have been born of the ocean's foam.

Aphrodite herself, goddess of love and beauty, was born of the foam of the sea; and many other examples might be quoted from history, legend, and myth, in which similar ideas may be traced.

In the neighbourhood of these bat and bird caves there were several broad ledges of rock covered, of course, with barnacles and limpets, but often bearing small shallow pools containing specimens of the fauna and flora of the sea-bottom. In one of these I obtained half a dozen specimens of the curious barnacle *Pollicipes*; in another I found a few small specimens of the purple *Distichopora*. As this was the first time—and, as it happened, the last—I had found *Distichopora*, I was very anxious to see the polypes alive and expanded, but I was disappointed, for they were all retracted. I fancy that in these shallow pools the polypes are generally expanded only at night or in the early morning, for the sun soon raises the temperature of the water to such a degree that their movements, if expanded, would be sluggish and uncertain. The *Distichopora* does not belong to the same class of the animal kingdom as the ordinary corals. The animals which build up the vast masses of madrepores, *astraeas*, and other reef-building corals, are allied to the sea-anemones, but the animals which build up the arborescent skeleton of *Distichopora* and the great laminæ of the millepores are more nearly related to the common fresh-water polype *Hydra* and its allies. They exhibit, however, a very curious division of labour in their colonies, as Professor Moseley discovered. Some of them are simply stomachs for the reception and digestion of food, while others are simply feelers for catching it. As all the individuals of such a colony are united together by a very complicated system of canals, this arrangement for catching and digesting the food benefits all alike, and is no doubt extremely efficient.

The majority of the forms in these pools were, however, true corals. I remember a beautiful piece of a coral called *Galacea*, most splendidly decorated with bright-green tentacles, and a mass of *Astræa* whose polypes were marked

with gold and purple colours. But it would take a chapter to describe all the forms of interest and beauty which were to be found within these sea pools. Each was a mine of wealth for the naturalist. Unfortunately my supply of spirit was at the time not very large, and I was unable to preserve more than a limited number of them; but nevertheless I was extremely sorry when my time was up and I

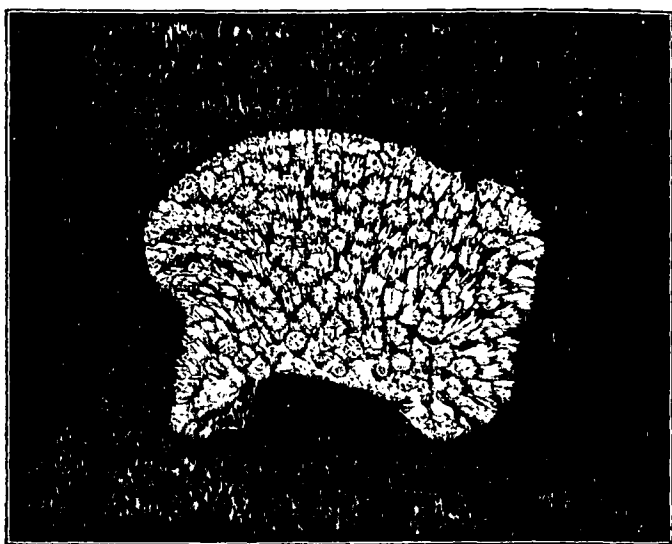


FIG. 8.—Portion of the skeleton of *Galacea Esperii*, reduced to half diameter.

was obliged to leave these interesting places to rejoin the cutter.

Two or three days after this little expedition to Tanjong Aros the surveying work of the 'Flying Fish' in the Banka Straits was finished, and the time had at last arrived when I was to part for a time from my kind and hospitable friends.

A farewell dinner in the ward-room, a hearty exchange

of well-wishes for good health and success, and my extremely enjoyable and interesting cruise on board H.M.S. 'Flying Fish' came to an end. I was put ashore in the dingy, and for the first time I passed the night on Talisse Island. The next morning when I awoke the 'Flying Fish' had departed.

CHAPTER IV

TALISSE ISLAND

Reasons for settling in this island—Inhabitants and topography of the island—Every-day life in the island—Surface dredging—The 'Panchuran'—Work on the reefs—Food—Temperature and barometric pressure—Insect pests—Evening amusements—The coolies—Diseases of the natives—My house—Attap—The gardens—Deer-kraal—Hill-climbing—Mangrove swamps—Collecting orchids—The plantations—Planting coco-nuts—Ebony—Kinabohutan—Pirates—Banka, Tindela, and Ganga—Absence of coral reefs on shores exposed to the N.N.E.—Our visitors—The post prau—Native songs—The 'Minahassa'—An Arab.

BEFORE describing my life and surroundings in the little island of Talisse I must explain why it was I fixed upon that island for my head-quarters. I required for my investigations a good, vigorous coral reef, not far from my house; I required a sea shallow enough for me to dredge, but at the same time not exposed to monsoons; I also wished to be near a primitive forest and a mangrove swamp, and not too far away from Manado. As all these conditions were fulfilled in Talisse, and as I had already acquired a considerable knowledge of the topography of the Talisse Sea during my stay on board the 'Flying Fish,' I thought that I could not do better than make it my head-quarters.

I believe now I made the best choice, and that Talisse possesses greater advantages in these respects than any other place on the coast or islands of the north part of Celebes. There is a fringing coral reef varying in vigour and size nearly all round the island. On the east side it is washed by the Talisse Sea, which is over twenty

square miles in area, in no place deeper than forty fathoms, and fairly protected in all winds and seasons; there is a considerable mangrove swamp in many places on the coast, and more than half the island is still covered with primitive forest. A canoe in the Dutch postal service calls about once a week, and the agent of the *Moluksche Handels Vennootschap*, a Dutch company that owns the coco-nut plantations on the island, calls on a tour of inspection about once a month. The only disadvantage that I found was the difficulty of hiring for a reasonable price a good seaworthy boat for my investigations upon the sea. Another time I should be careful to hire a boat at the principal town of the district before fixing upon my headquarters.

Talisse Island is situated in lat. $1^{\circ} 49' 30''$ N., long. $125^{\circ} 4' 19''$ E., and is bounded on the north-west by the Celebes Sea, south by the Straits of Tindela, and east by the Talisse Sea and the Straits of Kinabohutan. It is about seven miles long from north to south, and about three miles broad at its widest part.

With the exception of a small portion at the northern extremity, which contains the birds'-nest caves, the whole island is owned by the *Moluksche Handels Vennootschap*, a Dutch trading and culture company, with its head agency at Manado. The company has a resident 'opzichter,' or overseer, on the island, whose duty it is to superintend the clearance of the forest and the planting of the coco-nuts by a band of some eighty to one hundred coolies.

Besides the coolies there are a few wandering fishermen belonging to the Sangirese race, who reside temporarily in little tumble-down huts at various places on the coast. In addition to these, the island is from time to time visited by the canoes of those strange, gipsy-like people, the Wadjorese, who wander from place to place, subsisting

alone on the fish they can catch to eat or barter, and seem to know no home but their frail little outriggered canoes (54).

Running down the middle line of the island there is a range of hills from 1,000 to 1,800 feet in height, and from the foot of the hills to the sea-shore there is in many parts of the island a level plain from 100 to 200 yards in breadth. The presence of this broad level plain surrounding the hill-sides cannot be accounted for entirely by any theory of elevation, but rather by the accumulation of soil from the hill-slopes advancing on the mangrove swamps, as I have explained above in Chapter II. Although I searched carefully in the watercourses, I could find no evidence of any considerable elevation of the land in this region, nor do I believe that these coasts and islands have undergone any subsidence. The presence of a broad shore platform proves, I imagine, that the land has remained stationary for some considerable time.

There are only two constant streams in the island—one at Koa, where I lived, and one on the opposite side of the hill. In the rainy season there are many watercourses. These completely dry up in the summer. The water of our stream was cool, clear, and tasteless, but I always took the precaution to boil it before drinking.

The agent of the company allowed me to live in the house of the opzichter for the first few weeks of my residence in the island, but subsequently he kindly provided me with a small but comfortable little house in the immediate vicinity containing three rooms.

A slight sketch of my daily life in Talisse may not be uninteresting to those whose travels have not taken them so far or into such strange surroundings.

Being situated only 2° north of the equator, the difference of the duration of daylight between summer and winter is

hardly appreciable. For all practical purposes we may say that the sun rises and sets at six o'clock in the morning and evening. My usual custom was to rise between half-past five and six. My flannel sleeping costume was quite sufficient dress for the fashions of the island, so that I could, without any fear of losing my social status, read or write for an hour or two before my bath over a cup of coffee without the trouble of further dressing. I had not been long in the island before I found that reading and writing were not to be indulged in at that early hour; it was much too precious for other work, for not only are the birds and insects, which disappear as the sun becomes more powerful, particularly visible at that hour, but it is the time of the day above all others when the surface of the sea teems with animal life. I remember well my disappointment when I first got into tropical waters at finding that my surface-net invariably came up almost empty. It was not until I had been at work some time that I made the very simple discovery that in the early morning hours every sweep of the net brings up countless pelagic forms of all sizes and descriptions. This may be due to the change in the temperature of the water. The temperature of the surface-waters off the reefs in the middle of the day was as high as 80° F.; in the early morning hours it was often below 70° F. It is very probable that when the temperature of the surface rises above 70° F. these forms sink to a cooler zone a little below the surface, and that they could be readily caught in a tow-net sunk to a proper depth at all times of the day.

Thus, after a time, I used to forsake my books and diaries in the early morning for expeditions after birds and insects, or for excursions in a canoe for surface dredgings. At 8 o'clock A.M. one of the two great treats of the day was in store for me. This was the morning bath. Within a



FIG. 9.—THE PANCHURAN.

hundred yards of my house a little stream of water emerged from the hillside, and close by its source a long wooden gutter had been arranged to make a spout, or 'panchuran,' as the natives called it. The 'panchuran' had been surrounded by a palisade of split bamboos, and thus a primitive bathing retreat was formed, free from the gaze of the inquisitive natives, who seemed to be always pleased to get a glimpse of the white skin of the 'tuan puti,' or white gentleman, as I was sometimes called.

The 'panchuran' was overshadowed by lofty forest trees and the great leaves of some young sagoweer palms, and these were the favourite resort in the dry season of many of the most beautiful birds of the island. There I often saw that extremely handsome red kingfisher, called by the natives the 'rajah udan,' or 'king of the forest;' the beautiful parrot (*Tanygnathus Mülleri*), with its dark green wings and bright Cambridge blue back, and many other familiar friends of my rambles in the forest. How delicious it was to allow the cool fresh water to trickle over me, or to order Manuel to pour bucketfuls down my back! After my bath I went back to my house to breakfast, which usually consisted of boiled rice and chicken. From breakfast until lunch I employed myself in microscope work, in skinning birds, or otherwise attending to my collections; but when there were spring tides I had to prepare in the mornings for my expeditions to the coral reefs. Low water at spring tides is at Talisse in the middle of the day, and I found that I could work upon the reef for an hour or two, two days before and after the lowest spring tide. On these days (five every fortnight), Manuel and I would start off a little after eleven o'clock, armed with two or three iron buckets, a small case of collecting bottles, a crowbar, and other implements that were useful or necessary for our work.

I protected my feet and legs with a pair of water-tight

Magdala boots, and Manuel wore an old pair of boots I had given him for these occasions, for even his tough feet could not stand the wounds and lacerations caused by this rough work upon the reefs.

As soon as the ebbing tide permitted, we waded across the shallow sandy lagoon towards the edge of the reef, and worked away as hard as we could until the flowing tide compelled us to retreat. It was extremely hot work in the middle of the day, with the sun pouring down upon our heads, but as I was generally pretty well wet through all over, and constantly put my head in the water to keep it cool, I was never any the worse for it. I used to enjoy these excursions, however, notwithstanding their great physical discomfort, for the variety and interest there is in every square yard of a vigorous coral reef affords ceaseless amusement and wonder, the difficulty being to devote one's attention to any particular form or problem, and not to fritter away the time in watching the active movements of the brightly coloured reef fishes, the slow and steady march of the great sea-slugs and star-fishes, the slow and graceful waving movements of the Alcyonarian polypes, or the darting frightened scrambles of the crabs and squillas.

I was never sorry when the time came to turn our faces homewards, for, notwithstanding the excitement, this reef-work is extremely exhausting. Sometimes I would fling off my wet clothes when I reached home, and fall fast asleep for an hour or so before lunch; but as I had always a great many things to attend to, I tried to avoid this as often as possible, and get my corals and other things properly preserved at once. In such a climate I could rely upon nothing to keep for an hour. When the thermometer stands at 90° in the shade, a bucketful of water soon reaches a temperature at which all its living contents languish and die, and as soon as anything is dead putrefaction sets in

immediately and kills the rest. It was absolutely necessary, therefore, to attend to my collections as soon as I returned to my hut, and to keep only one or two choice creatures alive in separate glass jars in the coolest places I could find. At first I was inclined to be dissatisfied that I could utilise only five days on the reefs in the fortnight, but after a time I found that, during those five days, I could obtain more material to work upon than would last for two fortnights; in fact, the difficulty was to finish the examination and preservation of the material I obtained at one tide before it was time to work upon the next. But, besides this, I found it very important to keep well up to date as far as my writing was concerned. It is surprising how very soon one forgets facts and details which have made such an impression at the time that one fondly imagines they will never be forgotten. Letters, diaries, notes, and labels take up a great deal of time and energy, and it was as much as I could do to keep abreast with the times in that respect.

The morning's work done, I would have my luncheon brought in. I need not enter into particulars: lunch was the same as breakfast, and breakfast the same as dinner. Each meal consisted of boiled rice flavoured with curry and whatever fish, flesh, or fowl I could get. I generally kept a stock of chickens, but, as many of them would run wild in the woods, or be killed by snakes at night, or otherwise disappear, and as my commissariat arrangements with Likupang and Manado were not always in working order, I sometimes ran short of these useful fowls, and then I had to rely upon the produce of my gun. I have tried at times very many kinds of game for food, such as baboons, bats, parrots, sandpipers, pigeons, bivalves of many kinds, and cuttlefish, but, as the resources of my kitchen were limited, I can only say with varying success. Monkey is not bad—I could recommend it as an *entrée*, but it is too tasty and

strong for a hungry person. Bats, when thoroughly imbued with Spanish pepper (chillies) so as to disguise completely their own peculiar flavour, are excellent, but great care is required in the cooking of them. The wild bronze-winged pigeons (*Carpophaga paulina*) are very good, and so are the sandpipers. They can be made palatable even by an inexperienced cook; but parrots are inferior as an article of food. The bivalves are not very bad, but, like the fish, are quite inferior to those of colder climates.

The natives spoke very highly of the quality of the cuttlefish, but from the specimen I tried—it may have been improperly cooked or of inferior quality, it is true—I should think that first-class india-rubber would be more palatable and digestible. I was not always so badly off as this, however; for after my visit to Manado at the beginning of October I had a supply of tinned soups and vegetables, and a large sack of potatoes, which enabled me to add considerable variety to my table. After lunch was cleared away I often followed the custom of the colonial Dutchman, and turned into bed for a good midday sleep. I found this rest a useful and refreshing one when I was not on any of my expeditions, for it was an excellent way of getting through the hottest and quietest hours of the day, and at the same time a valuable stimulus to the exertions of the afternoon and evening.

I spoke just now of the 'hottest part' of the day. Perhaps I ought to explain this more accurately. It would never be considered very hot in Talisse by those who are accustomed to the heat of Egypt, British India, or even Java. The average temperature in my hut in the middle of the day was 85°·5 F.—that it is to say, about as warm as it is in England on an exceptionally hot summer's day. I kept regular records of both temperature and barometric pressure, but there is so very little change from day to

day that the record is uninteresting and monotonous. My aneroid registered 29·9 inches of mercury pretty constantly at nine o'clock in the morning, and 30·0 inches in the middle of the day during the dry season, and rose to 30·1 inches in the middle of the day during the rainy season. The advent of the rainy season was not marked by any disturbance of the barometer. So regular, in fact, is the rise and fall of the barometer in these parts, that it is almost possible to tell the time of day by a good aneroid.

After my afternoon slumber I would call my boy and start off for a walk in the forest. There were three paths open to me—one running northwards for about a couple of miles, one running southwards, and one across the hill to the other side of the island.

Along one of these paths I would start, and plunge into the forest or the mangrove swamp in search of birds and insects. Sometimes I came back quite empty-handed, but I generally had a few new butterflies or some birds either for my larder or my collection. I had practically to do all the collecting myself. I found that Manuel, although a fair shot and expert with the butterfly-net, was not independent enough to do any work for himself. If I had the gun and he the net, he would be much more anxious to find birds for me to shoot than to look out for butterflies himself; and *vice versâ*, if he had the gun and I the net, he seemed desperately desirous of catching butterflies.

On my return from these shooting excursions I would indulge in another bath at the panchuran, and then settle down to write my letters and the notes and observations for the day.

Writing is not in these coast places an unmixed pleasure after the sun has set, for the scribe is pestered by all kinds of winged abominations, which, attracted by the light and half-killed by the heat of the lamp, perform their

dying gymnastics in the ink and on the paper. I remember well on one occasion I was visited by a swarm of flying termites that fairly drove me out to seek another occupation. These horrible insects alighted on my table, dropped their wings, and then chased one another on foot over my paper, up my pen, over my hands, and up my shirt-sleeves in such numbers that it was almost impossible to make a legible mark upon the paper. Fortunately this was quite an exceptional visitation. But the pests that were not exceptional were the mosquitoes. When I first landed in Java I suffered severely from the bites of one or two mosquitoes, but afterwards I found that they became less irritating at the time, and left no lasting discomfort; but I was always cognisant of their presence, and the constant humming and pricking of these little brutes were always more or less distracting to me when engaged in any serious work.

When my writing was pretty well up to date I would often stroll round to the opzichter's house, and spend an hour or two with Mr. Cursham. Fortunately I had on the voyage out learned to speak a little Dutch, so that I could converse with him in a language that was not Malay, of which at the time I knew only a few sentences. But our *répertoire* of amusements for spending a quiet evening was not very extensive. He had a backgammon board—and many and many a game I played with him in the verandah of his house—and a fairly good musical box; but even backgammon becomes tiresome after a time, and the dulcet strains of 'Home, Sweet Home' and the 'Blue Danube' (with a few notes missing) fail to charm.

On moonlight nights such indoor recreations, however, were hardly necessary, for a stroll on the rickety little pier in the delicious cool evening breeze, listening to the rippling music of the ebbing waters, was a far greater attraction.

As a rule, the sea at Talisse is not particularly phosphorescent, not more so than it is on the coast of Scotland, for example—nor did I ever see any such milky-white seas as I afterwards saw in the Banda Sea ; but nevertheless the path of a small shark or other predaceous fish was frequently marked out in lines of fire even on moonlight nights, so that there was constantly something to divert my attention.

I was always on perfectly friendly terms with the natives of the island, and could generally make myself understood, either by signs or language, even by those who were not acquainted with Malay, and many a hearty laugh have we had together in trying to understand one another. The ‘coolies,’ as they were collectively called, varied in number from forty to a hundred or more. They were recruited from Manado, Tidore, Sangir, Talaut, and other places, and often arrived in a half-starved, fever-stricken condition. The Company always had a great difficulty in getting them to stop for any length of time upon the island, for as soon as they had had a few good meals of rice, and had earned a little money, they were anxious to be off again to their wives and freedom—a ‘Freedom’ which, as a philanthropist, I ought to spell with a capital ‘F,’ but which is, as a matter of fact, synonymous with idleness, sickness, and general unhappiness. Of course, the Company makes contracts with these men to stay so many months, but, as the Government officials are very anxious that there should be no whispered suspicions of slavery in the relations between European individuals and the natives, these contracts are broken with impunity, and the coolies often calmly run away after a few weeks’ work, with some portion of their wages paid in advance.

The coolies were under the supervision of two mandürs or foremen, natives of Minahassa, both of whom had lived on the island and served the Company faithfully and well

for some years. The wives of these two mandûrs were my most constant visitors, and would often spend the greater part of the day chatting with my boys and superintending the cooking.

I soon acquired the reputation of being a medicine-man, and my small medicine chest was a valuable aid to me in establishing friendly relations with these simple-minded people.

Their complaints were usually fevers, diarrhœa, boils, and ulcers, all of which I could treat with considerable success; but a very prevalent disease of the eye, consisting of a clouding of the cornea, was beyond my skill. The Sangirese men were very often afflicted with a form of ichthyosis, and were constantly scratching themselves like monkeys, but they never sought relief for it nor seemed to consider it anything but natural.

I never saw any cases of measles or scarlet-fever, small-pox, or of any other zymotic disease, nor any traces of syphilis acquired or inherited. Such complaints, however, do, I believe, occur. The natives have a great many medicines of their own, obtained by the infusion and decoction of various herbs and fruits, and many of the Europeans who have been a long time in the country, and the half-castes are firmly persuaded that they are much more effective than the drugs of our European pharmacopœias; but as the native doctors are able to extract live lizards, nails, and all sorts of things out of a patient's head when he is afflicted with a headache, I should not feel disposed to place too much reliance on their efficacy.

A thorough and systematic study, however, of native medicines might lead to some valuable results.

The natives have but little idea of some of the simplest laws of sanitation, and allow themselves to get extremely ill before they seek for assistance. It is wonderful, some-

times, what a simple remedy will do for them, and how quickly their skin will heal when wounded. I remember on one occasion a man came to me whose legs were nearly covered with large vicious-looking ulcers. He was extremely dirty, and the wounds had been seriously irritated by flies and mosquitoes. I first of all sent him to the 'panchuran' to wash himself, and then I covered the sores with strips of rag soaked in a weak solution of carbolic acid. On the following morning the ulcers were nicely granulating, and two days later he went to work again, and troubled me no more. As this man was exceptionally dirty when he came to me, I ought, in justice to the Minahassers, to notify the fact that he was Sangirese. I never saw or heard of such a case amongst the Minahassers, partly because they are accustomed to a more plentiful supply of wholesome and nourishing food, and partly because they are more cleanly and particular in their habits.

The natives often suffer terribly from large boils, but they come and disappear again in a day or two.

The house in which I lived after leaving the opzichter's was raised above the level of the ground about four feet six inches on piles. The piles and framework were of some kind of hard wood, probably the *Eusideroxylon Zwageri*, the famous 'belian' iron-wood of commerce; the walls and doors were made of a plait-work of young split bamboos, suspended on frames of thicker bamboos or other wood. This was sufficient to make the rooms quite dark in the daytime, but it would have been but little protection against draughts, if there had been any in the island to be avoided. It was quite possible to pry into the house through the interstices of this bamboo plait-work; and at night, when the rooms were illuminated with oil-lamps, it looked from outside not unlike a large hamper. The floor was made of strips of Arenga wood, tied together by an ill-

prepared string, made from the gumutu or leaf fibres of the same palm. These strips of wood were of various thicknesses, and consequently the floor was very uneven and irregular. The roof was very large, and covered with ordinary attap of Arenga palm-leaves. In some parts of Java attap is made from the allang-allang grasses, but in Celebes invariably from palm-leaves, in the following manner. The pinnæ of the leaves are first of all separated from the mid-rib. The Arenga palm-leaves are often fifteen to twenty feet in length, bearing 100 or more pinnæ on each side of the mid-rib. The pinnæ are about four feet in length, and from three to four inches broad when fresh. A lath or rod of split bamboo or reed about six feet long is then chosen and placed in a convenient position, with each end resting on a wooden stool or support. The pinnæ are then folded evenly over the lath, care being taken that each one slightly overlaps its neighbour, and sewn together in position by rattan strings or gumutu fibres. Each strip thus prepared is called 'faras katu' (22). It is carefully dried in the sun and then put aside until required for use. When a roof is made, several hundreds of these 'faras katu' are placed overlapping one another like the slates upon an ordinary European roof, and it is then called 'attap.' An attap roof is a far better protection against sun and rain than slates or tiles, the only serious disadvantage it possesses being that it affords a cosy retreat for spiders, mosquitoes, and other vermin.

My house contained three rooms, one of which I used as a bedroom, the front one as a dining and sitting-room, and the middle one, which was the darkest and coolest of the three, as a library and store. All round the house was a narrow verandah—well protected by the enormous roof—in which I had a couple of tables set apart for microscope work and writing. I had every reason to be satisfied with

my abode, although it was very much infested with the white ants, and so rickety that a single footstep made the whole house shake, for I might have been much worse off in such an out-of-the-way island. In front of my house was a sandy path which ran a distance of fifty paces to the sea in one direction, and to the panchuran, a distance of a hundred yards or thereabouts, in the other; joining these were the footpaths to the other parts of the island.

By the sea-shore ran a path past Cursham's house to the pier. On either side of this path had been planted a number of aloes (?), yuccas, hibiscus shrubs, and other garden plants, and it was shaded by two splendid casuarinas, an *Acacia cæsia*, and a number of sour lemon trees. At the back of the two houses were some banana plants, and in a clearing round the flagstaff, which stood in front of the opzichter's house, a number of pineapples had been planted by Mr. Rijkschroeff, a former opzichter. Immediately in front of my house was a large bamboo kraal, in which two stags and three does of the *Cervus moluccensis* were confined, and in another, next to it, a fine specimen of the babirusa pig.

There was great excitement when, at the beginning of September, the does gave birth to young ones; but the excitement was changed to disgust and disappointment when the unnatural mothers stamped the young to death. In every case, soon after the young was born, the mother, in a fit of puerperal frenzy, stamped upon her offspring with her fore-feet, and in this murderous intent she was immediately joined by the other does and stags. At no little risk—for the animals were all more or less vicious when the young were born—Manuel rescued for me one of the young, and I tried for some days to feed it with bananas, hoping that in time the mother would take kindly to her offspring, but it was no good; the doe remained inexorable,

and the young one was killed like the others. If I had been able to obtain a good supply of fresh cow's milk, I would have tried to feed it with an artificial nipple, but that was just what I could not get, and so I was obliged to try again the affections of the parent, with the painful result just mentioned.

Besides the companionship of one of my boys, Manuel or Marcus, Mr. Cursham, the half-caste opzichter of the plantations, often accompanied me on my expeditions, and I learned a good deal from his wide and varied knowledge about some of the details of animal and plant life in these forests. His experience in these matters often left me in the lurch, however, for in swarming up the hill-sides, or in breaking through a bush tangle, he and Manuel could get along so much faster than I could, that I was left a long way in the rear, while they were potting merrily at the birds, baboons, or kuis far ahead. The chief difficulty I experienced in getting along was that the leather soles of my boots became so slippery by walking on the dry leaves that I was obliged to plant my feet with the greatest deliberation and caution to avoid falling down. On some occasions I took off my boots, and went with naked feet, like Cursham and the boys, and then I found I could keep up pretty well; but this is not a plan I should advise a European to adopt too readily, for our feet perspire much more than native feet, and consequently our skin is much more liable to abrasions, and to suffer from the attacks of flies and mosquitoes, than is the hard, dry skin of the feet of coloured men. India-rubber canvas shoes are extremely valuable when climbing up the slopes of a forest-clad mountain; they give almost as much grip as the naked feet, and are for a time cool and comfortable. When I became more experienced in forest work, I always carried a pair of these with me, and put them on in place of my

ordinary boots on rising ground or where it was particularly slippery with dried fallen leaves.

Work in the mangrove swamps was always rather depressing and disgusting. The damp, stifling, stinking atmosphere, the muddy slippery ground, and the swarms of ants, flies, mosquitoes, and other abominations, made the work tiresome and annoying. The mixture, however, of marine and terrestrial faunas, and the varied conditions of life the swamp affords, make it an important locality for the naturalist. The best swamps on the east coast of Talisse—that is to say, those that were the broadest and most luxuriant—are situated opposite the southern point of Kinabohutan Island, and about half-way down the coast between Koa and Tindela Straits. The best place, as far as numbers go, to collect orchids is the sandy beach on the shore side of the swamp, where there are usually a number of young or stunted forest trees, bearing parasitic ferns and orchids which are not beyond the reach of a good long pole or rake. Of the many heart-rending disappointments it was my fate to undergo, I think that my experience as an orchid collector was the chief. When I first arrived, and was well enough to search for such things, there were few orchids—in accessible places, at any rate—in flower. The only one I obtained was a species of *Grammatophyllum*. I set to work to collect a number of the bulbs to send to England. Now, collecting orchid bulbs in the region of the swamps may be an entertaining amusement to other people who are looking on, but it is an unpleasant sport for the naturalist; so disagreeable is it, indeed, that Manuel, after one day's experience of it, refused to help me any further. The reason is that, as one pulls away the orchid from the tree to which it clings, numbers of large red ants, which are always running over them, turn round and fiercely attack the would-be orchid collector.

These ants ran up my arms, down my neck, up my trousers, and in a short space of time no part of my body was free from their sharp painful nips. An hour spent in collecting orchids in the swamps made me as angry and uncomfortable as two or three hours of ordinary forest work, and the irritating thing about it was that Manuel, who, no wonder, refused to help me in it, would stand aside and grow gradually more cheerful and amused as my pains and aches increased. By the time the rains commenced I had a tolerably large collection of orchid bulbs to send home, but they were neglected when I fell ill in December, and had finally to be thrown away, as they had become quite useless for transport to Europe.

The plantations of Talisse were mainly, as I have said above, plantations of coco-nut palms.

Coffee and cocoa had been tried, but, with the exception of one or two small patches at the foot of the hills, the soil was not sufficiently favourable to raise a paying crop.

The first process necessary for the formation of a coco-nut plantation is the destruction of the primitive forest. Strips of forest are selected; about two or three hundred yards broad, stretching from the crest of the hill to the sea-shore. The wild trees are then ringed by the coolies, with a kind of hatchet knife, and when the leaves are withered, and a favourable breeze is blowing, the forest is fired. The dried trees burn for about a week, the subterranean roots sometimes remaining glowing for months after the fire is apparently extinguished. The strip thus cleared in the dry season is left until the end of the rains, and then the young coco-nuts are planted.

The coco-nuts are imported from the mainland or from Sangir in the autumn; a small piece of the outer husk is chopped off with a hatchet to allow the plumule to protrude, and then they are arranged in rows under the opzichter's

house until the ground is ready for them to be planted out. I must confess I do not see the utility of thus allowing the coco-nut to germinate before it is planted. The opzichter told me that unless they did so the palm might grow up crooked. This is undoubtedly absurd. It is probable, on the other hand, that if they were not thus partially husked before the rains actually begin, the risk they run of drying up and dying before they are planted would be considerably lessened. When once fairly started, the young coco-nuts grow rapidly and in five years bear fruit. In ten years they are in full fruit, and give but little further trouble. For the first few years of their growth the planter allows a certain number of the young forest trees to grow up with them, so as to afford them shade and shelter. In three or four years these are ringed again and allowed to wither and die.

The forest is prepared in strips as described above to afford protection to the young and tender palms from strong driving winds.

When a coco-nut plantation is once well established, it is perhaps as good a class of property as could be wished for in the tropics. The trees require little or no care, are free from any serious diseases, and the copra can be easily prepared for export by unskilled labour. The copra-market, too, is fairly constant, and always returns a good profit to the grower. The most annoying parts of coco-nut planting are the initial stages, when many of the young palms and nuts are destroyed by droughts and other unforeseen circumstances, and the fact that there is always a period of some five or six years when there is absolutely no return for the capital invested.

In ten years' time, when the 54,500 coco-nut palms which had in 1886 and previous years been planted in Talisse and Kinabohutan are full grown and bearing fruit, they will yield a handsome profit to the M.H.V. In the meantime

the most valuable produce of the island is the ebony wood, the Kayu hitam of the local Malay, *Diospyros Ebenum* of botanists. There are several of these trees on Talisse, their long straight, dark unbranched trunks being very conspicuous objects in the forests. The trunks are cut into lengths of two metres each and then carried down to the shore. These logs of ebony are very heavy; it takes fifteen to twenty coolies to carry one of them. The chatter, noise, and hubbub they make about the job is very ludicrous. The wood is taken down to the inner side of the coral reef, where it is allowed to remain for some weeks or months seasoning in the water. When a ship arrives bound for Europe, a large raft is formed of light-wood logs and the ebony is floated on it to the vessel.

The little island, Kinabohutan, is said to have derived its name from having been used in former years as the burying place of the pirates. Not being an authority in any sense of the word upon the languages and dialects of the Eastern races, I simply record this saying without attempting to refer it to any language or to vouch for the truth of the assertion. The word Talisse is, I fancy, derived from the Buginese word  Talisey, which signifies, according to Matthes (45), the Katapang (*Terminalia Catappa*), a tree which is common in the island. According to Filet (17), however, the word Talisseij (Mak.) refers to (*Barringtonia speciosa*), a tall tree common on the coast of most of the islands of the Indian Archipelago.

Whatever may be the etymological derivation of the word Kinabohutan, there seems to be no doubt that it was originally used by the pirates as a burying-ground. Scarcely twenty years ago the Straits of Banka were literally haunted with pirates from the Sulu Archipelago, and, it is said, from the Gulf of Tomini. It was commonly reported to be



FIG. 10.—THE STRAIT BETWEEN TALISSE AND KINABOHUTAN.
On the left the mangrove swamp of the coast of Talisse.

one of the most dangerous passages in that part of the eastern seas. The island Banka was their chief resting-place, whilst Limbé, Cape Coffin, Ganga, and Talisse offered convenient places for concealment and retreat. It must indeed have been an ideal place for the Malay pirate-king and his dauntless followers. The coral reefs and shallows, the racing tides and currents must have been of great advantage to those possessing local knowledge and resource, and the wide extent of primitive forest, reaching from the hill tops to the sea-shore, must have afforded them endless opportunities for complete concealment and escape on the approach of men-of-war.

Thanks, however, to the vigorous conduct of the Dutch navy, piracy in these seas is now practically extinct. We hear no more of those bloody but exciting sea fights such as are found recorded in the voyage of H.M.S. 'Samarang' at Ternate in 1845, and the European sailing vessels and the native rorehis, sopis and praus sail these seas without encountering any dangers but those of the winds and tides.

The change in this respect has been brought about by the vigorous action of the Dutchmen, and is almost as marvellous as the change in the character of society in the highlands of Minahassa, which I shall presently describe.

The pirates are practically extinct now in the northern parts of Celebes, and, although the stranger may occasionally see in Manado or upon the seas a dusky individual with a thin black beard and a certain air of disputed chieftainship about him, that rumour says was once a captain of the pirates, his life is more likely to be that of a prosaic scoundrel of the nineteenth century than one flavoured with the freedom and romance of a 'Paul Jones' type of hero.

Banka is no longer the haunt of pirates and sea-robbers. At Djiko Sago there is a small village of peaceful people who have taken advantage of the two little streams of

fresh water and the fairly good anchorage afforded by the bay, to carry on their peaceful agricultural and fishing pursuits unmolested and unmolested. When the herrings come, a certain number of wandering fishermen from Sangir and elsewhere follow them to the bay called Djiko Calimata, and at other seasons some of these same people may often be seen at other parts of the island (21).

Kinabohutan now belongs to the M.H.V., and is covered with young coco-nut trees.

The neighbouring islands, Ganga and Tindela, do not call for much comment. Ganga has a small village on the western coast, Tindela is uninhabited. They are both covered with bush and scrub. The most interesting feature about them, and one which puzzled me considerably at the time, is that there are no coral reefs on the eastern shores at all, whilst on the western sides the reef is extensive and vigorous.

Without more definitive information than I have at my command it is with some hesitation I put forward now the view that this is due to the scouring action of the tide which sets in through the Straits between Kinabohutan and Banka across Talisse Sea and out through the Straits of Tindela and Ganga. Having experienced the effect of this current so often in canoes and sailing ships, I can testify to its strength and regularity, and it is a pity I cannot be more accurate and give in figures its measurement and average duration.

Whatever may be the cause of the absence of the coral reef on the eastern shore of Ganga and the vigour and extent of its growth upon the west, it seems to act upon nearly all the promontories of the coasts and islands exposed to the N.N.E. If the reader will refer to Map II. he will notice that no coral reefs are marked on the eastern shores of Ganga and Tindela, at Tanjong Aros and a

considerable portion of the eastern coast of Talisse between T. Aros and Kinabohutan, at the eastern promontory of Banka Island, at Cape Coffin and the southern shores of Wallace Bay, the northern and eastern coasts of Limbé. From personal experience I can vouch for the accuracy of the Admiralty chart in this respect in most of these places. To carry the problem into other regions, we find it stated by those who have visited these places—and their testimony is supported by official charts—that on the eastern side of the peninsula the shores are steep and rocky, with very few extensive mangrove swamps and coral reefs facing seawards. Contrast this with the western coasts of the peninsula. From the North Cape to Cape Piso there are many wide and extensive coral reefs and swamps, and the same at Tanawangko, on the other side of Manado Bay.

The obvious conclusion to be drawn from these facts is that for some reason or another—I will not enter into that now—direct exposure to the flood-tide from the open ocean is unfavourable for coral growth.

Although our life in Talisse was solitary enough, it must not be supposed that we were entirely without visitors.

Once and sometimes twice a week a little post prau from Likupang might be seen coming across the Straits. It was manned by two natives, who announced as officially as they could their approach by sounding the classic triton-shell and flying the flag of Holland. They brought my mails in a thick bamboo to shelter them from the wet, and they always presented them to me with a graceful Oriental obeisance—a form of respect due to one who had so much communication with the outside world.

Then there were the fishermen who frequently called for drinking water or to gather bark to twist into impromptu string for their rowlocks. These men would sometimes do

me the great favour of selling me some fish, but more frequently they would plead that they were taking them to the market at Manado, and my attempts to trade with them were unsuccessful.

Then there were the sopis from the Sangir Islands, bringing perhaps a rajah on his way to pay a visit to the Resident of Manado.

It was always interesting to see new faces ; and so strong was the sense of security in the island that we never felt the least anxiety about our property when these wandering seamen came to visit us in our settlement. I wonder where else in the world a small colony of planters, almost unprotected and perfectly unprepared, would welcome as we did boat-loads of dusky-looking villains such as these. I may say that my house was often left entirely unguarded ; and yet, with two exceptions, I never lost a single article of any value to me during my ten months' residence in the island ; and of the two exceptions I may say that it is quite as likely as not that the things were taken away by a misunderstanding of my instructions rather than by wilful theft.

Just behind my house there was a large shed, where frequently the crews of passing vessels would make a fire to roast their pig or cook a turtle or simply boil their rice and spend the evening in a sing-song. For many hours of an evening the wild plaintive songs of the Sangirese sailors would continue, now rising and swelling in a general chorus, now sinking to a low, half-muffled solo. The Sangirese music affected me at-first, as I suppose most Oriental music does English ears, as painfully nasal and discordant ; but after listening to it carefully for several evenings together, and at last recognising the several songs as they were sung, I began to feel their weird spirit and power and even to look forward to hearing them again. The curious and annoying thing about their music was that I found it

quite impossible to repeat. I tried in vain to remember one of the most frequent and familiar tunes, but by humming, whistling, or singing I could make no tune at all resembling theirs. Whether this is entirely due to my deficiency of 'ear' or to a different number of the notes in the Sangirese musical bar to ours, I do not know, but the fact remains that, although the music of those sing-songs is still ringing in my ears even as I write these pages, I cannot make a sound even now that in any way resembles it.

We had but few European visitors to Talisse besides the agent of the M.H.V. The visits of the 'Flying Fish' and 'Ternate' were, of course, of exceptional importance and interest to all of us.

There was a little schooner called the 'Minahassa,' belonging to the M.H.V., which came occasionally. The captain and the mate of this vessel were Dutchmen. Then a German brig named the 'Claus' and a Danish brig, the 'Louise,' came to take a cargo of ebony wood for Europe.

One day in December a brig came to Talisse with a cargo of rattans from the Tomini Bay. She flew the English flag, as she belonged to Singapore, but she was the property of the old Arab trader who always sailed with her as skipper. The captain had a harem of five wives on board, all of them Malay women from various parts of the Archipelago; the crew were mostly Arabs and Malays, the others being Chinamen. This captain often came ashore to see me, and told me many interesting things about the people of the Tomini Bay. He had spent the greater part of his life cruising about the Malay Archipelago, bartering his clothes and knives and beads for rattans, copra, copal, and whatever other produce he could procure. I was told that he had amassed a very considerable fortune in this trade, and I dare say it is true. But, like so many of the wanderers over the face of the earth, he could not

bring himself, even in his old age, to settle down to a life of retirement and inactivity.

I should like to have before me a true history of the experiences of one of these Arab traders. Like all Mohammedans, they seem to have facilities for travelling in unknown, unexplored regions of the world which are effectually closed to Europeans; and I feel certain that some of their experiences amongst the wild Malays must be full of interest and adventure.

This Arab captain who visited me in Talisse told me about places in the Tomini Bay which are still blank spaces in the maps, and others which are said to be inhabited by savages dangerous to deal with. It might be said that perhaps my friend the captain was not telling me the truth, and it is quite likely that if there had been anything to gain by it he would not have hesitated to 'draw the long bow;' but there was absolutely no reason why he should not tell me all he knew, for he was perfectly well aware that I had no connection but a friendly one with the Company he was dealing with.

When he had discharged his cargo and there was really nothing I knew of to detain him, he was an amazingly long time getting off. On Friday he could not go because it wasn't lucky; on Saturday the wind was not strong; on Sunday it was not lucky, and on Monday he was not ready. Thus for a whole week he postponed his departure, for one cause or another, from day to day, and every day he came ashore and told me most decidedly he would sail on the morrow. I mention this incident, not because it affected me in any way whatsoever, but as an example of the dilatory life that is led by the Orientals in these regions of the world.

I must now bring this general account of Talisse to a close, and pass on to consider some of the most striking features presented by its fauna.

CHAPTER V

FAUNA OF TALISSE

Mammals—Babirusa and sapiutan both absent—The baboon—The cuscus—Bats—Parrots—Eagles—Kingfishers—Eurystomus—Swifts—Crows—Shrikes—Starlings—Nectar-birds—Pigeons—Maleos—Sandpipers—Egrets—Reptiles—Amphibia—Insects—Spiders—Centipedes—Phosphorescent millipede.

HAVING described the details of my daily life in Talisse, I must now devote a chapter to a consideration of the fauna of the island.

As might be expected, there are not many terrestrial mammals. Neither the babirusa pig nor the sapiutan is found wild there, although fairly common near Cape Coffin, on the opposite shore of the mainland. As these two animals are among the most characteristic of the Celebean mammals, I cannot pass them by without some notice.

The babirusa (*Sus babirusa*) is a hog which, while closely resembling in colour the ordinary wild pigs, is characterised by possessing a very curious modification of the tusks. The tusks of the lower jaw are very long and sharp, while those of the upper jaw are curved upwards and backwards over the snout as far as the level of the eyes. It has always been a puzzle to naturalists to account for this curious modification of the tusks of babirusa. We had a full-grown male specimen in captivity at Talisse, and I watched it carefully for some months, in hope of being able to solve the difficulty; but I must confess that I was unable

to observe the animal use them for any particular purpose. I am inclined to believe that they are only useful to the animal when fighting; the tusks of the lower jaw being most valuable weapons of offence, and those of the upper jaw, by protecting the eyes and the fore part of the head, serve as excellent weapons of defence. The babirusa has only been found on the seaward slopes of the Klabat and 'Two Sisters' hills of North Celebes, but I was informed by Mr. Rijkschroeff that it is also to be met with on the Kelelonde and Saputan mountains of the interior. It is also stated that it may be found in the island of Buru. It is a very shy animal, and never comes near any of the native villages and huts (25), but is nevertheless active and ferocious.

Of the *Anoa depressicornis* Wallace says: 'The sapi-utan, or wild cow, of the Malays is an animal which has been the cause of much controversy as to whether it should be classed as ox, buffalo, or antelope. It is smaller than any other wild cattle, and in many respects seems to approach some of the ox-like antelopes of Africa. It is found only in the mountains, and is said never to inhabit places where there are deer. It is somewhat smaller than a small Highland cow, and has long straight horns, which are ringed at the base and slope backwards over the neck' (83). It is fairly common on the slopes of the Batu Angus in Wallace Bay, and also lives on the more desolate slopes of the mountains of the interior.

A jet-black baboon (*Cynopithecus nigrescens*) (fig. 11), with small red ischial callosities and a stumpy tail, is as common in the forests of Talisse as it is upon the mainland. A full-grown male measures twenty-three inches from the tip of the nose to the tip of the tail, eighteen inches from the hips to the tips of the toes, and has a span of sixty-four inches. If it were to stand erect, therefore, it would be a



FIG. 11.—*CYNOPITHECUS NIGRESCENS*.

little under three feet in height. These baboons are usually seen in pairs, but sometimes a family of seven or eight may be found together feeding in a tree. Such families invariably consist of a pair of adults and a number of young ones. The natives told me that these baboons, when once paired, remain faithful to one another until separated by death. I should not like to place too much confidence in the veracity of this story; but at the same time I should like to point out that any information we can obtain concerning the social arrangements of the *Quadrumana* is likely to be of the greatest possible interest. Ethnologists have now acquired a very considerable knowledge of the marriage laws and customs of the most savage races of mankind, ancient and modern; but at present we are almost entirely ignorant of the degree of conjugal fidelity of any of the genera or species of the anthropoid apes and monkeys, and consequently considerable controversy exists as to what systems should be considered primitive and what degenerate. I believe, for example, that if we knew more of the habits of the apes, we should find that a system of polyandry never occurs amongst them.

The baboons of Talisse are usually to be found in the branches of the trees feeding upon leaves and fruits, grubs and insects of various kinds, but when the tide is low they may often be seen walking over the roots of the mangrove trees picking up and munching the mollusks and small crabs they find in the swamps.

A fairly common mammal in Talisse is the *Cuscus celebensis*, a slow, awkward, nocturnal, frugivorous animal, rather larger than a cat. It lives entirely an arboreal life, and can only move slowly and awkwardly when placed upon the ground. It usually hangs suspended from the underside of the branches by its four feet and long prehensile tail. The young are carried on the back of the female with their

tails firmly twisted round hers. The flesh of the cuscus is rather tough, but quite palatable.

When I was in Manado, a native brought me a male, a female, and a young one alive, but they refused to eat the fruits and leaves I offered them, and soon sickened and died.

It is rather strange that in this little island the only conspicuous mammals inhabiting the forests should be representatives of two widely distant great zoological regions. The tailless baboons are characteristic of the African fauna, the cuscus of the Australian region.

The island of Celebes is the northern limit of the genus *Cuscus*, and with the exception of the island of Batjan, where it may have been introduced by man, the southern limit of the genus *Cynopithecus*, and yet here we find them, living together in the same forests, and the only large mammals of the island.

A small squirrel (*Sciurus murinus*) is fairly common, but, as it is very sharp and shy, I could only obtain one or two specimens.

There are several species of bats to be obtained. A large fruit-eating bat (*Pteropus Wallacei*?) may be seen flying about amongst the trees every evening as the sun is setting. The *Cynonycteris minor* is also very common, and I obtained a fine specimen of a female *Harpyia cephalotes* with a young one clinging to its mother's nipple by its mouth, and holding on firmly to the hair of her breast by its little claws. This species is readily distinguished by the bright yellow spots on its wings and body, which, however, lose much of their brightness after a long immersion in spirit.

It is a very curious fact that whilst the specimens of *Harpyia cephalotes* obtained in Celebes have longer forearms than those obtained from any other parts of the world, the

average measurements of the forearms of *Cephalotes peronii* are smaller in the specimens from Manado than those from other parts of the Archipelago (see Appendix A).

It is difficult to form any very consistent theory to account for these remarkable facts. It may be, however, that the struggle for existence among bats is so keen in Celebes that only the extremely long-winged forms and the extremely short-winged forms have been able to compete in the conditions of life.

One day, as I was passing the house of one of the *mandurs*, I saw a little boy with a beautiful little bat attached to a piece of string. For a small consideration I persuaded him to give it to me, and the next day he brought me another of the same kind. This bat has a body not much larger than that of a mouse, covered with long bright reddish brown hair, and the iris is quite white. It belongs to the variety *fulvus* of the species *Phyllorhina bicolor*. It has a very wide distribution, occurring in Ceylon, Sumatra, Java, Amoy, Celebes, Amboyna, but the colour varies from bright yellow to dusky brown. The specimens I obtained in Talisse are decidedly redder than any of those in the British Museum or the Rijks Museum at Leyden.

A few field notes on the birds of Talisse may not be out of place in this chapter. It is true I cannot add a single new species to the known birds of Celebes, nor can I say much about any birds that are not well known to the ornithologist, but my excuse must be that while naturalists in these regions have endeavoured to make their lists of the avifauna as complete as possible, they generally fail to give an idea to the general reader of the birds in any particular spot which are common and of every-day occurrence. My object, then, will not be to give a complete list of the birds known to inhabit the island of Celebes—for that has already been done by such competent ornithologists as

Lord Walden (80) and Blasius (6)—but rather to say a few words about the feathered friends I met on my daily walks, as one would describe the blackbirds and thrushes, the sparrows and martins, the rooks and magpies of our own country.

The only parrots on the island belong to the species *Tanygnathus Mülleri*. They are handsome green birds, with a patch of light creamy blue on their backs. They are very common towards sunset in the lower branches of the trees, and keep up a constant chattering noise until past midnight. The adult males can be readily distinguished by their bright scarlet bills, the bills of the hen birds being almost invariably white. Some ornithologists consider that there are really two species of this parrot because a few specimens of hen birds have been found with a scarlet bill and some cock birds with a white one, but I must agree with Meyer (46) that this view is erroneous. My boys and I shot a great many of these birds, partly to settle this vexed question and partly for food, and I found without exception that those with scarlet bills were males, and those with white bills were females. They live together in the same trees and fly about together in the same coveys, so that I feel perfectly convinced that they belong to the same species. It is very rarely that we find birds of two species so closely allied as these would be living together in any numbers. The struggle for existence is so keen in the tropical world that the laws of natural selection would soon pick out that species which was the better fitted for the environment and the other would go to the wall. We should, therefore, not expect to find that there are two closely allied species of this genus of parrots living together and feeding on the same fruits in this little island, and the burden of the proof goes to show that there is really only one.

I am surprised to read that Mr. Wallace (82) found that

the natives universally recognised these birds as two species, because my experience is that the natives of Celebes universally recognise them as the same bird; and, moreover, look upon the one with the scarlet bill as the 'lakki-lakki,' or cock bird, and the one with the white bill as the 'perampuan,' or hen bird. Dr. Meyer considers the parrots with white bills to be younger specimens, and that the scarlet bill is a sign of age. I have seen some hens with a bill slightly tinged with red, and it is very possible that they may have been older birds than the others; but if the bills of the hens do eventually turn scarlet, I should think, from the large number of them I obtained without any such tint, they must change very much later in life than those of the cock birds. The natives call this bird the 'Burong Kakatua,' but this name, it must be remembered, is applied by them to all parrots and cockatoos in general.

There are several large birds of prey in Talisse, but, as they have wonderfully keen sight and are very shy of human beings, it is very difficult to get within range of them. The great osprey (*Pandion leucocephalus*) has an expanse of wing of four feet. I saw several of them hovering over the forest of Talisse, but I never got a shot at one. The only specimen I obtained was shot for me by the Dominie of Manado in a rather remarkable way. It was on one of the Saha islands in the Talaut group. A small party from the 'Ternate' had landed on the island to shoot birds for me, and the Dominie was armed with one of the Government rifles used by the colonial navy. As we proceeded through the bush, two or three of these huge birds rose from the trees and whirled round and round some considerable distance above our heads, uttering the most piercing cries. The Dominie fired, and at the third shot brought down one of them. Now to hit a bird on the wing with a rifle bullet is at all times a difficult task, but the conditions

of this shot were so exceptional that it is worthy of being classified as a 'crack' shot, and should be recorded with a certain amount of respect. At the same time, I cannot recommend to ornithologists the Dutch naval rifle as the best weapon for use in collecting specimens, for the bullet is apt to derange the feathers. I found in the crop of this specimen a partially digested starling (*Calornis neglecta*), but both this great osprey and the sea-eagle (*Haliaetus leucogaster*), which is very common in these parts, mainly prey upon fish. I have often watched them for hours from the pier at Talisse fishing in the shallow waters of the reefs. They hover over the water for some time and then suddenly splash into it, seize an unfortunate fish with their claws, and sail away majestically to their home in the forests.

A bird, often seen on the orange trees and the higher branches of the trees in the mangrove swamps, is the beautiful brown falcon (*Erythrospiza trinotata*). The only specimen I obtained was shot for me by Cursham's boy on an orange tree just in front of my hut. I had been out shooting all the afternoon, and on my return I found this bird lying dead upon my table with a little skewer of wood through its breast. The boy, who boasted of the name of 'Solomon,' noticed the bird as he passed my hut on his way to the panchuran, and, finding that I was out, hastily manufactured a blowpipe from a piece of bamboo, and using a dart of the same wood and a little plug of cotton wool, at the first shot pierced the bird through the heart. Now this was not only an excellent example of the ease and accuracy with which the natives of these islands can use the blowpipe, but, as not a single feather was displaced in the operation, and scarcely a drop of blood spilt, an instance of the superiority of the weapon in many respects over fire-arms for collecting specimens. I am afraid, however, that it will never come into general

use, for it would require much patience and practice for a European to use the weapon with such accuracy as this, and the natives, when opportunities arise, infinitely prefer the pomp and vanity of fire-arms.

Another falcon, rather larger than this (*Spilornis rufipectus*), is also fairly common in the mangrove swamps. I saw one of these birds nearly every day not far from my house, but could never get a shot at it until at last one day I managed to break its wing as it rose from a mangrove tree.

I had started out that afternoon with the intention of collecting insects only, and had left my guns behind, taking with me only some nets and collecting bottles. As I passed this tree, however, I saw the falcon within easy range of my gun, and instead of flying away, as he usually did when I approached, he calmly sat and looked at me first with one eye and then with the other, as if he were making quite certain that I had no dangerous weapon about me. This was too much for me, so I hurried back to my hut and returned with my gun just in time to indicate to him that he had been for once a little too bold and that I wished to add him to my collection. I saw several other specimens afterwards, but never one that was anxious to repeat the experiment.

The *Poliornis indicus* is not so often met with in Talisse as the other rapacious birds, and is, I fancy, purely a forest dweller. I never saw one in the swamps on any occasion, and the few specimens I found were usually some two or three hundred feet above the sea in the depths of the forest.

The general native name for all the large birds of prey is Kohéba : thus, the sea-eagle is usually called the Kohéba besar, or big eagle ; the osprey, Kohéba gunong, or osprey of the mountains, and so on ; the *Erythrospiza*, however, is usually called the ' Sikip abuabu.'

Some of the most beautiful of the many beautiful birds

of the Malay islands are the blue kingfishers. They are seen in nearly every field and road-side, and their plaintive cry of 'kiss-kiss' is one of the most familiar sounds to the field-naturalist. The commonest species in Celebes is the *Sauropatis chloris*, a beautiful little bird with a white body, bright blue wings, and a long jet black bill. On nearly all my walks near the swamps or water-courses I found them skipping about on the huge leaves of the young coco-nut trees or feeding among the roots of the mangroves. They were by no means shy birds, and I could often get quite close to the trees upon which they were perched and watch them for some minutes before they became frightened and flew away. The natives call them 'Kiss-kiss,' from their cry.

A less common but by no means rare bird is the *Halcyon coromanda*, one of the most beautiful of the kingfishers, called by the natives 'Rajah udan,' or king of the forest. One of these, which I never had the heart to shoot, was nearly always to be seen perched on the bamboo palings of the panchuran when I took my morning bath. It has a dull red body and wings, with a patch of very brilliant light blue in the middle of its back. The bill is very long and thick, and has the same dull red colour. My boys shot a specimen for me one day, but I found it by no means an easy task to make a good skin of it, as its bill was so large and awkward to pass through the neck.

Another little kingfisher (*Alcedo bengalensis*) I occasionally met with in the mangrove swamps, but it is not so often seen as the other two.

The cuckoo to which I have already referred and the *Eurystomus orientalis* are occasionally met with. The *Eurystomus* is one of the most fearless birds in the island. He will sit upon his perch in a low tree or shrub flapping his wings and uttering a series of 'kiak-kiak' cries while his enemy approaches and he seems to have no fear of any

consequences that may ensue. On the first occasion I came across this bird he was sitting on the top of a small dead stump a few yards only from the spot where I had cut my way out of the mangrove swamp, and he was really so close to me that I was afraid of injuring the specimen. I waited a few minutes to slip into my gun a cartridge lightly loaded and with very small shot. I had plenty of time, however, to take deliberate aim, and the bird came down uttering most piercing shrieks. At the sound of his cry four or five *scissor-tailed* birds, which I had not noticed before, came out to join in the hubbub, and from the noise they made I assumed that they were rejoicing over the death of an old enemy. My boys called this bird 'Kokotaka,' but Meyer (46) says that the native name is 'Tjetje.'

Three kinds of swifts are very common in Talisse—two of the birds which build the edible nests (the *Collocalia esculenta* and *fusca*), and a larger bird with very long wings, the *Macropteryx Wallacci*. They may frequently be seen perching on the trees of the mangrove swamps or skimming over the waves of the sea in search of food. The two *Collocalias* build their nests in the almost inaccessible caves of the sea-shore, as described in a previous chapter, but I searched in vain, both in Talisse and elsewhere, for the nests of the *Macropteryx*. The native name for the *Macropteryx* is 'Pavas.'

The *Corvus enca* is a crow very commonly seen in the coco-nut plantations. In size, shape, and cry it very closely resembles our English crow. But the Celebean bird seems to be rather smaller than those from Java, Sumatra, and Borneo (24). The native name for it is 'Woka-woka.'

A shrike called by the natives 'Burong maspas,' or 'Kūkū inewahat' (24), and the handsome black drongoshrike or scissor-tailed bird, *Chibia leucops*, or 'Burong

gunning,' are as common as the blackbirds and thrushes of our English woods. The latter is a very handsome jet black bird, with two long tails which open and shut during flight like a pair of scissors in action.

There is a starling, too (*Calornis neglecta*), frequently seen in thousands upon the dead trees of the forest. It is of a uniformly dark colour, with a brilliant orange-red iris. The native name is 'Sié.' It is but rarely seen in the forests and fields of the main island, but is nevertheless quite the commonest bird met with throughout the islands which lie between Celebes and the Philippines. I found it in numbers in Tagulandang, Siau, Sangir, Talaut islands, and the Nanusa islands.¹

A beautiful golden oriole (*Oriolus celebensis*), reminding one of the English bird, is occasionally seen. † It is called the yellow bird, 'Burong kuning,' by the natives.

The smallest and at the same time the most domesticated of the birds of Talisse are the beautiful little nectar-birds (the *Anthothreptes celebensis*), called by the natives 'Burong chuwi.' They may be seen upon nearly every hibiscus shrub in the gardens behind my hut, and seem to be always so busy searching for insects upon the leaves and flower stalks that they hardly know what it is to be shy. The male has a most brilliant little head of green and pink and brilliant metallic colours; the throat is dull brick red, the breast pale yellow, and the back covered with a bright violet and green metallic gloss. Every specimen is a perfect little bird gem. The female chuwi is not nearly so brilliant, the back and breast being of a rusty pink and the wings of a dull golden green colour.

There were several kinds of pigeons, the commonest and at the same time the most conspicuous being the

¹ The variety of this bird found in these islands is regarded by some ornithologists as a separate species (67).

large fruit-eating bronze wing (*Carpophaga paulina*). The breast is of a creamy pink colour, and the wings dark green, with a very well marked reddish-copper gloss. Its native name is 'Kūm-kūm,' which approximately describes in words its deep musical cooing song, which is not unlike that of our common wood-pigeons. I usually found them in pairs, perched on some of the highest branches of the trees, and many an anxious moment have I spent, when my cupboard was bare, waiting to see if my fowling-piece would be effective at such a distance. The feelings of a hungry naturalist when he sees a really edible bird calmly waiting for the next shot are better imagined than described.

The grey pigeon, 'Kum-kum putih' (*Myristicivora luctuosa*), is not very common in Talisse, although it abounds in the neighbouring islands. A pair of these birds was given to me alive by the missionary at Mangarang, in the Talaut islands, and they were for some weeks my household pets; but they disappeared when I went over to Manado in December, and my boy declared they had died because something he had given them to eat had stuck in their throats. I wonder if the cause of death was that they had stuck in his throat.

A beautiful green dove (the *Ptilopus melanocephalus*), with bright red and yellow feathers in its tail, is frequently met with amongst the lower branches of the trees. It is one of the most difficult birds of the forest to see, for its colour exactly matches the foliage in which it lives. Many a time has Manuel said to me, pointing to a branch, 'Burong wakian tuan,' and I have looked and looked at the spot he indicated without being able to discover the bird, and been obliged eventually to hand him the gun to bring it down. Unlike the other pigeons, this bird is nearly always alone, or, perhaps I ought to say, I never could see its mate.

The well-known *Turtur tigrina*, found all over the Malay Archipelago, is also found in Talisse. It may be that it has been imported within recent years from Java, for it is everywhere a domestic pet in the colonial household. These birds are invariably found in pairs, and usually they perch so close to one another that it is impossible to shoot one without the other. The natives call it the 'Burong kükü.'

The bird which perhaps gave me more trouble than any other was the little brush-turkey (*Megapodius Gilberti*), called by the natives 'Maleo ketjil,' or small maleo. It seems to be particularly fond of the bamboo woods, and I scarcely ever walked through a little clump of bamboos about a quarter of a mile along the path to the south of my hut without seeing or hearing a 'maleo.' But seeing and hearing these birds are not shooting them, and when hours have been spent in chasing or endeavouring to stalk them in vain, one is almost inclined to wish sometimes that they would keep out of sight and hearing. The ground in the woods is usually covered with the crisp leaves of the bamboos, which make a loud crackling sound when trodden upon, and very effectively give warning to any bird or beast in the vicinity that danger is at hand. Approaching the wood along the little path very cautiously, a rustling sound in the leaves would frequently be heard, and Manuel would whisper to me, 'Burong maleo tuan'; but before I could get time to have a shot the bird would scamper away among the thickets and be lost to me. I tried several times to have the birds driven up towards me, and sent my boys round the bush with sticks to beat them up to where I was standing; but it was all in vain—they always managed to evade us and disappear in the undergrowth before I could get a shot. The only specimen I obtained was shot for me by

Mr. Cursham in the neighbouring island, Tindela. It is of a fairly uniform brownish-black colour, with black legs and claws. It is devoid of the handsome red crest which distinguishes the other maleo (*Megacephalon maleo*). I cannot understand why Dr. Meyer insists so strongly that the natives call these birds 'Moleo' and not 'Maleo.' It is always a matter of some difficulty to arrive at the correct vowel to use in spelling native words, for illiterate persons do not recognise such sharp distinction between vowels as those who are accustomed to constant reading and writing; but it would be impossible for anyone to distinguish the vowel used in the first syllable of the word 'maleo' and that in the word 'Malay,' and I am inclined to think that the sound employed by the majority of the natives is more correctly expressed by the letter 'a' than the letter 'o.'

The bird lays its eggs in the forest, under a heap of decaying leaves, and takes no further care of them. It is possible that the heat generated by the fermentation of the leaves is sufficient to hatch them, as is the case with the eggs of the Australian Megapode, which has a similar habit.

Mr. Kelling told me that in Tagulandang a small maleo digs holes in the sand, and leaves its eggs in them to hatch; while a larger maleo, called there by the natives 'Mamunga,' lays its eggs in the holes made by the smaller bird. The larger bird is perhaps the *Megapodius sanghirensis* of Schlegel, a brush-turkey, which is bigger than the *Megacephalon*, and extends over the Sangir islands (69).

The great birds of prey mentioned at the beginning of this section are not the only birds which take advantage of the splendid fishing grounds of the lagoon. The common sandpiper (*Tringoides hypoleucus*) is always present upon the sands and the roots of the mangrove trees as the tide is ebbing, and more rarely that handsome whimbrel,

Numenius phaeopus, with its breast covered with brown spots and its long curved bill, and the ashy egret (*Demi-egretta sacra*) may be seen wading in the shallow waters, making a splendid meal off the millions of tiny fish left in the pools at low water.

The native name for the whimbrels is 'Kerombek.' Meyer says that they 'assemble at sunset in flocks of hundreds, and are very noisy before they go to rest. They also cry at night on the seashore. They run quickly, and are only to be found on the seashore. They feed on Crustacea. Nests on small trees, very simple, of leaves and twigs; two eggs' (46).

These birds do not, I believe, either rest or breed on Talisse, and this perhaps accounts for the fact that I never saw more than one at a time, and never heard them at night. Their food is certainly not confined to Crustacea, for the crop of the specimen I shot was full of small fishes.

The native name for the egret is 'Sueko'; but it must be mentioned that this is only a general name applied to all herons.

In a small island such as Talisse there is seldom a rich fauna of reptiles. The *Crocodilus biporcatus*, which is common at the mouths of the large rivers of the mainland of Celebes, and about which there are probably more legends and fables than about any animal except the monkey, is never seen on these small islands. A large lizard (*Varanus bivittatus*), occasionally seen in the mangrove swamps of Talisse, and the common little gecko (*Platydictylus monorchis*), found running all over the native huts, are the only two representatives of the order Lacertilia I could find in the island.

I believe we were quite free from poisonous snakes in Talisse; and the sole genus which could be considered in

any way dangerous was the large python (*Pytho reticulatus*), or 'ular patjola,' as it is called here by the natives, which has been known occasionally to attack and attempt to swallow a full-grown man.

The only specimen I came across myself measured 13 ft. 1 in. in length, and was about as thick as a man's arm. I encountered it on an expedition I made one day towards the north end of the island. My gun was loaded with slugs, as I had just seen a cuscus and was hoping to get a shot at him, but Manuel's gun was loaded with No. 6 for birds. We came to four pits which had been dug for water, and upon looking into one of them I saw the red and yellow tail-feathers of the wakian pigeon. I retreated a few steps and signalled to Manuel to come up to shoot the bird, but as soon as he reached the pit he instantly saw that the bird was in the jaws of a large python, which lay curled up in the pit. At first he was frightened and inclined to run away, but when I offered to change guns and shoot the snake, he immediately plucked up courage and shot the reptile through the head. A few days after this a man brought me another python of the same species that was just over twelve feet in length.

A bright green snake (*Tragops prasinus*), about three feet in length, was a constant visitor to my hut, and I often found it on the bamboo palings of the deer kraal just opposite. It was an amusing sight to see Marcus attempt to catch one of these creatures for me. Manuel was always inclined to be frightened of snakes, but Marcus would never hesitate to go for them with his hands. The difficulty he had was to catch hold of them at all, for they climb the palings with such speed, and their bodies are so smooth, that they would often slip through his fingers before he could get a good grip upon them; but having once caught them it was no easy matter to unwind them, for as soon as the head end was

free the tail end was tightly coiled up, and *vice versa*. We sometimes had half an hour's exciting chase before a specimen was safely deposited in my pickle jar. Another snake, the *Dendrophis picta*, was a great nuisance to me, for it would come by night and kill my chickens; but it is a beautiful creature, of a warm brown colour, brilliantly ornamented with spots and stripes of a bright bluish-green sheen.

I saw one or two specimens of the sea-snake (*Hydrophis*) on the coral reef, but never succeeded in securing one. They are dangerous creatures to meddle with, for their bite is said to be very poisonous, and, equipped as I was on my reef expeditions only with weapons for collecting corals, echinoderms, and the like, I thought it better on the whole to let them go their own way. It must not be supposed, however, that because there are no terrestrial poisonous snakes in Talisse that they are also wanting in Celebes. It is true there are very few really dangerous snakes in that island, and very few cases are on record of natives having been mortally or even dangerously bitten; but, nevertheless, I was told that in elevated plains and forests there is a timid black snake which is greatly feared by the natives, whose bite is said to be extremely poisonous.

There were not many places in Talisse favourable for amphibia, but in a muddy stinking pool some distance from my hut a hoarse croaking, followed by a hasty splash, proclaimed the existence of some kind of frog. From the glimpses I caught of this animal, I believe it was the *Rana macrodon* (Kuhl), but I should not like to pin my faith to this. If I had possessed at the time a proper keenness for herpetology, I should have raked that pond with a net until I caught one; but, to tell the truth, the stench was so offensive when undisturbed, and spoke so loudly of the dread miasmas of the tropics, that I thought it wiser to direct my energies to other pursuits until more favourable opportunities presented themselves.

Concerning the invertebrate land fauna of the island, I have but few notes of interest to record, as the greater part of my collections was destroyed by insect pests after my hurried departure from the islands. The butterflies that fly about in the island at all seasons of the year are not distinguished by any very striking beauty of colouration or form. The most beautiful butterfly I captured in Celebes was the handsome swallow-tailed *Papilio Blumci*, a large swallow-tailed species distinguished by its extremely brilliant blue and green metallic wings and body. 'This very fine species comes nearest to *Papilio dædalus* from Luzon, Philippine Islands, but is much larger in size, and is conspicuous by its brilliantly-coloured tails' (81). I could not find this species in Talisse nor other coast places of the mainland; the only specimen I obtained was at Kelelonde, 8,000 feet above the sea. When I first arrived in Talisse in September, the commonest butterflies were the large white Pieridæ. They flew about in great numbers round the hibiscus shrubs and other flowering plants in the neighbourhood of the settlement. They are slow and clumsy flyers, and were consequently easily caught by Manuel, who was told off to entomological pursuits during my absence in the 'Flying Fish.' At first he brought me nothing but the 'whites,' thinking, I suppose, that I was a dealer in quantity rather than in quality. They were usually considerably damaged, partly by insectivorous birds before their capture, and partly by the clumsy fingers of the collector. There was another very good reason that Manuel caught me only whites at first: the whites were at that season by far the commonest Lepidoptera on the island, and when I first set seriously to work to collect other kinds, I found it by no means so easy as I expected. The first *Papilio* I caught was at the beginning of November, near a little pool of water in the bed of an

old watercourse in the forest. It has been called *Papilio polytes*, and is perhaps the second female form of *P. pammon*, a species of very wide distribution extending from Ceylon to China (81).

When the rains commenced in November and December the Pierides became less plentiful, their place being taken by Papilios. When I returned to Talisse in April—that is, at the end of the rainy season—the Pierides were again making their appearance in great numbers. Professor Westwood has described two new species from the collection I brought home with me—*Terias talissa* and *Tachyris phestus*.

It occurred to me at the time, and I have no reason to doubt it as a general statement, that the disappearance of the 'whites' in the rainy season was associated with the large size of their wings and their slow and laboured flight. A butterfly which cannot get to shelter with ease and rapidity when a heavy shower of rain comes on is obviously liable to be beaten down and killed by terrestrial animals or drowned, and, consequently, the time of year best fitted for their flight is the dry season.

It might be said that even the strong-flying Papilios would be liable to similar disasters in the heavy showers of the tropics. That is perfectly true. I have seen on more than one occasion a Papilio struggling on the ground in a shower of rain, but, perhaps this disadvantage is counterbalanced by the advantages gained by the larger number of flowers in blossom in that season and the correspondingly larger supply of food for them.

I was not particularly successful as a beetle-catcher, but whether this was due to my own stupidity or a dearth of beetles I cannot say. I found a few brilliant little cockchafers (*Parastia*) on the young coco-nut palms, and I often amused myself with catching the large black stag-beetles (*Odontolabis celebensis*, 40) soon after the sun had set.

It was in the months of September and October they were most plentiful; in the rainy seasons they were not so common. The method of procedure was as follows: I took up a position in the middle of the path opposite my house armed with a butterfly-net with a long stick. Presently I heard the beetles coming—bur-r-r-r. I made a plunge in the darkness overhead in the direction the sound came from, and—thud—the beast was in the net, or, more frequently the case, was not. Sometimes in this way I would catch three or four beetles of an evening, but often none at all. It was an amusing form of sport, but very fatal to the net, which was torn and gashed by beetles in a pitiable manner.

The commonest form of Longicorn is the *Batocera celebiana* of Thomson (73). The two yellow spots on the thorax and bright red spots on the elytra are very bright in the living animal, but lose a great deal of their brilliancy and effect when kept in spirits.

I pulled off the elytra of one of my specimens one day with the purpose of dissecting it to see what food was in its stomach, when, to my surprise, I discovered a large number of small parasites fixed on to the wings, which turned out to be Chelifers, or tailless scorpions.

I caught one specimen of the wax insect (*Flata marginata* var.), but it was in a very much damaged condition, and I never saw it in sufficient numbers to be of any commercial value.

Around all the huts in Talisse I noticed soon after my arrival a number of little pits about an inch in diameter in the loose sandy soil. These I soon found were the pitfalls of a little ant-lion. They are situated immediately under the edge of the roof, and appear to a casual observer to be caused by the constant dripping of water or some small bodies falling from it. I was not a little surprised to see the precise and regular way in which these little insects

arrange their falls in perfectly straight lines along the sand immediately vertically below the line of the roof. I suppose that a number of small insects and other food particles are constantly falling from the attap roofs, and the ant-lions feed upon them, but it would be interesting to know how the ant-lions discover these favourable places. As a rule the ant-lion cannot be seen in his pit, but by a careful examination one can sometimes distinguish his sickle-shaped mandibles at the bottom of it. I was amused to see one day a small boy entertaining himself by fishing for ant-lions. He took a small twig of a shrub that had a very sweet sap, and, breaking a fragment of it away from the rest, but still attached to it by a thin shred of the bark, he lowered it gently into the pit as one would a fishhook into the water. The ant-lion seized the sweet morsel, and was immediately drawn out of the pit by the boy.

If I were able to record in these pages all the numerous insect pests which visited me in my little hut in Talisse this chapter would have to be increased inordinately in length. The many quaint and curious creatures that fell from my lamp as I sat writing in my journal of an evening might have been made the subject of a separate memoir, if I had had the patience to collect and label them; and the numerous little beasts I found from time to time in my boxes, bed, and boots might have served me with zoological study for the rest of my life. The two enemies I most dreaded were the white ants and the large brown hairy spider, which Mr. Cambridge tells me is *Heteropoda sanatoria*, Linn.—‘a spider found in all tropical regions.’

The danger to be feared from the white ants was that their attacks upon the piles on which my house was built might so weaken them that the house would fall. I had seen houses in the island fall from this cause—in fact, I had often lent my dredging-rope to the natives to pull them up

again on to new piles, and, with my large collections of jars and glass bottles, I was naturally anxious that no such accident should happen to mine. I was not long in discovering that it is almost impossible to cope with these active and industrious termites. As is well known to every one who has travelled in the tropical East, the white ants make little sand or mud tunnels up the trunks of trees or through the beams and piles of dwelling-houses. One of these tunnels ran from the ground to the roof of my house, and I tried the experiment of destroying it completely every morning for about three weeks to see if I could induce the colony to desert my house. Every morning the tunnel and some hundreds of the blind, stupid-looking termites were destroyed, but they never swerved an inch from what they considered to be their path of duty, and immediately set to work to build a new tunnel in precisely the same place. Smearing the pile with turpentine caused them to divert the course of the tunnel to one side or the other. I thought that I had won the battle when I painted a ring of turpentine round the pile, but two or three days afterwards the busy little creatures had surmounted the obstacle and the tunnel was complete. One evening in the month of September I was visited by a swarm of the winged sexual forms of these termites. I was writing in my inner room when they arrived, and, on account of the great numbers of them which fell on the table, dropped their wings, and then proceeded to chase one another over paper, pens, and into the ink, I was obliged to desist.

The great Heteropoda spiders were a great nuisance on account of their predaceous habits. When I was arranging or labelling my insect collections and left the table for a moment, I was sure to find on my return one of these ugly brutes running off with my most cherished specimens. They were perfectly fearless, and frequently annoyed me by

coming as unbidden guests to my dinner-table. If they had confined their attentions to my sitting-room I might have forgiven them, but the sight of them crawling up the walls of my bedroom as I lay ill in bed was enough to banish all friendly feeling. Many of them carried a large silken sack of eggs or young ones, and nothing would induce them to let go of this till they expired in my collecting bottles.

Some of the large web-making spiders I came across in my excursions through the plantations of Talisse are beautifully coloured. They build large regular webs similar in design to those of our own English *Epeiras*. I have often noticed in their webs a number of very small spiders of another kind altogether, and these I imagine act as scavengers by devouring all the small insects that the owners refuse to notice. I was not aware at the time that Belt had observed the same thing in the webs of the large spiders of Nicaragua (4).

My efforts to obtain scorpions were unsuccessful. I hunted high and low for them in places which I thought were favourable, and I endeavoured to enlist the services of my boys and the natives of the island in the search by showing them pictures of scorpions and offering rewards for them; but it was all in vain. Whether they actually do occur in the northern peninsula of Celebes and the islands I am unable to say, but at present I have no evidence to show that they do.

In hunting for scorpions I often came across large centipedes belonging to the genus *Scolopendra*. They were formidable uncanny-looking creatures, some of them six or seven inches long and three-quarters of an inch across the back. I was rather surprised that the natives seem to have but little fear of them, although they must be capable of giving a very painful and poisonous bite. In dissecting one of these large *Scolopendras* soon after I had killed it in chloroform, I was rather surprised to find the

tissues in some places turning a bright blue colour. This was due to the escaped blood, which in these animals is white in the vessels but turns blue when brought into contact with the oxygen of the air. Blood of this kind occurs in some Crustacea, Mollusca, scorpions, the king-crab (*Limulus*), and elsewhere in the animal kingdom; but it is not generally known that it also occurs in centipedes. Some of the Myriapoda are known to be phosphorescent, but there is one little creature not uncommonly found in parts of Celebes which is really remarkable in this respect. It is apparently allied to the genus Siphonophora, and is called by the natives 'Kala moyang.' I found two or three specimens on the mosquito curtains of my bed in Talisse. It is about an inch in length, and as it progresses leaves a trail of some highly phosphorescent secretion behind. It is really astonishing what a bright blue light this thin streak of matter can give.

The little pool of water at the Panchuran contained many forms of animal life of considerable interest. The banks were bored by land-crabs belonging to the genus *Sesarma*, a crab that wanders all over the low-lying districts of the island. My boys caught for me in the pool a few specimens of the large fresh-water prawn (*Palaemon ornatus*), and sometimes the water was quite black with hundreds of the larvæ of dragon-flies and gnats. The Mollusks at the Panchuran were the same as those found in the marshes and swamps.

I must now leave the subject of the land fauna to consider that of the sea and coasts. I would that I could feel in closing this chapter that I have really done justice to a subject of such vast and varied interest; but in a country such as this, where the life-histories and habits of the animals have not yet been seriously studied by anyone, the field of work which lies before the travelling zoologist is so large that it is quite necessary for him to confine himself within definite limits in order to produce any useful results.

CHAPTER VI

MARINE FAUNA OF TALISSE SHORES

Depth of Talisse Sea—Shore gradients—Fauna of the sea-bottom—Structure of corals—Principal types of corals—A ramble on the coral reefs—Fauna of the lagoon—Fauna of the mangrove swamp—The food of corals—The colour of corals.

THE marine fauna of this region may conveniently be considered under four headings—the sea bottom of Talisse Sea, the coral reef, the lagoon, and the mangrove swamp. I am sorry that I can give no account of the marine fauna of the bottom in the deeper waters outside the group of islands, but I found the difficulties in the way of investigating the greater depths insuperable, and I was reluctantly obliged to relinquish the attempt. The main difficulties were the impossibility of obtaining a suitable boat for such work and the rapidity of the tides which sweep round the islands. For deep-sea dredging in these seas it is quite necessary to have steam, and an almost unlimited supply of good manilla hemp-rope; without them the naturalist runs the risk of losing much valuable time and apparatus, and obtaining no results.

I was able, however, on several occasions to dredge in the shallow waters of Talisse Sea, and thereby gain a glimpse of the character of the sea-bottom.

From the edge of the coral reef off Talisse Pier the water rapidly deepens to 12 fathoms, and then less rapidly to 19 and 20 fathoms—a depth which is maintained without much variation over the whole of the Talisse Sea.

It must not be supposed that the shores of the island are really so very precipitous as coral shores seem to be in some regions of the world. If Talisse Sea were to become dry we should have a great plain, which, with the exception of one or two low hillocks, and a slight depression here and there, would appear to the observer on the island as a tolerably level plateau. At the approaches of what is now dry land there would be a slight incline to a low cliff (the edge of the coral reef) not more than 12 or 14 feet in height. This incline is not much more than one in seventeen—a good stiff gradient for a railway, but not what a pedestrian would consider a serious climb. It is a mistake to suppose that if we could imagine a passenger walking along the bottom of the ocean

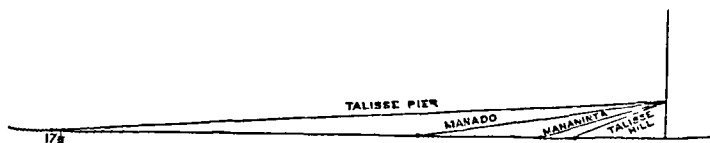


FIG. 12.—Diagram to illustrate the average shore slopes in the neighbourhood of Talisse Pier, Manado, and Mananinta, compared with the inclination of Talisse Hill, in the neighbourhood of Koa.

he would come to a precipitous impassable barrier at the foot of the reefs. He would find nothing more than a gradual slope perfectly easy to surmount. Let me take an example to illustrate my meaning. The hill at the back of my house in Talisse was a good stiff climb; no one could call it precipitous; and yet it was not easy to negotiate without occasionally using hands and knees. The incline was here certainly not less than one in every three and a half. Let us suppose now a traveller approaching the coral reef at Mananinta from the bottom of the Celebes sea. He would find an incline of not more than one in four and a half. At Manado, which has the reputation of being very steep, not more than one in seven. In fact, if he wished to reach

what is now dry land, he would probably find in but few places walls of coral reef so difficult to climb as Talisse Hill. Perhaps the only precipices are in places where there are no coral reefs, such as at the eastern point of Banka, in the neighbourhood of Cape Coffin, and the northern portions of Limbé, Batu Kapal.

There is, in fact, in this region off every coral reef a talus of bits of dead and broken coral, which extends as a steep but not precipitous slope into the deep water of the ocean. I dredged up several samples of this talus at the spot, about three cables from the end of the pier, where the 'Flying Fish' usually anchored. It consisted mainly of broken pieces of various branching corals, such as the fan-shaped madreporas, pocilloporas, seriatoporas, and others, and a coarse gravel of broken shells and coral skeletons. Living corals were not common, although the water was not more than twelve fathoms deep—a fact which rather astonished me; the only ones that were alive were rounded lumps of *astræas*, and occasionally branches of the graceful and delicate *Seriatopora tenuicornis* (18). Of other life in these depths the encrusting *Alcyonaria* were the most interesting to me. Whenever a branch of dead and broken coral came up it was pretty sure to be partially covered by a number of anastomosing, ribbon-like bands of a soft, brownish, gelatinous, fleshy substance; and standing upon these at intervals were a few delicate alcyonarian polyps.

Occasionally a fragment of a Gorgonian came up, in texture not unlike a piece of solid gutta-percha cord, such as is used for making catapult strings, of a dirty brown colour. I never succeeded in getting the polypes to expand. I also caught several large ophiurids, or brittle stars. They were always the liveliest inhabitants of the dredge, crawling about when they were turned out upon the deck with amazing speed over the coral débris. Lastly, a few of those graceful

and delicate creatures the feather-stars (Crinoids) were occasionally found in the dredge. It was impossible to capture a single perfect specimen of these. Their long, graceful arms and delicate pinnæ were invariably more or less broken in the journey from the bottom of the sea, and when I handled them for examination or preservation it was never unattended by further damage. One day, off Likupang, I thought I would keep one of these feather-stars to watch and observe in the living state; so I put it in a large bucket of water and left it in the darkest, coolest place I could find on board until the afternoon. When I came back again to look at it, I found my *Antedon* had broken itself into a thousand little pieces; every joint of its long arms had separated from its neighbour, and there the beautiful creature lay, at the bottom of the bucket, like the block puzzles of the nursery, every piece in its right position, and yet with no cohesion between the pieces. One of the most striking peculiarities of the feather-stars is their brilliant colour. Anyone who has seen a living specimen of our own British feather-star, *Antedon rosaceus*—a form which often comes up with the trawls and lobster-pots on the western coast of Scotland, and is not uncommon in some localities in the English Channel—must have been struck with its brilliant rosy colour. This colouring-matter is soluble in alcohol, so that when the animal is preserved in spirit all its colour is dissolved out into the alcohol. The colouring-matter of *Antedon* has received the name antedonin. Similarly, the deep-sea crinoids have a colouring-matter of their own, which has been called pentacrinin, after *Pentacrinus*, one of the stalked crinoids found in deep water. The crinoids of Talisse Sea are not less conspicuous for their brilliant colours, some being rosy red like *Antedon*, some of a deep rich claret colour, and some of a bright green chlorophyll colour. As I am now upon the subject

of the crinoids, I may be allowed to digress, to say a few words about the crinoids of the reefs.

It was my impression at the time—an erroneous one, as it happens—that the feather-stars were never found between the tide marks. Great was my surprise, then, when I found one day as I was wading on the reefs a number of bright green crinoids crawling on a fan-shaped madreporian coral, in water that was certainly not more than two or three feet deep. A still more astonishing thing to me was a feather-star, lively and happy apparently, climbing on a pile of Talisse Pier a couple of feet *above* the level of the water. I think I am right in saying that this is the first recorded instance of a crinoid living a semi-amphibious existence like a star-fish or a sea-cucumber.

The green colour of the reef crinoid is soluble in alcohol like pentacrinin and antedonin, and it would be interesting to know what spectrum it gives. Unfortunately, the bottle containing a sample of this brilliant green colouring-matter got broken on the way home, and I must consequently leave the problem to others who may be fortunate enough to find this feather-star on the coral reefs of Malaysia.

The sea-bottom varies in character very considerably in different parts of Talisse Sea. I was fortunately able on board the 'Flying Fish' to make a large number of observations as to its character by examining the grease-patch put upon the bottom of the sounding-lead. For a distance of some three or four cables from the edge of the reef, the bottom is mostly composed of broken bits of coral, with a few living ones, sponges, alcyonarians, and the like. Further out the bottom is composed of a coarse sand or shingle of broken coral and shells; in still deeper water in the straits the sand is much finer, and contains a considerable number of foraminifera shells, and a few black grains, probably, of augite. From a few soundings we made in water ranging

from 112 to 648 fathoms off the northern point of Limbé, and the east of Banka Strait, my impression is that on the bottom of the deeper waters there is a much larger proportion of black sand mixed with the calcareous deposits than there is in the deeper parts of the straits which never reach to more than 40 fathoms. It should be mentioned, however, that the region in which these observations were made is not a good one for giving a fair account of the character of the deep-sea bottom, owing to a recent eruption of the Batu angus, which must have sent tons of black soil to the bottom of the sea in this region.

At the mouth of the river at Likupang there are a number of extensive sand-banks covered by a few fathoms of water. I dredged in that neighbourhood on several occasions, but found very little animal life there; in fact, as far as I can remember, the only thing I caught was a fine large claret-coloured feather-star. Whether this remarkable absence of life upon the Likupang sand-banks is due solely to the stream of fresh water, or is connected with the sulphur which is said to be brought down in considerable quantities by the Likupang river, I have no evidence to determine.

Turning now to the fauna of the coral reef.

The fishes which actually live among the living corals must be distinguished from those which live in the lagoon at high tide, and among the corals or in deeper water when the tide is low. The former are, without exception, I believe, most brilliantly coloured; the latter are not. The brilliant colours of the reef fishes were first noted by Captain Cook, and form one of the most striking features of the fauna of the tropical shores. Very few of them can be called beautiful, however, although their colours are so rich and brilliant. They are more quaint than pretty, more grotesque than beautiful.

Some of those curious flattened fish with rather pointed projecting jaws, the Chaetodons, may frequently be seen, swimming about on the edges of the reef, apparently feeding upon the younger branches of the corals. Most of them are of a bright yellow or orange colour, marked with blotches of black and blue or stripes of red and purple, or covered with small spots of the same colours.

I have often watched the Chaetodons for hours from the pier. One species in particular (*C. ephippium*?) was very commonly to be seen feeding on the zoophytes which grow upon the wooden piles on which the pier is built. Like many other fishes, the greater part of their lives seems to be passed in hovering or resting in the water, just slightly moving their tails to keep themselves in the same position, with their heads towards the quarter from which the tide is flowing. They will rest for hours without feeding, or even noticing the actions of the swarms of little fishes which are swimming round them. When doing this they invariably swim in an upright position, that is to say, dorso-ventrally upright like an ordinary fish; but when feeding or frightened by an enemy they often turn upon their sides, and have then an appearance not unlike that of an ordinary flat fish.

Some of the Serranidæ and Mesoprions fairly common in some places on the reefs are also very brilliantly and beautifully marked. A red mesoprion is said to be one of the finest fish brought to the Manado market-place. I have often tasted it, but cannot say that it is anything to boast about. Fishes caught in tropical waters are never very tasty.

Nor must I omit to mention the trigger-fishes, easily recognised by the curious trigger-like arrangement of the dorsal spines and their sharp-pointed incisor-like teeth. A small specimen of *Balistes aculeatus* was one of the first

coloured reef fishes that I caught, and I am never likely to forget the excitement and pleasure I experienced noting its brilliant colours. Its body was of a dark green colour verging into pink below from the middle to the tail, and bore in this region four pale blue stripes running nearly parallel with one another across the back. Its head and shoulders were of a brighter colour, and bore three stripes of bluish-green, the middle one of which spectacled across the bright orange-pink eyes. On each side of the tail there were three rows of bright transparent spines, each of them standing on a pit of dark brown pigment, so that they had the appearance when casually examined of small eye-spots. In the tail region the nerve of the lateral line on either side divides into three branches, one of which lies immediately beneath each of these rows of spines: and I have traced a small nerve from these branches running to each of the pits or rings of pigment on which the spiny scales stand. Whether in the youngest stages, when the spines are quite transparent, these organs can be affected by the rays of light, and thus function as rudimentary optic organs, cannot at present be determined, but I am inclined to believe that they do. Whatever their exact function may be, however, there can be no doubt from their nerve-supply that they are very highly sensitive organs.

In the older and larger trigger-fishes the spines become long, hard, pointed, and bent over towards the head. They are then undoubtedly used as organs of defence. It is a curious thing that, besides the *Balistidæ*, nearly all the fishes of the genera *Naseus* and *Acanthurus*, also reef-feeding fishes, are similarly provided with defensive spines upon their tails. There is some mystery about them, though, which requires to be cleared up. If, as may be supposed, their enemies catch them by the tail when they are browsing among the

coral branches, why are the spines directed forwards? The spines would act, surely, like ordinary fish-hooks, and not only prevent the enemy from disgorging his prey, but actually help it in its passage down his gullet. If, on the other hand, their enemies catch them by the head, why are the hooks not situated there instead of on the tail?

At the best of times the old trigger-fishes cannot be a satisfactory or savoury meal; for the scales form a very complete tuberculated armour which covers the whole body, and the file-like trigger spine must be an awkward morsel to swallow and digest. The jaws are armed with eight strong, chisel-shaped teeth, by means of which they are able to browse upon the hard coral branches or break through the shells of mollusks to feed upon the soft parts within. It is said that the trigger-fishes cause an immense amount of damage to the pearl-fisheries.

Another *Balistes* (*B. lineatus*) I often saw, but never succeeded in capturing. It is marked with a number of thin transverse lines of a bright red colour, giving the fish a most curious bizarre appearance.

Those curious fishes the sea-horses (*Hippocampi*) are sometimes found upon the reefs or in the vicinity. I never caught any of them myself, but have seen them in the collection of the resident of Manado.

Another very interesting fish, which I have often seen upon the reefs, and succeeded in capturing on one or two occasions, is the 'ikan sapi,' or cow-fish, of the natives (*Ostracion Arcus*, Bl.). It possesses two long, sharp spines above its head not unlike the horns of a cow, and its projecting mouth and thick lips resemble in a way the mouth and lips of a ruminant. The body is protected with a firm and unresisting box-like armour of thick scales. In colour this fish is, when quite fresh, uniformly greenish-brown on the dorsal surface, gradually changing to a pale

blue shot with pink on the ventral surface and the fins. When removed from the water it seemed to me that the colours faded almost more rapidly than those of other reef fishes; whether this is a sign that the ostracions are able to change their colours during life with greater rapidity than other coloured fishes, I am unable to say.

A very instructive series of investigations might be made by some naturalist in the tropics upon the powers that the reef fishes possess of changing their colours. It is well known that trout, minnows, and many other English fish do considerably alter in appearance when placed amid different surroundings. It would be very interesting, then, to see how far or how rapidly the bright red, blue, and yellow spots and stripes of these tropical fishes are capable of altering when kept alive under more sombre circumstances than the life amid the gay colours of the coral reefs. Such experiments, I am afraid, can only be made on some well-fitted vessel where a constant supply of fresh sea-water can be kept running through the aquaria.

A large blue sting-ray (*Aetobatis*?) was given to me by a sailor soon after I arrived in Talisse. He had caught it while fishing off the pier. It came as a timely warning never to attempt to wade upon the reef with naked feet, for the large, serrated, stinging spine on its tail looked capable of inflicting a very dangerous wound. Its back was covered with large round patches of a dull prussian-blue colour. This was the only elasmobranch fish I obtained during my stay in the tropics.

I must now leave these brightly-coloured fishes of the reefs. It would serve no useful purpose for me to attempt to give in this volume a complete list or description of the varieties of the fish of Celebean waters. Those of my readers who are particularly interested in the subject will find a very complete account of the ichthyology of these

islands in the writings of the distinguished naturalist Bleeker (8).

There were a considerable number of cuttle-fishes swimming about in the regions of the reef, and they possessed, perhaps to even a still greater degree than European cephalopods, the same remarkable power of adapting the colour of their skin to the colour of the surrounding objects. When I was waiting for the tide to leave the reef, so that I could start upon my expeditions, I would often amuse myself by sitting on the lowest of the pier steps watching the movements and habits of the various animals that were swimming about amongst the brilliant-coloured corals and sponges. On such occasions I often saw advancing slowly over the sea-gardens, in parties of from four to six, a group of cuttle-fish, swimming with an even backward movement, the fringes of their mantles and their arms trembling, and their colour gradually changing to what seemed to me to be an almost infinite variety of hues as they passed over the various beds of the sea-bottom. Then suddenly there would be a commotion in what was previously a calm and placid scene, the striped and speckled reef fishes would be seen darting away in all directions, and of the cuttle-fishes all that remained were four or five clouds of ink in the clear water. The appearance in the neighbourhood of a small shark or other kind of voracious fish was the cause of this sudden agitation, and the cuttle-fishes, after squirting out a cloud of ink to 'throw dust in the eyes' of their enemy, had, by violent contractions of their mantle, made off. I tried to find out what kinds of fish they were that caused such dismay among the inhabitants of the coral reefs, but the rapidity with which they dart into the shallow water and out again renders it impossible to make even a general determination of their zoological position,

and the various attempts I made to catch them with a hook and line were unsuccessful, so that I procured no specimens to bring home for identification. Several species of dog-fishes (*Scyllium*, *Chiloscyllium*) and sharks (*Carcharias*) have been described by Bleeker (9) that occur in the seas around Celebes, and it is quite probable that they are the chief disturbers of the peace on the coral reefs of Talisse.

People have often asked me if there are sharks in Celebes, meaning thereby sharks that are large and hungry enough to attack human beings who by accident or design find themselves in the water. There can be no doubt that there are, and it would be an extremely imprudent thing for anyone to attempt to swim from one island to another if he could possibly avoid it. Really large dangerous sharks are, however, but rarely seen, and the natives will bathe freely and fearlessly even in tolerably deep water. I have never seen large sharks swimming round a vessel in N. Celebes as I have at Banda and Timor and within the breakwater at Colombo, nor have I seen them in the hands of fishermen nor in the market-place.

Of the corals themselves which flourish on and form the reef I must now speak, and I am aware that the task before me is one of no ordinary difficulty.

Many of the genera and even orders of the corals are so unfamiliar to English readers that we have no English words for them in common use. My description must consequently be hampered with many long and cumbrous Greek and Latin words, which, even when translated into English, convey a very slight and imperfect description of the objects they stand for.

First, let me explain for the benefit of those of my readers who have not dipped into this branch of natural science some of the essential features of the coral structure, that they may be able to follow me more clearly when I

describe the varieties that are found. The hard and complicated calcareous structures we see in our museums under the heading Zoantharia are the shells, or skeletons as they are more generally called, secreted by and supporting a number of small anemone-like animals called the polypes. The polypes are not 'insects' nor anything like insects; they are simply sea-anemones, provided with an elongated slit-like mouth surrounded by a crown of simple tentacles.

The reason that one hears so many people talk about coral *insects* is that until quite modern times a perfectly erroneous doctrine had been current about the relation of the coral polypes to their shells. Many people supposed that the relation between them was the same as that between the bees and the honeycomb, that the coral was of the nature of a hive or nest in which the coral 'insects' could take refuge. If we must make any comparison at all with other orders of the animal kingdom, we might say that the coral skeleton is like the shell of a whelk, with this difference, that whereas every whelk has its own separate and independent shell, the coral shell is very often a colonial one, being formed by and giving shelter to a multitude of polypes, each of which, though housed in its own compartment, is to a degree connected with its neighbours. The hard parts of the coral, it must be understood, are formed outside the body of the polypes like a mollusc shell, not inside like a vertebrate skeleton, and this is why it might perhaps be more consistent to call them coral 'shells' instead of coral 'skeletons,' as is more generally done.

Here, again, it is possible a misunderstanding may arise. Although the calcareous shell is truly formed outside the coral polypes, it very frequently has the appearance of being inside and enclosed by them. This is entirely due to the overlapping of the soft parts over the complex ridges of the

skeleton. When a glass vase is filled with a profusion of drooping flowers it may be partially or completely hidden by them, and yet we are accustomed to say that the flowers are inside the vase. So it is with a coral; the fleshy parts may overlap and hide the hard parts, yet, as a fact, the hard parts are anatomically outside the soft.

As the colony of polypes grows and increases by budding, more and more of the calcareous skeleton is formed, new cups, septa and other structures are laid down layer upon layer over the old, and new branches grow out from the old ones. Endless are the varieties of form the coral skeleton may take. Every specimen the naturalist handles differs from every other in the mode of branching, in the number of its branches, in the arrangement of the spines, warts, blotches, septa and canals with which it is covered, just as every oak is different from every other oak, and every beech-tree from every other beech. This immense variety in the form of coral skeletons has led some authorities to make of them an immense number of different species. Now, as the species are usually named and separated from one another by specialists at home who have at their command only the dried hard parts to examine, we have very meagre accounts of the varieties of the colour, structure, and reproduction of the polypes. If these details were better recorded by those who collect corals for museums, I am sure we should be able to reduce immensely the number of species which have been made by an examination of the hard parts only.

Imagine a party of botanists starting off to name the species of British oaks and beeches in the depth of winter. With only the form of the bark and stem and the mode of branching to guide them, without flowers, fruit or leaves, they would probably make a great many more species than the botanists who undertook the work in summer. So it is with corals; the naturalists who have named the species

have had altogether insufficient information to work upon, and have in consequence raised to the dignity of separate species many forms which it is only necessary to consider as local varieties of the same.

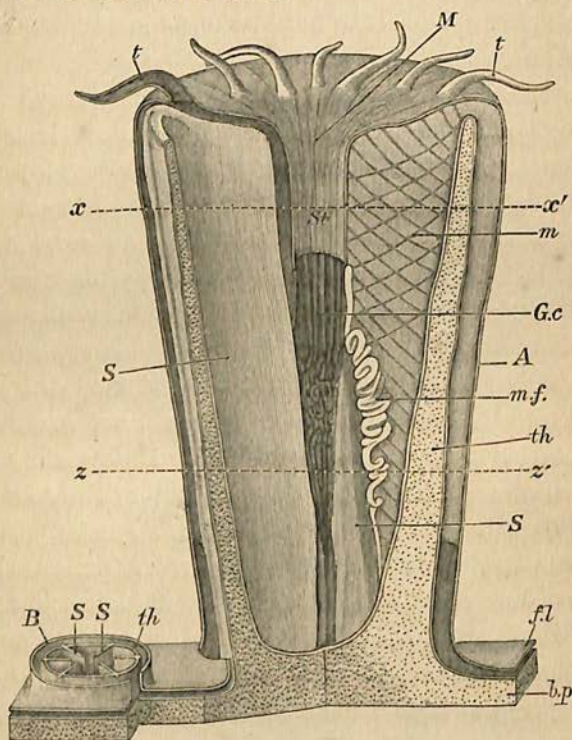


FIG. 13.—Diagram to illustrate anatomy of *Galacea Esperii*.

A, a full-grown polype divided longitudinally to exhibit the internal anatomy and the relation of the hard parts to the soft.

B, a young bud divided transversely and the upper portion removed.

b.p., basal plate of lime; th, theca, and SS, septa of lime; tt, tentacles; M, mouth; St, stomodæum or throat; G.c, general cavity of the polype; m, mesentery; m.f., mesenterial filament; fl, fleshy lamina covering the upper surface of the basal plate.

A description of the accompanying diagrammatic figures will perhaps make the complicated organisation of these polypes a little clearer. The skeleton or hard parts of an imperforate coral *Galacea* consists of a basal or encrusting plate (b.p.) upon which stands a number of cylindrical cups

or thecæ (*th*) which give support to the coral polypes. Each theca is supported by a number of vertical plates projecting centripetally from the inner side of the cup. These are called the septa (*S*). They serve as buttresses to give strength to the theca. All this skeleton is composed of nearly pure carbonate of lime (a salt present in solution in all sea-water), which is absorbed from the water by the coral polypes and secreted again by them as the solid skeleton.

The soft or fleshy parts of the coral completely cover the skeleton, following all the ridges, septa and other irregularities, so that if we could imagine the soft parts drawn or pulled off from the hard, they would bear an exact impression on their under side of the surface of the skeleton. On the outside of the cups and on the connecting basal plate the soft parts are composed of a simple flat plate of fleshy substance (*f.l.*). Within the cups are situated the polypes, which are directly continuous with the fleshy lamina covering the rest of the coral. The main points in the anatomy of a coral polype are soon described. On the upper disc there is a crown of tentacles (*tt*) surrounding a slit-shaped mouth (*M*), as in a sea-anemone. The mouth leads into a short flattened throat (*St*) technically known as the stomodæum, and this opens below into the general cavity (*Gc*) of the polype. The general cavity of the polype is divided into a number of chambers or compartments by the septa and mesenteries, the arrangement of which may best be studied in the diagrammatic transverse section, fig. 14. The upper half of the diagram represents a section of the theca in the region of the dotted line *xx'*. The mesenteries (*mm*) are here seen to be thin vertical plates of flesh connecting the walls of the theca with the throat; the septa (*SS*), composed of vertical plates of lime covered with a thin layer of

flesh, do not project so far towards the centre. The lower half of the diagram represents a transverse section of the theca in the region of the dotted line zz' , fig. 13. In this region it may be noticed that the edges of the mesenteries are free, so that there may be complete communication between the intermesenterial chambers of the central portion of the general cavity of the polype. At the edge of each

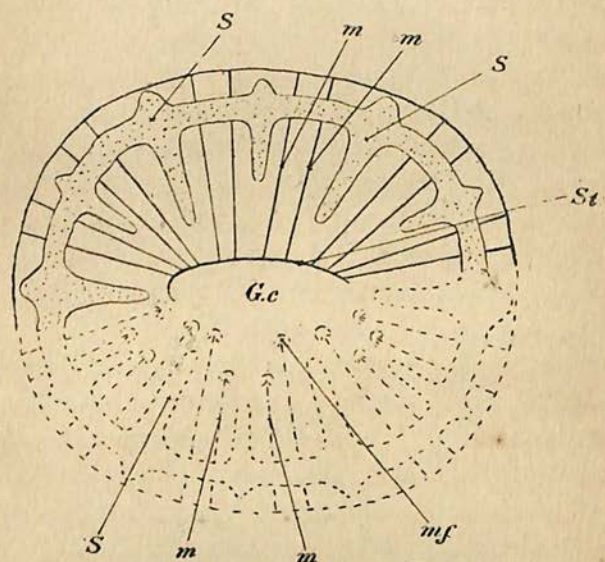


FIG. 14.—Diagram of transverse sections through a polype of *Galacea Esperi*.

The upper portion of the diagram represents a transverse section in the region indicated by the dotted line xx' in fig. 13. The lower portion printed in dotted lines indicates a transverse section in the region zz' in fig. 13. The reference letters are the same as they are in fig. 13.

mesentery there is a coiled thread, mf , the so-called mesenterial filament, which plays an active and important part in the processes of digestion.

It is not my purpose in these pages to trouble the reader with the species of corals that are found upon the reefs at Talisse; but I must refer just briefly to the most important characters which separate the larger groups, in order that

the general reader may follow me in my description of the reefs.

Of the true or Zoantharian corals, the most important and largely represented family is that of the Madreporinæ. The madrepores may be readily distinguished by the fact that they possess distinct cups for the polypes, and that these cups, together with the rest of the corallum, are thoroughly perforated in all directions by numerous pores and anastomosing canals.

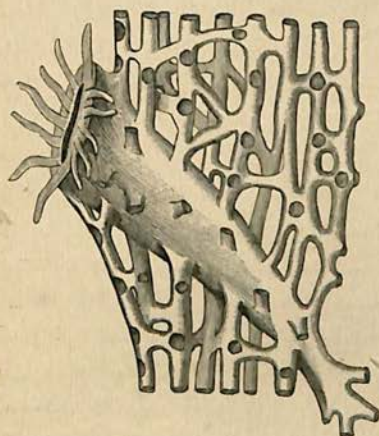


FIG. 15.—Schematic drawing of a single polype of a colonial perforate coral and of the surrounding tissues after the skeleton has been removed by acid, showing the system of tubes by means of which the digestive cavities of the polypes communicate with one another.

In fig. 15 is drawn a small portion of the soft fleshy parts of a Madrepora after the removal of the coral skeleton by acid. While the general structure is the same as that of Galaceæ, a large number of fleshy tubes lead from the body space of one polype to that of its neighbours, so that a complete circulation is maintained throughout the whole colony. These tubes ramify according to a fairly definite system, passing through a corresponding system of stony channels in the coral skeleton. Many of them have extremely grace-

ful and beautiful forms, being sometimes fan-shaped, sometimes considerably branched like a small bush or shrub, sometimes multilobate like a number of blunt fingers standing upon a swollen wrist.

The Turbinarias are like the madrepores in general structure, but they usually form thin plate-like coralla which frequently become cup or saucer or plate-shaped.

The Fungias are large solitary forms, sometimes nine to ten inches across. Each is composed of a large fleshy polype resting on an oval mushroom-shaped skeleton.

The remaining Zoantharians are distinguished from those corals just described by secreting a skeleton which is never perforated throughout by canals and pores. To this order belongs the enormous family of the star corals, *As-træidæ*, most of which form large solid stone-like masses marked by a perfect system of star-like thecæ. It also includes the well-known brain corals (*Mæandrinæ*), the mussas, galaceas, and many others.

The Pocilloporas and Seriatoporas, which must be included in the order Imperforata, although their exact zoological position has not yet been accurately determined, form branched bush or shrub-like structures not unlike some of the madrepores in form, but their surface is smoother and the thecæ not nearly so conspicuous as they are in those corals.

Besides the Zoantharia two other classes of animals form complicated and massive calcareous skeletons which help to build up the coral reefs in tropical seas. Among the so-called Alcyonaria two genera alone in tropical seas form solid calcareous skeletons. The first of these is the blue coral (*Helipora cærulea*), which forms thick folds and plates of spongy limestone of a pale blue colour, and the organ-pipe coral (*Tubipora musica*), which builds up huge red clumps of small pipes traversing layer upon layer of

transverse plates. The precious coral of commerce (*Coralium rubrum*) belongs to this order; but it is never found in warm tropical waters. The remaining Alcyonarians possess a skeletal support of loose spicules disconnected with one another, which, when the soft parts are dissolved away, fall to the ground as fine granules of lime. Many

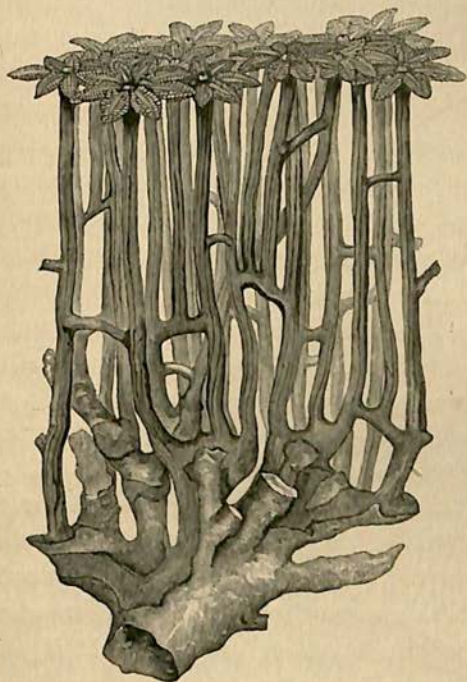


FIG. 16.—*Clavularia viridis*, an Alcyonarian coral growing upon a dead branch of a Madrepora.

of the Alcyonarians, however, are supported by other skeletal substances than lime. The flexible corals (*Gorgonidae*), for example, possess a solid core of horny substance, and several of the creeping stoloniferous Alcyonarians have their walls strengthened by a hard horny substance of uncertain chemical affinities.

The Alcyonarian polypes can be readily and easily distinguished from the Zoantharian polypes. Whilst the Zoantharian polype possesses simple finger-like tentacles, the Alcyonarian polype's tentacles are invariably provided with a number of small processes or pinnæ; they are in fact feathered or pinnate tentacles. The Alcyonarian polypes, moreover, have without exception eight tentacles, no more, no less; the Zoantharian may have very many tentacles, or in some cases only ten or twelve, but rarely eight.

Nearly all the Alcyonaria possess the calcareous spicules characteristic of the order. *Heliopora*, a few of the stolonifera, and some of the pennatulids or sea-pens, are the only exceptions. The organ-pipe coral and the precious coral are the only two in which the spicules become fused together to form a solid skeleton.

Besides the Zoantharia and the Alcyonaria, some members of the order of the Hydrocorallinæ form large masses of calcareous skeleton, viz. the Millepores, which may be ramified or plate-like in form. They may be distinguished from all others by the fact that the pores are very small and arranged in systems, seven or eight smaller pores surrounding a somewhat larger one in each system. The smaller pores (dactylopores) shelter the small tentacle-like zooids which catch the food, the larger pores (gastropores) shelter the stomach zooids which digest it. The natural history and structure of these forms have been so well described by Prof. Moseley (51), who first discovered their true affinities, that it is not necessary for me to again describe them.

To this order also belongs *Distichopora*, a beautiful purple, and in some cases red hydrocoralline, common on many reefs, but it is rarely found upon the shores of Talisse.

The Bryozoa or Polyzoa too sometimes build beautiful basket-like skeletons of lime, but as these do not form a

very conspicuous feature of the Talisse reefs, I shall not make further reference to them.

Having thus briefly explained the principal differences between the large groups of corals, I will ask the reader to accompany me in imagination upon one of my reef expeditions. Armed with a large net and stout walking-stick, clothed in a thin flannel shirt and trousers, my head covered by a large leaf hat, and my feet and legs protected by a thick pair of Magdala boots, I start off across the sandy lagoon accompanied by one or two boys carrying crowbars, buckets, bottles, and small boxes. The sun is pouring down its fiery rays upon our heads, and when the water first penetrates our boots and clothes it strikes warm, or almost hot instead of cold.

Upon the wooden piles of the pier itself may be seen a large number of interesting things. Some beautiful branches of an Alcyonarian called *Isis*, whose flesh is of a brilliant colour on account of the millions of blood-red spicules with which it is beset, a few little graceful basket-like bryozoan skeletons clinging to the wood, and here and there a large brush-like tuft of a gorgonian, like a bit of seaweed in colour and texture, hanging down into the water ; but slimy masses of sponge and a few barnacles are the principal things which cover the piles in the water that is shallow enough for me to venture into.

Leaving the pier I pick my way along the edge of the coral reef, now stumbling into a hole that douses me to the neck ; now standing firm upon a great mass of fan-shaped madreporæ. I pause a moment to make a note of this splendid specimen. It is a true madreporæ, springing from a root-stalk that is as thick as a man's arm. It is fan-shaped, the root forming the hilus or axis, the anastomosing branching substance of the fan being at right angles to the stalk, and parallel to the sea-surface. Upon its broad expanse—

it is just three feet across—stand up a number of blunt processes or tubercles an inch or two in length and half an inch in diameter, bearing the youngest polypes. The whole coral is dark, dull, orange green, but the growing points and polypes are distinguished by a brighter yellow colour.

A little further on there is a dirty white lump of *Millepora plicata* in the form of four leaves or plates with their upper edges slightly turned over towards the deeper water. I wonder if the delicate hydroid polypes are expanded there in their natural position, so planting my feet firmly on the ground and handing Manuel my hat, I take a deep breath and plunge my head and shoulders into the water to see. But they are not, and my trouble and discomfort is for nought. A few paces further on another madrepora of a different species attracts my attention. It is of a different shape to the last, and is of a deeper reddish-brown colour, the growing points being delicate violet or purple.

All this time I have been wading along the outer edge of the reef among the growing corals, but I never feel satisfied unless I examine at the same time the fauna of the inside of the reef; i.e. that part of the reef which at the lowest spring-tides is left partially or completely uncovered. This region is usually strikingly different to the outer edge, which is never uncovered, and is very generally the best locality for Tubiporas and Clavularias, that in some places literally carpet the ground. When the polypes are fully expanded it is not easy to distinguish the Tubiporas from the Clavularias. All that the naturalist sees of them is a waving mass of deep-brown polypes with pinnate tentacles so closely situated to one another that it is impossible to see anything between them. The lumps of Tubipora are sometimes a foot or more in breadth across

the surface, and several inches deep. On the outer edge of the reef, where they are always covered with water, I have frequently found them twice or three times as large as this. The colour of the polypes is usually uniformly deep brown, but many specimens may be found in which the tentacles are tipped and speckled with a delicate emerald-green. When the masses are covered with water every polype is fully expanded, and they contract only very gradually and slowly when touched or moved. Sometimes a lump of *Tubipora* is found half in the water and half out of it, and then may be seen every stage of contraction, from the polypes that are tightly contracted and completely withdrawn into the red tubes of the skeleton to those which are still only half in and half out of it. It is very probable that this power of complete retraction into solid calcareous tubes enables the organ-pipe coral to live in places which are at times left partially dry at low water. Most of the Zoantharian corals would in all probability suffer, and perhaps die immediately under similar circumstances. Before leaving the organ-pipe coral I must say a word or two about the species of this genus. By collecting a large number of specimens and making careful notes of the colours of the polypes, I hoped to be able to arrive at some trustworthy basis for the separation of species. The more specimens I collected, the more surely was I driven to the conclusion that there is only one true species to be found on the reefs of Talisse. The length and diameter of the tubes and the appearance of the horizontal platforms are the features which are usually used by naturalists for the separation of species of *Tubipora*. These, however, are not, I am persuaded, sufficiently trustworthy for the purpose. My investigations proved conclusively that the length and diameter of the tubes depend entirely upon the position of the coral on the reefs. If it is found on the

inside of the reef, where there is plenty of room for it, and, comparatively speaking, little competition for the floating food, the tubes are large and long. If, on the contrary, it is found amongst a crowd of other corals on the outer edge of the reef, the tubes are small and short. Every possible variety exists upon the shore intermediate between the extremes of largeness and smallness; and I feel perfectly certain that had I devoted myself exclusively to this one problem, I could have brought home with me from the reefs within a few miles from my hut in Talisse examples of every *species* of *Tubipora* that have yet been described. My conclusion is, then, that there is only one species of *Tubipora* at present known, and this it is best to call *T. musica*.

The varieties of *Clavularia* found, as I have said, usually on the inside of the reef, were of considerable interest to me.

Clavularia (fig. 16) differs from *Tubipora* principally in the character of its hard or skeletal parts. Instead of having a skeleton composed of fused spicules as *Tubipora* has, its walls are strengthened by a few long isolated spicules imbedded in a hard horny substance. The polypes resemble those of *Tubipora* in shape and size, but the colour rarely varies from the deep brown previously mentioned. I discovered that some varieties of *Clavularia* possess a curious mode of branching and budding resembling that of the extinct *Syringopora* (33, 34, 53). Now, this genus of fossil corals has been tossed about from the group *Zoantharia* to the *Alcyonaria* by different authorities, but this last observation of mine supports the view Professor Moseley has maintained, that *Syringopora* was undoubtedly an *Alcyonarian*.

Besides the *Alcyonarians*, however, a few living *Zoantharian* corals may be found upon the inside of the reef. These are chiefly the brain corals, fungias, and perhaps ¹⁰

few small seriatoporas. They are found almost exclusively in the pools. When I found them uncovered and exposed to the sun, they were almost invariably dead and putrefying. Nearly everyone who visits a coral reef for the first time at low water notices an unpleasant stench everywhere in the immediate vicinity. After a time I got quite accustomed to it and did not notice it; my recollection of it is, that it resembles the stench of decaying sea-weed, but is rather more offensive. It is due, I believe, to the fact that whenever the water leaves the inner side of the reef exposed, a considerable number of corals, star-fishes, worms, and other things are killed by the fierce heat of the midday sun, and in the warm damp atmosphere begin to putrefy almost immediately. The coral reef is not alone to blame for the malarias of the tropical coasts; the mangrove swamp, which I shall presently describe, is the principal offender in this respect, the parent and nurse of all manner of noxious vapours and fell diseases.

But to return from this digression to my expedition on the Talisse reefs. I have now, let us suppose, wandered half a mile in a northerly direction towards Kinabohutan straits. The reef is here quite different in appearance to what it is near the pier. Not only is it nearly twice as far from the shore, but it is also much more densely crowded with coral growth of every sort and description. Here on the outer edge are huge specimens of the common fan-shaped madrepore, great bushes of seriatoporas and milleporas (*M. alcornis*), and hundreds of different kinds of corals too numerous to mention. No specimen is here that is not fine and well-grown, and not a square inch of ground can be seen that is not covered with some vigorous and flourishing coral growth. The inside of the reef is very much the same as it is nearer home, but I find here a large armless star-fish (*Culcita*) like a great pentagonal leather

bun, which I have not seen elsewhere on the Talisse reefs. There are also plenty of large Holothurians, the black trepang of commerce for which these islands were at one time famous, and the long snake-like Synapta, of a grey mottled appearance.

These and every other sign indicate that this part is what I have previously called a 'vigorous' reef, the conditions of the water; the rapidity of the tides, the food supply, or whatsoever it may be, are most favourable for coral growth, and the reef is probably growing slowly but surely seawards.

Passing still further northwards, I find the reef gradually diminishing in size and vigour, and before I have traversed another quarter of a mile it has disappeared, the deep water of the strait being close alongside of the sandy beach of the shore. Curiously enough, this was the only part of the reefs where I could find the bright green feather-stars.

Returning now to the pier from which I started, and wading in the opposite direction, I notice that the character of the reef is rather different to that of the other side. It is true there are to be found many of the same familiar corals as before, but the specimens are, if anything, smaller in size and more weakly in growth, and at the same time there is a preponderance of soft fleshy creatures such as Sponges, Alcyoniums, and Sarcophytums. None of the sponges here grow to the enormous size they do in some places, but some of them present the brightest colours that are to be seen upon the reefs. One of them, I can remember, was of a very brilliant orange colour, and others were bright red and green. These colours are all soluble in strong spirit. The shapes of the sponges are very varied; some form branching or multilobate masses not unlike the Madrepores, others form solid clumps like puff-balls, while others are but thin crusting lamellæ on the surface of

dead coral stones. The Sarcophytums are extremely interesting things as far as their anatomy and zoological relationships are concerned, but I must confess rather unpleasant things to look at and to handle. They are Alcyonarians allied to the alcyoniums, common enough on English coasts under the name of 'dead men's fingers,' but instead of the polypes being all alike as they are in Alcyonium, there is an interesting dimorphism to be observed amongst them. Some of the polypes attain their full development and act as the food-catchers and food-digesters for the colony. These are called the autozooids. The majority of the polypes, however, are arrested in their development, and never possess tentacles. These are called the siphonozoids, and by means of a groove on one side of their stomachs (siphonoglyphe) armed with long powerful cilia they act as pumps to produce currents of water, which circulate through the complicated system of canals, by which the mass is perforated (32). The Sarcophytums are like huge toadstools in shape, in many cases as much as two or three feet across the disc. They are of a sickly yellow or yellowish-green colour, and very slimy to the touch. In the course of my wanderings I must have slipped down into the water several dozens of times, scratching myself, tearing my clothes, and frequently stinging my hands severely at each disaster. Clavularia was very often the cause of my loss of equilibrium, but the chief culprit was undoubtedly Sarcophytum, whose broad, smooth, and slippery surface never offered a sure foothold for one moment. Before leaving Sarcophytum, I must note my disappointment at never finding any of the autozooids properly expanded. The polypes were frequently to be seen only partially retracted, but I never saw them with their tentacles all spread out, as they are so frequently seen in Tubipora and Clavularia. I could frame no theory that would account for the fact that

on the coral reef some polypes seem to be always expanded, at low water, and others are always retracted.

Passing on then from the pier towards the southern cape of Talisse, noticing how wonderfully the reef changes in appearance and in vigour in different localities, I come at last to a great prize in the rare and beautiful *Heliopora cœrulea*. Coral reef work has many personal discomforts and intellectual disappointments, but this can be said in its favour, that when a prize is found it is usually found in great abundance. Nature does not reward the naturalist with a little tiny specimen that must be labelled carefully and put away in a pill-box in a cabinet, but provides him with a sufficient quantity to make a cartload if he wishes it. I had been hunting everywhere for *Heliopora*, and should have been thankful for a smaller piece, but here at last I come across a mass that it would take twenty strong men to lift and carry away. Fortunately, there are several smaller masses in the immediate vicinity, and I am consequently able to take away with me sufficient for my purpose without calling in the aid of the coolies from the plantation.

Heliopora is in many respects one of the most interesting corals of the reefs, for it is as it were a representative of prehistoric times, a survival of a generation that has long since passed away. *Heliopora* itself did not appear until Eocene times, but its allies, *Heliolites*, *Plasmopora*, *Propora*, *Thecia* and others, together with *Syringopora*, *Halysites* and others that were probably allied to *Tubipora*, were the main factors of the coral reefs of Silurian and Devonian times. If a naturalist could have walked along those prehistoric shores he would have found scarcely a single Zoantharian coral, the majority of forms being Alcyonarian in structure allied to the modern *Tubipora* and *Heliopora*. The introduction of the Zoantharia at the close of the Devonian period caused a rapid decrease in the stony Alcyonaria, until at

the present day there are only two of them left, viz. Tubipora and Heliopora, that can fairly be called reef-building corals. The reef-building Aleyonarians have, in other words, yielded their places in the struggle for existence to the victorious Madrepores and Astræids. Now, in connection with this history, it is an interesting fact that the only part of the reef where I ever found a Heliopora was a remarkably poor one. Large patches of sand separated the different lumps of feeble Madrepores and other corals, and every sign was present that there the reef was in anything but a flourishing and vigorous condition. Whatever may have been the struggle for existence here, the competition with Zoantharians was reduced to a minimum and Heliopora flourished.

Not far from the spot where Heliopora is living I come across one of the most beautiful corals I have ever seen. It is called Galacea and belongs to the group of the Imperforata (fig. 8, p. 53). The polype cups, or thecæ as they are called, are raised $\frac{1}{2}$ – $\frac{1}{4}$ inch above the general surface of the corallum, and contain most beautiful emerald-green polypes united with one another by delicate fleshy strands of the same colour. When I first saw it the polypes were as fully expanded as, I believe, they are capable of being, and the mass looked like some handsome ornament studded with emeralds of the finest quality.

This general account of a ramble on the reefs of Talisse is perhaps sufficient to indicate the immense variety of form and colour of living corals that may be observed in different places, but it would take a separate volume to describe in detail all the different creatures, their marks and colours, their movements and their habits, which are to be found upon a hundred yards of such a coast. I have said nothing about the mollusks of the reef, the handsome white Cyprio, covered by its coal-black mantle, the polished tiger cowry (*Cypræa tigrina*), bivalves with their beautifully marked

fringed mantles and tentacles, the long-spined purple sea-urchins, the brittle stars, the green and purple squillas, darting in and out among the coral branches, the octopuses marked with large blue blotches, the prawns and shrimps of every kind of colour and variety of spots and stripes. Any attempt I might make to describe all these things would lead me far beyond the purpose I have now in view, and I know that my notes are quite insufficient to enable me to do ample justice to the subject.

The third section of this chapter must be devoted to a brief description of the fauna of the lagoons. In places where there are barrier reefs a distance of a mile or more from the shore, the area that lies between the reef and the shore is in the strictest sense of the word a lagoon. It is covered with a few fathoms of water at all states of the tide. In places where there are fringing reefs, however, the lagoon is at low spring-tides almost dry, and then perhaps the word is not strictly applicable.

I prefer, however, to use the word lagoon in all cases for this region, rather than invent a new one, for this might lead to the erroneous notion that there is an essential geological difference between the lagoon of a barrier and a fringing reef. Darwin long ago pointed out that every intermediate form between the two extremes can be found in different parts of the world; and whatever view they may take of the mode of origin of coral reefs in general, all naturalists and geologists are agreed that the latter is rightly considered to be a younger or less developed condition of the former.

When the tide ebbed at Talisse the first thing that appeared was a streak of hard dry sand, lying alongside of the steep sandy beach of the shore. Then in the distance there appeared a few lumps of coral indicating the position of the inner edge of the reef, and afterwards a broad streak

of sand appeared upon the shoreward side of this which gradually increased in breadth until it joined or nearly joined the sands of the coast itself. At the lowest tides there was thus formed in many places a continuous stretch of dry sand leading from the shore to the edge of the reef, but in others this was broken by large pools of water an inch or two in depth. At high tide the water of the lagoon was six or seven feet deep, and then it was the resort of swarms of fishes of various kinds and descriptions. The herrings (*Clupea atricauda*), whose peregrinations I have previously referred to, were there sometimes in countless thousands, and they could easily be caught from the pier by the ordinary circular throw-nets. Pipe-fishes too, easily recognised by their long pike-like snouts and small terminal mouths, were not unfrequently to be seen in small shoals containing a dozen or more, and many other fishes whose names or relations I was unable to determine. The interesting point about the fishes of the lagoon, however, is that, in striking contrast to those who feed upon the reef, they were all, when looked at from above, of a uniform dull colour. None of them possessed brilliant spots, stripes and curves, but they were, as far as I could see, without exception soberly dressed. When the tide went down most of these fishes crossed the reef in time and disappeared in the deeper waters beyond it, but swarms of tiny fry were always left in the pools to fall an easy prey to the whimbrels and egrets. I have sometimes seen these pools crowded with little fishes, and in a little hand-net that Manuel made for me I have been able to catch in a few minutes enough of them to make a handsome dish of whitebait for my dinner. Now the reason that the lagoon fishes are of this uniform colour is of course its resemblance to the lagoon bottom when that is seen through five or six feet of water. The bottom is a vast expanse of

white coral sand covered with a sparse vegetation of green weeds. When covered with water this has a uniformly, greenish-grey colour. If it were asked why it is that these fishes unconsciously imitate the colour of the sea-bottom, the answer would be that the lagoon is the favourite fishing ground of the fish eagles and hawks, and any fish that were not so coloured would be most obvious to these enemies and be the first to be devoured. The lagoon fishes have, however, many other enemies: large sharks and other voracious fishes often dart across the reef to snatch a hasty meal and retreat again, but it is rather difficult to imagine the colour that would be protective against such enemies as these. Man can probably form a tolerably accurate idea of what colours look like to any other air-breathing animals such as birds, but I doubt whether he can form any idea of the powers of vision of aquatic animals. If a man opens his eyes under water he can see scarcely any distance in front of him. His vision must be vastly inferior in that element to that of fishes, and consequently, I think, we are justified in saying that we can know nothing accurately of the way in which fish are protected from fish enemies by their colour.

We know that many of our shore and river fishes in England are very differently coloured on their dorsal side and on their ventral side. They present, in fact, one colour to the enemy who approaches them from above, and another to the enemy who approaches them from below. How far this latter colour is one of protective imitation we have no means of knowing until we are better acquainted with the powers of vision of fishes.

Besides fishes there are but few objects of interest for the naturalist in the lagoon. A small variety of the bright-green *zostera* and a few corallines are usually the only seaweeds that grow there, and animals are few and far

between. In some places where the green weeds are pretty thick, the ancient brachiopod *Lingula* may be found. The natives being fond of it as an article of food are very chary of showing anyone the places where it lives.

There are considerable numbers of orbitolites, calcarinas, and other foraminifera, and very frequently the large and beautiful star-fishes *Pentaceros* and *Ophidiaster* may be found drying on the sand or slowly moving in the shallow pools.

The sands are perforated by holes which I believe are the retreats of crabs, but I really did not give them the attention they perhaps deserved. I had inadvertently forgotten to bring with me from England a good iron spade, and consequently I postponed from time to time the investigation of these holes until it was too late. The only time I did any spade-digging on lagoon sands was when I was in search of the owner of some long thin tentacular filaments which may be seen in some places stretching for long distances across the sands. I found several of these upon some damp loose sand north of the spot marked *Parigi* in the map, but I cannot say that I have satisfactorily made out their meaning. As soon as I began to dig, these filaments contracted, and the shorter and thicker they became, the more they resembled anemone tentacles, but I did not succeed in digging up the animal to which they belonged. I may be excused for mentioning this zoological failure of mine here, because it may attract the attention of other naturalists travelling in these countries, and induce them to make another attempt to solve the difficulty. Since my return I have been informed that these filamentous bodies are frequently to be seen on tropical sands, and I know of no investigations that have at present been made which will explain them. There is one little crab very commonly found upon the sands of the lagoon, belonging to

the genus *Calappa*, and when at rest it has a remarkable resemblance to a lump of old water-worn coral stone. This, protective resemblance is brought about by the chelæ being large and rugged, and fitting tightly to the carapace, which is also very uneven in appearance. On many occasions, when I saw these little fellows lying half-buried in the sand I was at a loss to know whether they were really crabs or only stones, until I turned them over with a stick.

I must now pass on to the fourth section of this chapter—the Mangrove Swamps. When the naturalist first enters the mangrove swamp he cannot fail to be impressed with two things: the enormous field for investigation in animal and vegetable life that it affords, and the extreme difficulty and discomfort of doing any work there. The various kinds of mangrove trees bearing creepers, orchids, and parasitic ferns, the swarms of ants, termites, flies, mosquitoes, and other creatures of the air; the snakes, birds, fishes, crabs, anemones, and worms afford endless themes for investigation and research. On the other hand, the damp, stifling, malarious atmosphere and the insect pests are quite sufficient to drive away even the enthusiastic naturalist to purer air and more wholesome places.

In localities where the swamp is tolerably broad, the trees on the shoreward side are very lofty, but they gradually become shorter as they approach the seaward limit, where they are in many cases not more than ten or fifteen feet in height. The swampy ground is covered with a network of root-branches averaging about a couple of inches in diameter, and in the intervals between them there is a black slimy mud, with patches here and there of hard dry sand, and several shallow pools and puddles. It is not an easy place to walk about in, for one has to be extremely careful when treading on the slimy roots not to slip over, and not to leave a boot behind in the soft sticky mud

between them. I often had the unpleasant reflection before me that such a ground is not an unlikely place to break a leg, and a dread thought of the savage surgery which might one day be in store for me.

The ground is perforated in all directions by the holes of the *Gelasimus* crabs. These have been well described by Adams in his account of the zoology of the Samarang, and as I can confirm in every respect his description, I cannot do better than quote it here (1).

‘Near Manado there is a woody tract not far from the town which abounds in *Gelasimi* of the most beautiful colours. I have described and figured one species allied to *G. bellator* of a green colour with black markings; another black with two bright ultramarine spots in the centre of the carapace; and another grey, marbled with white, with an enormous yellow chela. These cover the ground by thousands, stalking about and holding up their claws in a most ridiculous manner. Notwithstanding they appear to be overburdened with this unwieldy member, they are by no means easy to capture, but on the slightest attempt on their liberty they run quickly to the mouths of their burrows for protection, where they will boldly wait and see if their enemy makes any further advances; and, if he does, they retreat quickly backwards, holding out their pincer as a weapon of defence.’

In Talisse many of the grey varieties had the large chela of a very bright purple colour, and when a number of these were together on a stretch of sand or mud, it was a curious sight to see them dart into their burrows one by one, holding up their chela in much the same way as a prize-fighter holds his right arm when he begins a maul.

The only mollusk that was at all common on the ground was the common *Pyrasmus palustris*, distinguished by its straight tubular canal.

Over the roots and across the dry mud in some places are to be seen long marches of the large red ants, whose vicious bites caused me perhaps more pain and annoyance than the swarms of flies and mosquitoes with which the air is filled. As soon as the tide is out these ants come down from their nests in the trees in thousands, and rapidly scavenger about in all directions for any little fishes and other marine animals that are left helpless, stranded on the mud.

The mosquitoes are born and bred in the waters of the swamp, but what they actually feed upon in the imago or flying stage, when there are no human beings about, is a mystery to me. It is possible they may obtain a scanty nourishment from the slimy ooze upon the surface of the mud and mangrove roots, but then it is difficult to understand the advantage of their piercing mouth parts. It may be that of the millions hatched only a few actually deposit fertile eggs, and those may be the lucky ones who have had a draught of blood of the mammals and birds in the swamps. All that I can say about their feeding is that when we met they seemed to be invariably hungry, and when they fed were never satisfied.

In many of the pools in the swamps thousands of the swimming, or rather jumping, larvæ of the mosquitoes may be seen. I was rather surprised at this, because in my ignorance I thought that none of the gnats and flies could stand sea-water. I was inclined to doubt it at first, and fancied that they must be the larvæ of some other creatures; but there could be no doubt of their nature when I came to examine them more carefully, and I had an opportunity of definitely settling the matter before I left. I had two large tubs near my house, which I filled with sea-water in the hope of keeping in them some animals alive for a while, to study, if possible, their development.

In a few days, however, notwithstanding every care and precaution, the tubs were slightly putrid, and then they swarmed with these jumping larvæ. I watched the larger ones carefully for some hours, and actually saw the mosquitoes emerge from them. In some of the low small islands near Manado the air is black with mosquitoes, and yet there is not a drop of fresh or even brackish water. The mosquitoes must, then, in such places pass their larval stages of existence in salt water.

Upon the outskirts of the swamp the jumping fish, *Periophthalmus*, is very common. It rarely penetrates very far into the swamp, and is never seen in such numbers as it is upon the more rocky coasts, such as we find at Bohoi and the north end of Limbé. Where I found *Periophthalmus* in the swamp, I also observed a curious and interesting form of sea-anemone, with bright green tuberculated tentacles, apparently allied to the *Côrallimorphidæ*, *Thelacceros rhizophoræ* (47 A). It might be thought that it is the simplest thing in the world to 'collect' a sea-anemone, but I had a fine struggle before I succeeded in obtaining a perfect specimen of this one. It is usually found in shallow pools near the roots of the mangrove trees, and when frightened, rapidly retreats below the roots. It is necessary to use both spade and hatchet to effect a capture, and even then one has to be pretty sharp to prevent it sinking altogether out of reach. It might seem rather ludicrous to see two men starting off with axe and spade to catch a 'sea-anemone,' but I would defy anyone who was not so armed to catch this beautiful actinian.

Of the birds that may be shot in the swamps those most commonly seen are the swifts (*Macropteryx* and *Collocalia*) feeding in their rapid flight upon the thousands of winged insects that abound, kingfishers perching on the roots or lower branches of the trees, cuckoos, and occasionally, but

rarely, a *Eurystomus*. Pigeons and doves are often seen in the higher branches, and the larger birds of prey waiting for the tide to leave the shore or resting after their labours of the day. Of the mammals, the baboons occasionally come down from the hills to feed upon the mollusks and small crabs, and numerous small bats may be seen, as the sun begins to sink, flitting about among the trees.

The conditions of life in the mangrove swamp are so extraordinary that if examples of all the animals found within a given area of it were collected, it would be discovered not only that a very large number of the genera, but nearly every one of the classes of the animal kingdom were represented.

Mammals, birds, reptiles, fishes, mollusks, insects, crustacea, worms, echinoderms, coelenterata, and protozoa live and thrive within its limits. The same cannot be said of any other region on dry land or in the waters. We find, in fact, a curious combination here of the land, the sea and fresh-water fauna brought about by the peculiar advantages the swamp affords to various animals of different habits to live and find their food.

The flow of sea-water over the ground twice in every twenty-four hours brings a fresh supply of small fishes and other marine animals to be caught in the meshes of the mangrove roots and left as food, when the tide goes down, for the terrestrial forms.

The constant rain of leaves and fruit from the great trees and their parasites, together with the numbers of little insects which tumble from them into the waters, form an animal and vegetable pabulum for aquatic creatures. Ants and crabs, the scavengers of sea and land, find an abundance to devour. The insectivorous bats and birds are well supplied in the swarms of flies and mosquitoes that abound. The larger birds of prey, the kingfishers,

snakes, and lizards have not far to seek their food. In fact, to cut a long story short, nearly all the forms of animal life, whether they crawl upon the earth, fly in the air, or swim in the waters, whether they breathe the air or water or are amphibious, whether they are animal, vegetable, or carrion feeders, can live and find their proper food within the limits of the mangrove swamp.

There are no droughts, floods, sandstorms, or other disasters to check at times the increase of their numbers, and the dense canopy of leaves which shelters them from the burning rays of the midday sun forms a mighty blanket to protect them from the cool breezes of the night. The struggles between the animals and the elements are, in fact, reduced there to a minimum; there are no great variations of temperature to be prepared for, no scarcity with change of season, no extraordinary conditions of the elements, but the animals are able to devote their vital energies entirely to their own interests and the struggles for existence with one another.

The mangrove swamp not only forms a field of striking interest to the biologist, but should enter largely into all considerations of the geology of these coasts. A very noticeable feature of the coasts of Celebes is the fact that nearly all the coral reefs are fringing reefs and not barrier reefs; or, in other words, the reefs are rarely more than a few hundred yards from the shore, and separated from it by a lagoon which is only a few inches deep at low water. This may, to a very large extent, be due to the steepness of the shores, but not entirely. It is partly due to the growth of the shore platform. Some of the reefs would, I believe, have had the characters of true barrier reefs if they had not been followed in their seaward extension by the mangrove swamp and shore platform. I have already indicated in a previous chapter (p. 23) the line of

argument I adopt. The roots of the mangrove trees form a large natural breakwater, which retains the soil brought down from the mountain-slopes and the sand washed up by the tides. In this way the floor of the mangrove swamp is gradually being raised to form the shore platform where ordinary forest trees supplant the mangroves. If there had been no mangrove swamps in these regions I believe there would be no shore platforms, and the coral reef, instead of being only a hundred or two hundred yards from the shore, would be a mile or two in many places, and could then be called a barrier reef. On the island of Talisse itself we have not many good examples of this, but at the southern cape opposite Tindela Straits, the reef is at least three-quarters of a mile from the nearest rising ground, and on many places on the west coast it must be over half a mile from it. On the northern coast of the peninsula there are better examples. Nearly the whole way from Cape Papal-empungen to Cape Piso there is a broad shore platform, in many places several miles across, and a similar condition may be observed along the shore from Manado to Tanawangko. Here then, I believe, if there had not been a mangrove swamp to form new land upon the shore as the coral reefs extended seawards, we should have had a barrier reef with perhaps a deep lagoon.

Before leaving the fauna of the coral reefs of Talisse, two points in connection with the vital economy of the polypes claim our attention. In the first place, is it possible to state with any degree of certainty what the corals feed upon? It has been usually assumed that their food consists almost exclusively of small free-swimming pelagic animals which they catch with their tentacles as the tides flow over them. There can be no doubt that, broadly speaking, this assumption is true. The batteries of stinging cells—nematocysts—found upon their tentacles must be for

the purpose of paralysing or killing small organisms which come in contact with them, and from the analogy of our own sea-anemones we are justified in assuming that organisms thus killed are conveyed to the mouth by the tentacles and swallowed. On the other hand, I have carefully examined sections of reef polypes of various kinds and, with the exception of *Millepora*, I have not yet been able to discover any remnants of animal food in the body, cavity, or throat of any of them, and moreover two authorities I have spoken to on this subject, both of whom have examined far greater numbers of these forms than I have, assure me that their experience in this respect coincides with mine. It seems probable therefore that their meals of animal food, of a size large enough to be distinguished with the microscope, are few and far between. I do not think we are justified in assuming that the corals are dependent entirely upon the small crustacea and the like which are brought to them by the tides. The currents of water which are constantly kept up in and around the throat by the action of thousands of minute cilia must bring with them numerous extremely minute organisms upon which the corals may feed. But food which is brought to the polypes by this means must be of a very heterogeneous description and mixed with particles of sediment floating in the water. Now, in the water which flows over the reef there is in many places in suspension the scourings of the mangrove swamps. Fruits, leaves, and wood undergoing decomposition and disintegration fill the water with shreds of vegetable matter which gradually sink to the bottom. Some of these must find their way into the throats of the thousands of little polypes on the coral reefs. Particles of vegetable fibre are frequently found on the mesenterial filaments of the *Alcyonarians* I have examined, and it may be they also occur in

the same positions in some of the Zoantharian corals, although I have no evidence to show that they do. There is then some reason for believing that many of the corals may be partially at least vegetable feeders, and herein we see the possibility of a relationship between the mangrove swamp and the coral reef which has not been previously recognised. If the food of corals is to a certain extent supplied by debris from the trees of the mangrove swamps, we can see why coral banks in the neighbourhood of extensive swamps are often so much more vigorous than those which fringe the steeper shores. The old coral reefs of the shore form, as I have previously pointed out, a substratum for the mangrove swamp, and in return the swamp supplies a certain amount of vegetable food for the living corals.

Perhaps this is not the only service it renders the living corals. Corals are dependent for their normal growth not only upon their food, but also upon the carbonate of lime in solution in the water, which supplies them with the material for building up their skeletons. But carbonate of lime is only slightly soluble in pure water, the amount which any quantity of water will hold in solution depending upon the amount of free carbonic acid it contains. Now the water which flows through the mangrove swamps must become highly impregnated with carbonic acid and thus become capable of dissolving a comparatively speaking large amount of the carbonate of lime which exists in abundance in the millions of foraminiferous shells and lumps of coral skeletons with which the coasts are littered. The sea-water then which flows through the swamps must be highly charged with carbonate of lime, and therefore particularly favourable for the increase and growth of coral.

Another problem of considerable interest and importance in connection with coral reefs is the meaning of the

brilliant colours which so many of them display. It is not sufficient, in these days, simply to state as a fact that certain animals or plants possess certain colours, but it is necessary, if possible, to discover the meaning of the colours and the part they play in the economy of the individual or in the struggle for existence of the species.

Colours and colouring substances perform various functions in the animal and vegetable kingdoms. Sometimes the colours of animals serve to attract, sometimes to repel, sometimes they are merely signs of disease or weakness. Some colouring matters, again, perform important physiological functions such as the hæmoglobin of the blood, others are signs that a chemical or physiological change in certain substances has taken place. It is not necessary for me to run through here all the various meanings of colour in the animal kingdom, suffice it to say that the colour of corals has probably a physiological meaning and is intimately connected with some chemical change constantly taking place in the coral organisms.

The only other alternative to this would be that it is useful as a protection against enemies, but it is impossible to see how the colours of any of the corals can act in this way. The enemies of the corals, such as the reef fishes which are said to browse upon them, would be attracted rather than repelled or deceived by the bright colours of the young growing points of the Zoantharia or the plumed tentacles of the Alcyonaria.

If we admit, and I think we must, that the colours have a physiological function, we have two, and as far as our knowledge goes at present only two, alternatives before us. They may either be respiratory in function or of the nature of the green colouring matter in plants assimilating carbonic acid from the water for purposes of nutrition. I do not deny that many of the colouring matters in corals may be

respiratory in function, but it is my opinion that the most widely distributed colours will eventually be proved to be allied to chlorophyl, the green colouring matter of plants, and perform a very similar if not precisely identical physiological function. It is not my purpose to enter here into all the reasons which have led me to this conclusion, although a sketch of the line of argument may be interesting to the general reader. The prevailing colour on the coral reefs is a deep greenish-brown colour, and next to that the commonest tint is a bright green. The latter occurs most frequently on young actively growing branches, the former upon the older branches and larger clumps. Some of these colours dissolved in alcohol have been submitted to spectrum analysis by competent authorities, and in many cases the report is that they cannot be distinguished from, or are very closely allied to chlorophyl. If in the future it can be proved, as I believe it will be proved, that a very large majority of the corals on the coral reefs do possess a colouring matter allied to chlorophyl, which performs a physiological function very similar to that performed by the chlorophyl of plants, we shall have an explanation of some of the anomalies of life upon the reefs.

It is a recognised axiom in biology that all living things are directly or indirectly dependent upon the physiological action of chlorophyl for many of the most important elements of their food, and in accordance with this we find in every locality which supports life, whether it be in rivers, ponds, the sea, the tropics, the deserts or the arctic regions, a fairly even proportion of animals and plants. The one striking exception to this general rule is afforded by the coral reefs where animal life is far in excess of vegetable life. Extraordinarily rich in many forms of animal life, they are exceptionally poor in varieties of seaweeds and other marine plants. If then it can be shown

that the corals themselves provide the substance which is analogous in function to the chlorophyl of plants, this anomaly receives its explanation.

A discussion of the vexed question of the origin of barrier reefs and atolls would hardly be in place in this volume, for the coasts of N. Celebes and the neighbouring islands present but few examples of those characteristic forms upon which the most important theories are based. I have already stated the views I hold upon the subject in a paper I read before the British Association in 1888, and in the opinions I have expressed in the preceding pages it is evident that I am not a believer in what is known as the 'general subsidence theory' (12). Mr. Murray's view (52) that coral reefs can, under favourable circumstances, grow out into deep sea-water upon the talus of their own débris seems to me to be supported by sufficient evidence, and is fully confirmed by the phenomena of the reefs I visited in this region.

I searched for evidences of recent elevation or subsidence of the land, but could find none anywhere, save in the Talaut and Nanusa islands, where there has been a recent slight elevation. In fact, the presence of considerable shore platforms in many regions on the coast indicates that for a considerable number of years the land has been stationary. There can be but little doubt, I think, that coral reefs are constantly altering their shape, in some places growing out seaward, in others dissolving and retreating shoreward, and that these processes may go on without any movement of the rocks on which they stand. But a discussion of this wide and far-reaching subject would take me beyond the limits of this book.

CHAPTER VII

TO SANGIR AND TALAUT

Arrival of the 'Ternate' at Talisse—Lirung—Saha islands—The rajah of Pulutan—Nanusa Archipelago—Kampong Karaton—Raised coral reefs—Legend of Mengampit—Alaoruru—Mangarang—Abundance of butterflies—Béo—Terrible sickness—Glorious sunset—Sangir—Coco-nut palms—Taruna—Manganitu—Mr. Steller's house and gardens—Koffo—Curious mode of keeping time—Visit to the coral reefs—Trip to the interior—Reception of the Resident at Manganitu—Siauw—Tagulandang again—Talisse.

On Sunday, November 8, the little post-prau from Manado brought us a letter from the agent of the Company, telling us to prepare for the reception of no less a personage than the Resident of Manado.

From time to time it is the duty of the Resident to make an official tour to the coasts and islands which are under his control in a steamer provided for him by the Government. As there had been rumours for some months of very severe sickness and distress in the Sangir and Talaut islands, the Resident had urged upon the Government the necessity of sending him a steamer as soon as possible to enable him to make the necessary inquiries and carry medicine and food to the afflicted districts. After some delay the Government had sent him the 'Gouvernement's stoomschip' 'Ternate' and the tour was to commence with a visit to Talisse for the purpose of coaling.

It is hardly necessary to say that this news caused no little excitement in our colony. The visit of H.M.S. 'Flying Fish' had been an event of the greatest importance, but that

the Resident of Manado, the representative of the great King William III., should honour the island with his presence was of sufficient importance to mark an epoch in the history of the island.

During the three days that passed between the arrival of the news and the appearance of the smoke of the 'Ternate' over the island of Ganga, the coolies were busily employed in trimming the hibiscus shrubs, in cutting away the dead leaves of the agaves which were planted along the terrace in front of Cursham's house, in raking and weeding the aforesaid path, in cleaning up and making orderly the house—in fact, in doing everything that would be likely to catch the eye and take the fancy of such a potentate.

We had routed out from among the stores two little brass cannon, and we were prepared to fire a salute of thirteen guns the moment the Resident put foot upon the island.

The 'Ternate' arrived at twelve o'clock on the following Wednesday, and as she took up her position at the end of our little pier we made the customary salute with an enormous Dutch flag we had hoisted to the top of our flagstaff.

After lunch I went on board, and was received with the greatest cordiality by my old friends the Resident, the Controleur, and the Dominie of Manado, and by the captain of the 'Ternate,' van Eyck. I was invited to accompany them to the islands on the 'Ternate,' an invitation I was only too pleased to accept.

The agent of the Company had accompanied the Resident to Talisse in order to explain to him the natural resources of the island and the prospects of the Company's plantations, and he invited him with the Controleur, the captain, and myself to a sumptuous feast in the Opzichter's house that evening.

It was a strange sensation to be again feasting in a civilised manner with a small company of European gentlemen, and to be drinking the wines of Burgundy and Cham-

pagne and smoking the cigars of Havanna in that cranky old house, whose timbers were bored by solitary bees and beetles and whose beams were rotten with white ants; but it was really an extremely pleasant experience, and the feast was a credit to our host's hospitality.

Captain van Eyck, an excellent and careful seaman, of what we should call a typically Dutch figure and physique, was the life of the party. His unending series of anecdotes of sea and land, his jokes and quibbles, and even his hearty laughter itself, kept us in a state of perpetual merriment until the early hours of the morning.

The next two days were spent in the unpleasant occupation of coaling the ship, and it was not until an early hour in the morning of Saturday, the 14th, that we left Talisse for the northern islands.

It was one of those beautiful mornings which are rather the rule than the exception in those parts of the world, and the refreshing sea-breeze we met as we passed through the straits between Kinabohutan and Banka gave us additional zest for the enjoyment of the lovely little bits of coast scenery and the glimpses of the distant azure mountain peaks of the islands and the mainland. The sun was shining brightly in a clear blue, cloudless sky, and the caves and grottoes of the Tanjong Aros stood out in bold relief against the familiar forests of the island, and the broad white sands of Kinabohutan glistening in the sunshine afforded a striking contrast to the deep blue waves that broke upon them. I was in the mood then for the enjoyment of the beautiful scenes of the tropical seas, for the pleasant winds of the open sea in the early morning hours were a wonderful relief from the stifling and ever-present

- heat and moisture of my little island home, and it really seemed as if for a time at least I could gaze upon the brilliant colours of sea and sky and land with about the

same wonder and appreciation as when I for the first time sailed amongst the coral-girt islands of the Javanese waters. For the first part of the voyage we made no prolonged stay anywhere, but merely stopped at Tagulandang, at Siauw, and at Petta in Sangir to leave word that the Resident commanded the attendance of the rajahs on his return.

We arrived at the Talaut islands on Monday morning, and let go our anchor off the little village of Lirung in Salibabu. I went ashore immediately with the Controleur and my boy, and strolled along the beach for some distance in search of birds, insects, and plants, hoping that, as it was still early, there might be a few living things about. I saw a few birds about of the same species as those I was accustomed to see in Talisse, such as the sandpipers, the starlings,¹ the green parrots, the nectar birds, and so forth; but a very brilliant little red and blue lory, which I had never seen before, was very abundant. Before we left Lirung the natives had sold and presented to members of our staff and crew at least three score of these pretty little creatures; but the mortality among them on our voyage was tremendous, and I believe that not a half-dozen reached Manado alive. Three specimens were presented to me, but they all died, apparently of cramp, before we reached Sangir. It is a very curious fact that this bird, which goes by the name of *Eos indica*, should be so abundant in these islands, comparatively rare in the neighbouring islands of Sangir, and unknown in the great continent of Celebes.

There is not much to be seen in the village of Lirung. There are not more than a dozen houses, each capable of holding three or four families, and a small 'toko, or shop, on the coast, which is, of course, run by a Chinaman, where the commonest kinds of cloths, iron, tools, and crockery may be purchased, or, I should say, received in exchange

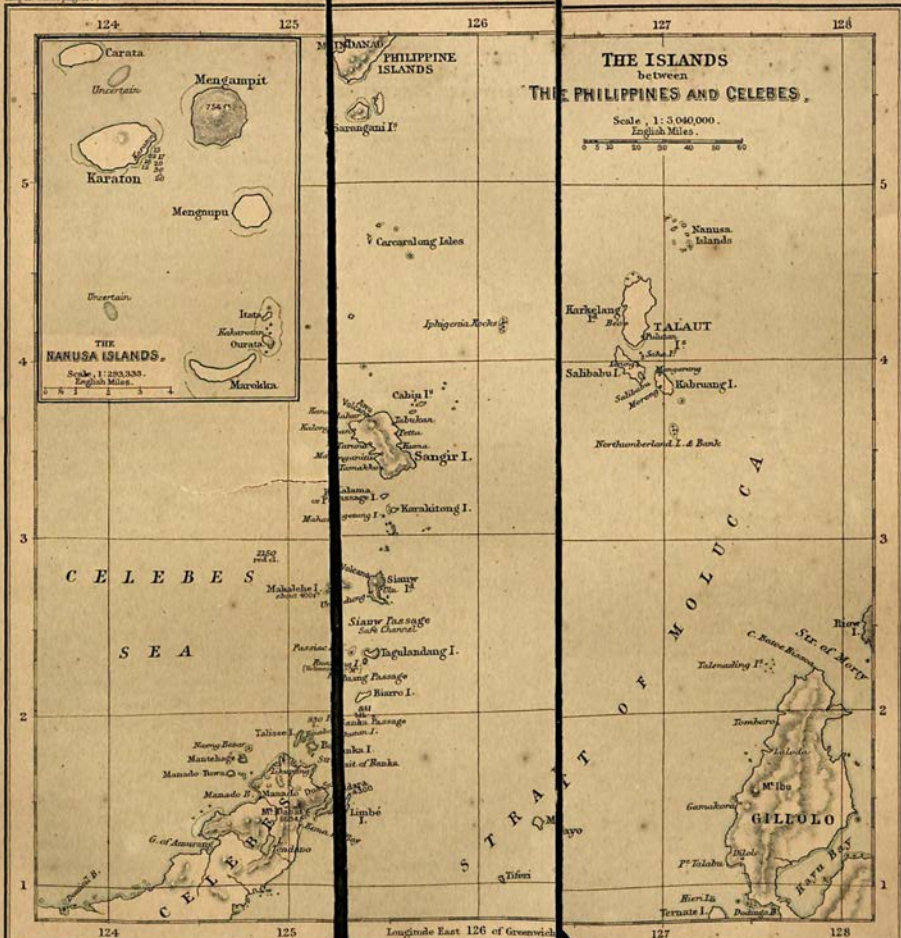
¹ *Vide* note, p. 92.

for produce. At one spot near the coast we were shown the tomb of an ancient chief, half hidden by shrubs and creepers. It was a massive structure, composed of the usual concrete of sand and burnt corals; at one end of it was a rudely carved crocodile, and at the other a model of an old-fashioned European sailing ship.

I could obtain no details of the life of this worthy chief, whose deeds were so remarkable as to merit this unusual and extraordinary monument, nor could I obtain any trustworthy information as to the date of his decease. The savage hero went down to his grave mourned by a race who speedily forgot him, and the people he sought to save from wild beasts or the freebooters of a barbarous civilisation are reminded only by this tomb of the enemies he encountered for their sake.

The silent tomb of this unknown hero recalled to my mind the words of Sir Thomas Browne: 'To subsist in bones and be but pyramidally extant is a fallacy of duration.'

On the following day I received permission to land on one of the Saha islands. These are two small islands lying off Lirung in the Karkelang Straits, the larger of which is about three-quarters of a mile in diameter, and the other about half as large. My attention was called to these islands by a flock of lories, consisting of many hundred individuals, which flew from the main island to the larger of them as the sun was setting on the previous evening. I was in hopes that I might discover the nests of the Eos or of some other birds on these small islands, although my experience on Talisse had taught me that very few birds were nesting at that time of the year. Anyone who has looked through the ornithological papers dealing with the birds of these regions must have been struck with the small amount of information contained in them concerning birds' nests and birds' eggs, and I was surprised to find



that the Malay hunters are almost as ignorant of these things as our European authorities.

We must accuse the baboons and snakes of being the chief cause of our want of knowledge, for they are able to carry on their predatory habits in all the nooks and crannies of the branches of lofty trees which are inaccessible to human beings, and consequently the birds are compelled for self-preservation to hide their nests and their precious contents in some of the secret places of the forests free from the visits of unwelcome visitors, and at present beyond our ken.

As a bird's-nesting expedition, however, my visit to the island was a failure; but there were many things in the dense jungle covering the island which I am sure would have repaid further investigations had time and opportunity permitted. The island is surrounded by a strand of white coral débris, upon which is found, as usual, lumps of water-worn organ-pipe coral, blue coral, shells and bits of drift wood, and nuts of various kinds, but presented nothing that was new or particularly interesting to me. For some time our little party, consisting of the *Dominie Wielandt*, the second mate of the '*Ternate*,' and a small party of Malay sailors and attendants could find no entrance to the thick jungle of vines and creepers which formed an encircling barrier round the forest, but at last Manuel found a track leading to a small plantation of bananas in the centre of the island. In many respects the jungle was different from any that I had seen, for some heavy rains had brought out in flower a number of the herbs and creepers, and these again had attracted from their hiding countless beautiful butterflies, diurnal moths, and other insects, which in their turn kept a number of birds in a state of agitation. Our advent into this wild island jungle was not hailed then by the usual deadly silence of the forests I had previously visited, but by a cloud of brilliant

flies, moths, beetles, by the shrieks and screams of the parrots, starlings, and scissor-tailed birds.

If I had only had with me a few companions willing to devote themselves to the collection of different specimens, we should have made a magnificent collection of new and interesting animals, but the interest of the party was nearly the whole time concentrated upon the efforts of the Dominie to bring down with his needle-gun one of the three or four large ospreys that were soaring above our heads, and even when he had succeeded, and presented me with the mangled remains of the bird I had often wished for, I had the greatest difficulty in stimulating the ornithological enthusiasm of Manuel to a proper pitch.

The most interesting bird I obtained upon this little island was a fine specimen of the handsome parrot, *Tanygnathus megalorhynchus*. It is not uncommon in the Talaut and Sangir Islands, but, like its little ally the *Eos indica*, is almost unknown in Celebes. Meyer (46) says that he obtained one specimen on the little island Mantehage, near Manado, but other ornithologists have failed to obtain any specimens from Celebes at all. It has a fairly wide geographical distribution extending as far south as New Guinea.

It is an interesting fact that the wing-coverts gradually change from a deep green colour to a brilliant metallic blue as we approach the southernmost limit of the species. The specimens I obtained have quite green covert feathers, and those from New Guinea, in the Leiden Museum, are blue. Intermediate varieties of these two colours are found in the islands which lie between these two extremes.

On the following day I visited the smaller Saha island, but found fewer birds and butterflies there than on the larger one. The woods were very damp, and there were many screw pines, mangroves, and other marsh trees, but, perhaps owing to the greater scarcity of birds, a great many helices and other land and swamp mollusks were found.

On Thursday, the 29th, we left our anchorage at Lirung and steamed towards the Nanusa Archipelago. On our way we brought to off the village Pulutan, and sent a boat ashore to fetch the rajah. He came on board, accompanied by three or four of his principal officers, and conversed for some time with the Resident of Manado through an interpreter.

The rajah spoke in Talautese, and his remarks were translated into Malay by the 'capitain laut' of Lirung, whom the Resident had brought with him to act as interpreter.

The languages spoken in the Talaut islands are, according to the best authorities, closely allied to the language spoken in Great Sangir.

The Rajah of Pulutan and his people were miserable-looking, half-starved individuals, and were all bent half double with awe or fright as they approached the Resident. They seemed to be more comfortable when they were squatting in a row on the deck, and supporting one another shoulder to shoulder, like a group of monkeys. The rajah's hair was long, black, and rather crimped, and his head was covered with a dirty cloth fashioned like a turban, which he removed when he came on board. He was clothed in a loose-hanging garment of native manufacture, and judging from his appearance must have had very little contact, at any time, with Europeans or European manufactures.

Steaming along the coast of Karkelang all that afternoon we crossed to the Nanusa islands before sunset, and came to anchor in twelve fathoms at six o'clock off the little village of Karaton.

It was too dark for me to go ashore that evening, but I had an interesting anthropological study in a group of natives who came aboard in a large canoe, loaded up to the water-line. Some fifteen or sixteen of them came on to the deck, and immediately squatted down on their heels, while the others swarmed up the hatchway, and

tried to get a glimpse of those on deck. Nobody seemed to take any notice of them, and they seemed to take no notice of anybody; they asked no questions, made no complaints, uttered only a few whispered words to one another, and, in fact, seemed to me as if their purpose in coming aboard was to be seen rather than to see. The quiet, inoffensive, phlegmatic character of the Malay seemed exemplified in these poor miserable inhabitants of the remote islands. They must be fatalists to the backbone to show so little curiosity in a fine modern steamship, which had nominally come to save them from sickness and starvation. Early the next morning I went ashore with the Resident and other officials to inspect the village. It is only a few paces from the shore, but is completely hidden by a grove of dense forest trees, amongst which I noticed some fine specimens of the famous waringin (*Urostigma benjamineum*), with its long pendulous aërial roots.

There were eight large houses built to enclose a considerable oblong quadrangle, and the whole was surrounded by a low concrete wall. Each house accommodated several families, and I was told that in some cases as many as five hundred individuals were crowded into one of these dwellings. They were built upon wooden piles, many of them seven feet above the level of the ground, and the refuse of the kitchen and all manner of filth had accumulated for years beneath each house so as to diffuse a stench which is beyond my powers of description. Had the village been visited by a sanitary inspector with the necessary powers instead of by a Resident without, there can be no doubt of the first step he would have taken to restore the village to a fairly sanitary condition. It is useless to recommend such people to remove their rubbish; their spirit of conservatism is so strong that they look upon their refuse accumulations as they would upon any other relics of a departed generation,

and would as soon remove the bones of their ancestors as the débris they left behind them.

Our entrance into the village caused no little interest and excitement, and we were followed about wherever we went by a crowd of half-naked men and boys. The women, of whom we saw very little, wore only a sarong folded round the waist—no bracelets, necklaces, or hairpins of any description. Their long dirty black hair was simply tied in a knot on the top of the head. They all ran into the



FIG. 18.—Large house in Karaton.

houses as we approached the village, and all we could see of them afterwards was a row of their uncomely heads watching us over the balustrades, or peeping at us through the chinks in the walls.

After some little delay we were invited into the house of a miserable shrivelled-up old man, clad in a long cloak of the native koffo cloth of the simplest 'cut,' who, I believe, was the chief of the village.

The house was dirty, dark, and of evil odour, and the crowd of men and boys who followed us in made it rather

difficult for me to see as much as I should have wished. The house was approached by a ladder of some nine or ten steps, and was divided into a number of compartments by



FIG. 19.—Tampat Got.

a series of wooden partitions, the one at the top of the ladder being probably the largest, and serving as a common room or entrance hall. When we entered, the chief sat down on the floor in front of one of the principal pillars

which supports the roof, and the djugugus, capitains laut, and other officers stood around him facing us.

Suspended to a rafter above our heads, I noticed a number of little painted canoes hung with the torn leaves of coco-nut palms, and in the middle of them was a pyramidal cage made of short wooden sticks like a European boy's birdtrap, covered with the spathes of the banana flowers, and decorated with coco-nut leaves like the canoes.

The canoes are undoubtedly for the spirits of sickness, and I believe, although I could obtain no information on this point, that the 'tampat Got,' or god-cage, as Manuel always called it, was a temple for the protecting spirit—corresponding with the Empung rengarengan of the Alfurs of Minahassa—of the house. The use of the fetich canoes may be explained in this way. The natives of Nanusa, and, in fact, of most of these regions, believe that when a man is ill his own spirit is released from his body and is replaced by the Sakit, or spirit of sickness. In accordance with this view, their cures consist of various attempts to call the spirit of the patient back again into his body and to drive out the Sakit. The obvious means of preventing sickness, then, is to provide some resting-place for the Sakit in their houses which is more attractive to him than the body of man. Being islanders and spending the greater part of their lives upon the water, these simple people naturally suppose that the spirits, both good and evil, are mariners, and consequently will be more attracted by a handsome and gorgeous canoe than by anything else.

I was very anxious to obtain these canoes and the god-cage for our museums in England, and consequently the first business I had to transact in this house was an attempt to barter some Manchester sheetings for them. One of the lads in the house who could talk a little Malay tried to persuade me that they were very poor things after

all, and produced an old and very dirty model of an ancient Spanish whaler, which he said was very beautiful and could be sold. I bought this as a preliminary to further negotiations, for it was of very little interest to me compared with

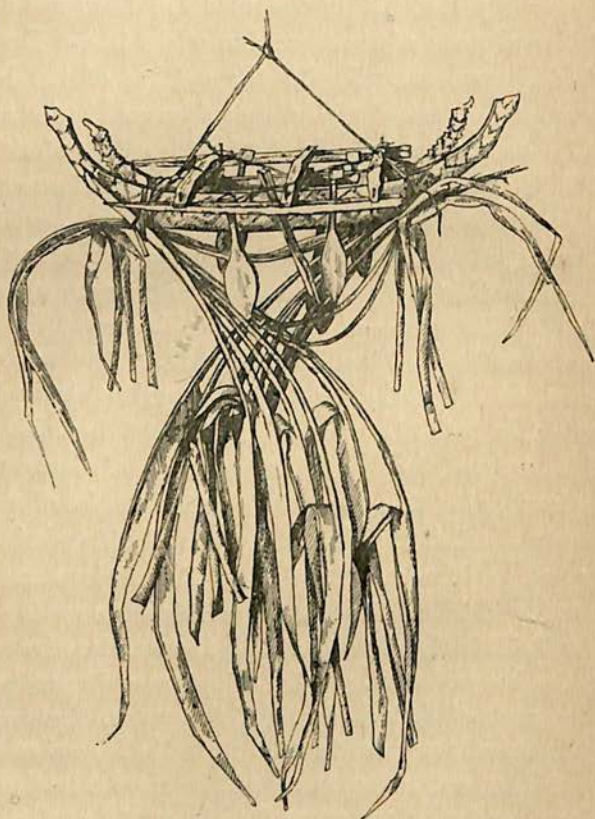


FIG. 20.—Sakit canoe.

the other more valuable canoes hanging from the rafter. Subsequently I was successful in purchasing, for many yards of cloth, the god-cage and all the fetish praus, and immediately gave them to my boy to be carried back to the 'Ternate.' I hope sincerely that our visit to Karaton was

not followed by a severe epidemic, because if it had been, I am sure these poor people must have called down upon my head all manner of curses for having robbed them of, or rather bought from them, their most potent preventive medicines.

As soon as I had finished negotiations about the canoes I wished to penetrate into the other compartments in search of an altar, which I was told was to be found somewhere in the house; but as I was warned that I should frighten the women, who were there in great numbers watching our movements through the chinks in the walls and over the partitions, and that I should seriously displease the rajah if I went any further, I was persuaded not to, and thus I left this interesting but extremely dirty house with only a view of the entrance hall.

Before the boat came to take us off, I had an opportunity of examining the coast-line for a few minutes, and was surprised to find a great reef of hard coral limestone just below high-water mark. I had had suspicions in Lirung that the Talaut islands have been slightly elevated, from the wide marshy plains raised a few feet above the sea-level which extend from the hill slopes to the seashore, and that they could not have been formed in the same way as the shore plains of Talisse and the north of Celebes, as there is no vigorous coral reef nor mangrove swamps.

This reef, then, of old coral limestone, raised about some eight or nine feet above the level of coral growth, was of great interest to me, as it confirmed the view I had tentatively held that the Talaut islands are being, or perhaps I ought to say have been, slowly elevated. I should not like to assert that the Sangir islands and the northern portions of Celebes are not also being slowly elevated, as is very commonly the case in volcanic regions, but so far as I am aware we have no conclusive proof of it, and for many

reasons I am inclined to believe that those lands have for several years, at least, been in a state of rest.

The same afternoon we weighed anchor and returned to Lirung.

Of the seven islands in the Nanusa Archipelago only Karaton, Mengampit, and Ourata are inhabited; and, as it is said that there is no other anchorage in the archipelago, Karaton is probably the only island that has ever been visited by Europeans.

Karaton is a flat island with a hill about 200 feet high on the north side.

Mengampit is a conical island, very probably an extinct volcano, and its highest point is 800 feet above the sea-level. Mengnupu is low and covered with forest. The legendary story of Mengampit is as follows:—

In olden times there were two bees on the island Mahampi,² of which one was a male and the other a female. The female bee conceived and brought forth a human female child, who was called Ansalina. Not far off there was an island called Pulu Pate, inhabited by a man named Bidadarie, who fell in love with Ansalina, and eventually became her husband. From the children of Ansalina and Bidadarie all the people of Nanusa trace their descent.

The principal deity of the Nanusa islanders is called Alaoruru, and two minor gods are called Ada and Tewah. The first seems to indicate a Mahomedan influence, and the last two names so closely resemble the Judaic Adam and Eve that we cannot help suspecting the influence of the old Spanish Catholic priest. In a later chapter I shall point out that similar names are found in the mythology of the Alfürs of Minahassa. The people also believe in a devil and witches. When a woman is discovered to be a

² This legend was obtained for me by the Resident of Manado. Mahampi is another way of spelling Mengampit.

witch she is buried alive. Circumcision is practised in the Nanusa Archipelago. At the age of twelve the boys are taken into the bush by their father and a friend, and the operation performed there. It is not the occasion for any feasts.

Some of the men are tatoored on the breasts and the women on the hands, the commonest figure being a cross with the lines crossed, +.

When a man marries in Nanusa he leaves his own village, or the house of his parents, and goes to live in the house of his wife's parents. There seems to be no law of exogamy—that is to say, a man is allowed to marry a woman of his own tribe. Polygamy is infrequent amongst the best people.

We only stayed one night at anchor in Lirung, and then sailed for Mangarang in Kabrukan. Mangarang is one of the largest villages in the Talaut islands, and is famous for the large sailing canoes (*sopis*) built there. There is no safe anchorage known near this village, so that the captain of the 'Ternate' simply laid to and put us off in a boat. We walked through the long straggling village, and came at last to the house of a German missionary of the name of Gunther. His house is prettily situated at the foot of a small hill, and commands a good view of a fine avenue of trees which runs through that part of the village. He did not seem to be quite satisfied with the condition of affairs, and complained bitterly of the unhealthiness of the climate and the irreligion of the natives.

The people seemed to me to be clean and their houses tolerably well kept, and I should have thought that a capable missionary would have made some impression upon them. It is true they were not well clothed, and were not particularly diligent in their attendance at the services held in the little wooden church, but these qualities depend more upon the minister than upon the natives. They will

not spontaneously clothe themselves and go to church on the appearance of a missionary in their midst. They must be taught to do these things. Mr. Gunther was married to a native wife, and I believe that, to a very great extent, his want of success was due to this. There can be no doubt that the native does not have so much respect for a European who is related to him by marriage as for one who successfully resists the charms of the native beauties.

It was evident that Mangarang had not suffered as we had in Talisse for want of rain, for the long grass was quite green and there was an abundance of flowering herbs and shrubs in the avenues of coco-nut palms, pala trees (*Myristica*), nangka trees (*Artocarpus*), and waringins. There were simply thousands of large convolvulus and hibiscus flowers on all sides, and in some places the ground was covered with the yellow flowers of a species of water-melon called sambiki by the Malays. As a botanist my opportunities there were immense, but then my zeal as a zoologist was also excited by the hundreds of brilliant butterflies and moths that were visiting the flowers, and the slugs and snails that were enjoying their herbaceous repast in the warm damp vegetation. I believe I did right in devoting the short space of time at my disposal to the zoological world, for the shore plants of these small islands are usually the same throughout a given area, and the botanist is very seldom rewarded with anything new or very rare unless he journeys to the mountains and hills of the interior. Insects and land mollusca, on the other hand, often manage to exist in remote islands, which would immediately or rapidly succumb in the struggle for existence in larger islands or continental lands.

My great prize in Mangarang was a large clumsy brown butterfly (*Liphyra brassolis*) with a thick heavy body like a moth. Professor Westwood informs me that some

entomologists have mistaken it for a moth, but that my specimen proves beyond doubt that it is a true butterfly, and that its nearest allies, curiously enough, are the little 'blues.' We left Mangarang the same day, and a few hours afterwards arrived at Béo. Here the 'capitaine laut' came on board, and told us a terrible story of sickness and death. Out of a population of nearly nine thousand in the neighbourhood no fewer than three thousand had died within the space of a few months. The rajah was dead; the president rajah, the djugugu, the father, mother, and the brothers and sisters of the capitaine laut were all dead; and the village was still stricken with severe sickness.

I went ashore with the Resident and Controleur to inspect the village, and to see if anything could be done to relieve the suffering people.

We first visited an old German missionary named Richter, who had spent the greater part of his life in that remote and fever-stricken mission. He expressed no particular wish to leave his exile even for a time, nor any desire to revisit his fatherland and civilisation, but seemed quite content to live the remainder of his life and to die on the scene of his lifelong labours. Poor man, his visit from us was destined to be the last he received from any white man, for a few weeks or months after we left the news arrived that he had fallen a victim to the fever in Béo.

The walk through the village and the glimpses I caught of the people were perhaps as depressing as anything I had experienced in the East Indies. The numerous deserted and tumble-down huts, the long rank vegetation even in the principal paths of the village, and the still heavy pestilential atmosphere seemed to whisper death and disease at every step; and the lean gaunt figures of the men and women, with their painfully slow and weary movements, told only too eloquently the story of their sufferings.

But I should be sorry to accuse the climate of Talaut of being exceptionally bad, without first of all trying the effect of a few simple sanitary experiments. If a strong native government could insist upon a general destruction of all those huge foliaceous trees which retain the heavy moisture and prevent the free play of the sea-breezes, and a general clearance of the long rank vegetation which chokes the paths through the village and of the accumulated filth and rubbish beneath the huts, I believe that Béo might become as healthy a spot as any in the archipelago. There are no vast pestilential mangrove swamps in the neighbourhood, there are no stagnant ponds nor slow-flowing rivers to keep the district damp and fever-stricken, but there are cool breezes every evening from the hill ranges, and refreshing winds from the sea-coast to clear the country of evil vapours. It is, I believe, the indolence and filthy habits of man alone which cause the frightful calamities in these remote districts, and I believe that a few simple lessons in sanitary conditions would do far more good than thousands of war-ships bringing quinine and other medicines.

The Dutch Government has established elementary schools throughout the colonies under their direct control, and even in Béo I saw signs of an attempt on the part of a native teacher to impart an elementary education. Would it not be possible for the Government to instruct these teachers in the first principles of sanitary science, and give them powers to carry their principles into practice? We went from hut to hut in this dreary village, hearing the same story of sickness and death until we were heartily tired of it, and felt quite relieved when we were once more on the way back to the 'Ternate.'

In one house we entered we found a woman sitting on a mat in the middle of the floor with a crowd of her relatives and friends around her. We were told that people

came from long distances in Talaut to see this woman, and I fancy that she supposed that she had been the main object of our visit to Béo. She was an emaciated old woman who had suffered severely from fever a few weeks previously, but seemed quite pleased to receive her distinguished visitors.



FIG. 21.—Wooden spears from Béo.



FIG. 22.—Wooden shield from Béo.

She exhibited the curious and interesting abnormality of two functional nipples on each of her breasts. I tried to find out if there was a history of the same abnormality in her family, and she told me that her grandfather had had four and the child of one of her sisters four also, but could think of no other instances.

In passing through the village I noticed in one of the huts some curious spears and shields entirely made of wood. The spears are about seven feet long, and made of some hard wood with a piece of bamboo cut in a wedge-shaped fashion to a sharp point lashed on the end by a piece of rattan; the shield is about five feet long by one broad, and is composed of three pieces sewn together by coarse stitches of rattan, a middle piece with a large central boss and two wings. These are to the present day the principal weapons used by the natives of the Talaut islands both for warfare and the chase. The Talautese are, in fact, living in what might be called a 'wooden age.' All their implements, weapons, utensils, and tools are made of wood and leaves, and they are destined to remain in that condition until the advent of civilised man: for in those islands, built up in the sea by volcanic and coral action, there are no stones that could be fashioned to form knives and no iron and no copper. It will not be possible for them to pass through a stone age, a bronze age, an iron age, as our own savage ancestors have done; they must wait until circumstances allow them to pass directly from the wooden to the civilised condition.

Before I left one of the men showed me the way they procure fire in those parts. He took a piece of bamboo and split it in two pieces, and then cut a small slit-shaped hole in the middle of one of them. Placing this one on the ground with the concave side downwards, he rubbed the edge of the other one over the hole with a jerky sawing motion until a considerable quantity of smoke appeared. Rapidly removing the piece of bamboo from the ground, he fanned the little heap of smoking sawdust that had been formed with the other bamboo stick, and in a very few minutes the heap began to smoulder and burst into flame.

The whole process was done so quickly and so simply

that when I had secured the sticks I thought I had also secured the method, but I soon found out my mistake, and notwithstanding long and diligent practice with those two bamboo sticks, I have never yet succeeded in producing a spark by rubbing them together.

By the time we had finished our inspection of Béo the sun was sinking on to the horizon, and as we rowed back to the 'Ternate' the whole sea and sky was illumined by one of those brilliant rosy-red sunsets so frequently seen in tropical lands. The long coast-line of Karkelang and its undulating plains and hill ranges were lighted up by the brilliant colours of the sunset. The whole scene was as gorgeous and beautiful as could be well imagined, and everything seemed to speak of peace, of quietness and beauty. It was hard to believe we were leaving a district haunted with deadly miasmas, and that the elements were shedding a pall of colour and beauty, as it were, over a scene of human suffering and death but rarely paralleled even in these fever-stricken climes.

We left Béo at about half-past six in the evening of Saturday, November 21, and steamed half-speed all night towards Great Sangir. At daylight the next morning we were close to the northern shore of that island, and in sight of the great Awu volcano, whose slopes are broken up by magnificent ravines and gorges. This volcano has been, perhaps, more destructive than any in the Moluccas. We have records of a most terrible eruption which lasted from December 10 to December 16 in the year 1711. Sjamsialam and his son, the Princess Lorolabo and her daughter Sarabanong, and over two thousand people of the kingdom of Kandahar were killed (42).

On March 2, 1856, there was another fearful eruption, which lasted until March 17, and nearly three thousand human lives were lost (14). The streams of boiling water

and of steam, which poured down the mountain slopes, rather than the flow of lava, caused the enormous mortality of this second eruption. After the eruption of 1711 it seems that a large lake of water was formed in the crater, and a certain privileged class of Sangirese were allowed by the gods to visit this lake every three or four months to test the water with their rice. If the water was hot enough to cook their rice, they took it for a sign that an eruption would shortly follow. The eruption came in 1856. The waters of the lake began to boil, burst their banks, and flowed down the side of the mountain towards Tabukan and Taruna, causing immense destruction of human lives and property.

As we were passing Kandahar, we noticed a large prau coming out towards us, flying the Dutch flag, so we stopped to allow the rajah who was in her to come on board. He wore a curious cap, in shape not unlike a 'glengarry,' made of black cloth, and he carried a beautiful blue umbrella. His business did not seem to be very urgent or important, so we soon left him behind in his big canoe and continued on our way to Taruna, which we reached shortly after mid-day. Taruna may be said to be the capital of Great Sangir, for not only is it the seat of one of the most powerful rajahs of the island, but it is also the headquarters of the Contrôleur of the Sangir and Talaut islands, and the port of call for the steamers of the Ned. Ind. Stoomvaart Maatschappij. A considerable trade is carried on by a few Chinese merchants, who barter European cloths and other articles for copra and other native products.

Sangir may be considered to be the home of the coconut in these parts. All along the shores of the islands the traveller sees rows and rows of these handsome palms, and on entering the Bay of Taruna the hills and shores seem to be almost destitute of any other trees. The natives are fully

aware by this time of their commercial value, and in every Sangirese village the traveller notices and his nostrils are offended by the stench of the copra, the white fleshy part of the nut, which is laid out in rows in the sun to dry.

From the abundance of this palm in some lands, and the fact that it requires absolutely no care in its cultivation after the first few years of its growth, it is quite easy to understand how the European sailor in olden times looked upon it as a forest tree, the property of the first comer, and had in consequence no compunction in cutting it down for his own use and enjoyment. I believe that if we could trace the cause of all the many troubles that our sailors have had with the natives in tropical lands, we should find that one of the commonest of them is the destruction of the coco-nut trees, followed by the natural resentment of the 'extremely savage' owner. It should be taken as a maxim by the traveller that every coco-nut palm he sees in the tropics belongs to some one, and that he is committing a theft if he steals the fruit thereof.

It might well be asked, how does the owner of coco-nut palms protect his property from native thieves? There can be no doubt that anything of the nature of police regulations would be absolutely useless, and consequently society has discovered a method which is both more effective and less expensive. The native owner simply hangs up in the tree a little fetich doll (*urō*), which I suppose has previously been properly endowed with power by the walian, or priest, and then anyone who steals a fruit from that tree becomes immediately afterwards violently ill. This method is found by experience to answer extremely well, and property in the wild forests and desolate sea-coasts of Sangir is probably as well protected as it is anywhere in the world.

It may be said that this is simply gross superstition, and that we should pity the poor native for his ignorance,

but I have no pity for a man who is superstitious where the superstition is his protection. In our more highly organised European communities we can afford to dispense with such

primitive ideas, and even to discourage them as mischievous, but among savage races these superstitions are essential features of their social system, and their sudden abolition without anything to replace them might lead to endless mischief in their communities.



FIG. 23.—Urō, a coco-nut fetish from Sangir.

A little while after we came to anchor I went ashore with the Resident of Manado, the Dominie, and Controleur. After a considerable walk along a narrow path in a field of allang-allang grass (*Imperata arundinacea*), kussu-kussu grass (*Chrysopogon*), and glaga (*Phragmites*), we came to a nice broad

road lined by groves of coco-nut palms leading to the village. We passed the house of the rajah, which was decorated with festoons of palm leaves, and protected by four sentries, each of whom wore curious grass hats, shaped like an old-fashioned 'chimney-pot' with a tuft of chicken's feathers stuck jauntily on one side of it, and armed with wooden spears and curious little wooden shields; and then we came to the church, a large substantial building of coral concrete, well seated and well lighted. The village was tolerably tidy and clean, but did not present the same signs of progress and prosperity that I have seen in other Sangirese villages.

The next morning the Dominie Wielandt and I left the

'Ternate' for Manganitu in a small boat. We had not got out of the bay before we met five large praus filled with men beating drums and making a terrible noise. We hailed the largest of them and spoke to the rajah of Manganitu, who was on board. He told us that Mr. Steller, the German missionary, was at home, and that we could stay in the village until the arrival of the 'Ternate.'

It took us three hours to row to Manganitu, but as it was not oppressively hot at that early hour in the morning, we could thoroughly enjoy and appreciate the lovely coast scenery as we passed along, or gaze with wonder and admiration on the displays of colour of the numerous sea-gardens on the sea-bottom.

Manganitu is, like Taruna, situated at the end of a deep bay, but it does not, unfortunately, possess the same natural advantages as a port, for the bay is much more open and exposed to westerly gales, and a great barrier of coral reef prevents any approach to the village nearer than six cables.

The tide being nearly high when we reached our destination, we were able to force our little boat through the opening in the reef made by a stream of water which runs through the village, and thus gain the shore without wetting our feet.

The village of Manganitu is very pleasantly situated at the foot of the range of hills which forms the backbone of the island of Great Sangir, and the wide roads and well-



FIG. 24.—Ceremonial shield of sentry at Taruna.

This shield is only 21 in. long. The sides are decorated with split palm leaves.



FIG. 25.—Hat of sentry at Taruna.

kept compounds round the houses give it a very neat and tidy appearance. There are very few large trees actually in the village, and this, I believe, accounts for its remarkable salubrity compared with many of the other villages in the island.

As soon as we had landed we were conducted to the house of Mr. Steller, the missionary, a very pleasant and picturesque little home at the head of the village. Beds were provided for us at the house of the rajah, and we were invited to take our meals during our stay with Mr. Steller's family. I can never forget the kindness and hospitality of these good people, and perhaps the two days I spent at Manganitu were the most enjoyable and interesting of the whole cruise. I had often felt dissatisfied in other places with the results of missionary work—I thought that the benefits that accrued to the natives were hardly worth the expense and sacrifice incurred; but in Manganitu I began to feel differently about it, for Mr. Steller's beneficial influence upon the people was to be seen on every hand, and the practical value of his teaching was to be observed in every corner of the village.

A missionary such as Mr. Steller, who teaches the use of some of the simpler arts of the civilised races, and by cultivating the soil himself brings home to the native mind the practical value of the land he lives upon, undoubtedly increases the happiness and prosperity of the people. The missionary who merely indulges in evangelical dreams, and devotes himself only to the destruction of practices and beliefs which he classifies as 'pagan,' is to my mind worse than useless.

After we had partaken of some lunch we were introduced to the *tuan bohki*, the rajah's wife, and she took us to her house to see the room that had been prepared for us.

The house was a very large one, and consisted of a large

central hall or reception room, as it might be called, and a number of little partitions or retiring rooms opening from it. One of these was reserved for the Dominie Wielandt and me, but as it was thought to be inconsistent with European customs for two gentlemen to sleep in one room, a large curtain was hung across it between the two beds, so as to give each of us a separate compartment.

The whole house was hung with an amazing quantity of the native koffo curtains, giving it the appearance of a small ethnological museum.

These curtains are made from the fibre of the wild banana,³ which is found in considerable abundance in the Sangirese forests. The Malays call the cloth they make from it 'koffo,' a word which has been imported from the Philippines. The tuan bohki explained to me the way in which the cloth was woven, and I thought at the time that I fully understood it, but in trying to repeat the explanation on a loom I obtained from Sangir I broke down, and the process still remains a mystery to me. Some of the threads are used quite plain, but others are coloured to form a pattern. The colours used are blue, red, yellow, and black. The blue colour is obtained from the *Indigofera tinctoria*, the red colour is obtained from the roots of a plant called by the natives seha, the black colour from the bark of trees called palenti⁴ and from the flowers of the hibiscus, the yellow colour from the *Curcuma longa*.

The loom is apparently of the same construction as that used in the Philippine islands.

In front of the house there was a roomy verandah

³ *Musa mindanensis*, the pisang utan of the Malays. It has not a very wide geographical distribution, but extends from the Philippines to Gilolo and Celebes. The Sangirese word for *Musa mindanensis* is *herti*; for the koffo *dorundung*.

⁴ The native boy who accompanied me into the country could not show me a seha tree nor a palenti, so that I am unable to identify them.

situated on the ground. It was furnished with two large tables, upon which the tuan bohki had placed some vases containing beautiful bouquets of wild flowers, and a number of chairs of European design.

In a corner of the verandah stood a sentry, or *djaga*,

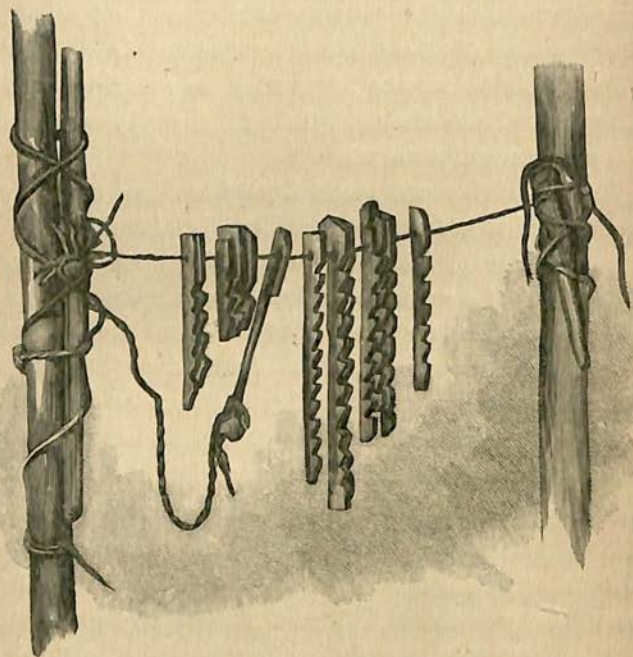


FIG. 26.—Notched sticks for keeping time in Manganitu.

The numbers read from right to left. The time indicated in the illustration is between twelve and one.

whose business it was to keep the time for the village. The way in which the time is kept is as follows: Two beer bottles are firmly lashed together, mouth to mouth, and fixed in a wooden frame, which is made to stand upright in two positions. A quantity of black volcanic sand runs from one bottle into the other in just half an hour, and when the upper bottle is empty the frame is reversed.

Twelve short sticks are hung upon a string, marked with notches from one to twelve, and a hook is placed between the stick bearing the number of notches corresponding to the hour which was last struck and the next one. The hours are struck by the djaga on a large gong.

Unfortunately my watch had stopped, so that I was unable to test the accuracy of this primitive sand-glass, but Mr. Steller told me that it kept very good time.

When we returned to bed that evening, after spending the day with the Stellers, we found the rajah and his wife waiting to receive us. The house was lighted by ordinary paraffin lamps, and the numerous attendants and retainers of the court who had retired to rest were lying asleep all over the floor of the entrance hall. We picked our way to our compartment over the prostrate sleeping forms, and to the music of the concerted snores of some hundred people we soon fell asleep.

The following morning, after a delicious bath in the cool stream behind the mission house, I started off, in a canoe lent to me for the purpose by Mr. Steller, for an inspection of the coral reef. After dragging the canoe over the sandbanks at the mouth of the river, I skirted along the reef until I came to a spot where a number of women were collecting shellfish, and then I ran the canoe on to the reef and got out. Although the reefs are very much the same as they are in some places on the coast of Talisse, I found a few things which were new to me. The chief peculiarity was an extraordinary number of brittle stars, some of them ornamented with the most brilliant colours. I remember one in particular, with its arms striped with broad green and yellow bands, the disc being marked with spots and streaks of the same colours.

For the first time I found on this reef one of those

chitons whose shells are provided with a number of small eye-spots (*Chiton incisus*). As these eyes had never been observed before in the living animal, and some conchologists were formerly sceptical about their optical nature, I examined these brilliant little spots with great care and interest. The surfaces of the lenses only are visible without dissection, but they are very clear and transparent, and although I could not detect any rosy (or other) colour in the spots which disappeared after death, I am nevertheless perfectly convinced from Moseley's anatomical investigations that they are really true eyes (50).

After working some two hours on the reefs in the excessive heat of the mid-day, I was glad to return to the village to dinner. In the afternoon, a boy, who, I suppose, had seen me or heard that I was collecting things on the reefs, brought me a couple of *Lingulas*. *Lingula* is a brachiopod, and one of the few animals which has been living in this world almost unchanged since Cambrian times. I was particularly anxious to see the animal alive in its native habitat, but I never succeeded. The fact is that the natives are very fond of it as an article of food, and although they would bring me a few specimens now and then for my collection, they were afraid to let me poach on their preserves.

There can be little or no doubt that it lives near the corals, and it would be really very remarkable if it could be shown that this animal, which has come down to us from such remote epochs, has been all the time an inhabitant of the shallow tropical seas, where, perhaps, the struggle for existence is keener than it is in any other area of the globe.

The next morning after breakfast Mr. Steller placed a horse at my disposal to take me to his garden in the mountains.

The glimpses I got of the country and the seashore, as we slowly toiled up the tortuous mountain path were extremely beautiful; every view I obtained of the mountains and valleys, or of the wide expanse of blue sea with its little green islands, seemed more perfect than the last. At one time we passed through a low bush and undergrowth, to which the golden flowers and white bracts of the *Mussaenda frondosa* gave colour and variety; at another time we plunged into a wood of lofty trees, where the banks of the path were covered with a profusion of moss and ferns, and at another we passed by wide fields of rice and maize or groves of bananas.

At last we came to Mr. Steller's garden, where a pretty little house was being built for him. A stroll among the young trees in the garden in search of birds and insects, and after lunch a bath in a deliciously cool brook, brought my visit to this delightful spot to a close, and it was with great reluctance that I retraced my steps down the mountain side towards Manganitu. The general aspect of the country of Great Sangir is very similar to that of North Celebes.

There is a bird in Great Sangir which the natives call the 'burong mas,' or gold bird. I was told that it only occurs in this island. I tried in vain to obtain a specimen during my short stay in the island, but since my return home I have, through the kindness of the Resident of Manado, received a skin in a very fair state of preservation. It turns out to be the Nicobar pigeon (*Calenas nicobarica*).

The only specimens of this handsome ground pigeon found in Minahassa were, I believe, obtained by the late Mr. van Musschenbroek, a former Resident of Manado. It is, however, extremely rare on the main island. Several specimens have been obtained by different naturalists in the Sangir islands, where it is not so very rare. Mr. Wallace

(83) has pointed out that this bird has very long powerful wings in proportion to its body, and is consequently peculiarly fitted for island life. 'Being a ground-feeder,' he says, 'it is subject to the attacks of carnivorous quadrupeds which are not found in the very small islands.'

Soon after I reached Manganitu the news arrived that the 'Ternate' was in sight, and in a few minutes the village was in a state of unwonted excitement and commotion. The rajah assembled all the able-bodied men about him, and harangued them on the plans for the reception of the Resident, and these in turn rushed about collecting guns and drums and spears and shields and all manner of things that would make a noise or appear decorative and pleasing to their honoured guest. After waiting about for some time on the sea-coast we saw a boat approaching us from the 'Ternate' containing the Resident and Controleur of Manado. They were received by the rajah and Mr. Steller amid a fiendish noise from the guns and drums of the villagers, and then we all passed in procession to the verandah of the rajah's house, where we sat in solemn conclave for upwards of an hour.

Had a stranger suddenly appeared during that hour he might have supposed that we were discussing affairs of the most vital importance to the state. The Resident, the Controleur, the Dominie, the rajah, president rajah, and myself were seated round a long table, while the djugugus and other officials stood at the opposite end of the verandah, and the natives of all classes crowded round gazing at us with deep interest and curiosity. It might then readily have been supposed that matters of importance for the welfare of the state were under discussion, but it was not so. As far as I can remember the conversation, not a word was said bearing upon the politics of the Sangir islands from the beginning to the end of the visit, and the incident

closed without reference to the burning questions of the day in the little state of Manganitu. All these questions I understood were discussed at the meeting of the rajahs at Taruna, and this visit of the Resident to Manganitu was purely a formal one.

Early the next morning we parted with our kind host and rejoined the 'Ternate.'

We reached Ulu in Siauw the same day, and I went ashore to visit the beautiful and famous spring at the head of the village.

In the early history of the Sangir islands Siauw played a very important part. The rajahs of the island have been for centuries extremely powerful, owning considerable property in Great Sangir and drawing levies of warriors and ships from the distant Talaut and Nanusa islands. In the sixteenth and seventeenth centuries it was the scene of several conflicts between the Portuguese, the Dutch, and the native rajahs. Soon after I landed I came across a large white stone slab, bearing the monogram of the old Dutch East Indian Company and a date which was only partially legible. The figures 16 and half of the figure 8 were sufficient to indicate that the year the stone commemorated was within the 1680-1690 decade, and 'D. i. Janev' indicated that the day was New Year's day.

Siauw was made over to the Dutch by the king of Ternate in 1677, and it is probable that this stone was placed there by the officers of the Company to commemorate the event a few years afterwards.

Ulu was formerly the seat of a European missionary, but for some years previous to my visit there had been no European on the island, and the people had to a certain extent degenerated in consequence. The village, however, looked tolerably clean and respectable, and the delightful bathing-place at the springs shadowed by glorious forest

trees was evidently extensively used and enjoyed by the people. The village was overrun with pigs, some of the young ones being curiously striped with transverse bars of gold and slate.

The great volcano was in a fairly active condition, the crater sending up towards evening volumes of dense black smoke which showered down a fine ashy dust over the deck.

In the morning the rajah of Siauw came on board—a fine handsome man, well dressed in black European clothes and bearing the gold-knobbed cane of office. The Resident seemed to be very angry with him about something I did not understand, and I can well imagine that in dealing with this proud and powerful monarch any official might feel that his hands were full.

We left Siauw for Tagulandang the next morning, but our stay there was very brief, as the only business we had to do was to confirm the appointment of a new rajah, and to fire a salute of seven guns in his honour. We steamed away the same afternoon, and as the sun was setting that evening we were once more at anchor off the little wooden pier at Talisse.

CHAPTER VIII

CHARACTERISTICS OF THE SANGIR ISLANDS

Holy islands—The islands between Celebes and the Philippines—Facilities for the distribution of animals—The avi-fauna—Legend of a former land communication with Sangir—History of Sangir—The Sangirese race—Slavery—Food—Diseases—Religions—Marriage customs—Funeral customs—Fishing implements—Weapons—Dress—Physiognomy—Language.

GREAT SANGIR, situated between lat. 3° and 4° N., long. 143° E., is about twenty-five miles long, and in its broadest part about fifteen miles across. It is exceedingly mountainous throughout, the greatest height¹ being reached by the Awu volcano in the north. The land is everywhere very fertile, and where it is uncultivated is covered by luxuriant forest growth.

Between Sangir and the Talaut group there are several small islands, but their exact number and position has never yet been very accurately recorded. Of these the Cabiul islands are the largest, and their position is from one and a half to two miles to the east of the northern extremity of Sangir. One of these islands, called Cabiulusu, is considered by the natives to be holy, and they leave from time to time goats and chickens on the island as offerings to the spirits (79). The island is used by the natives as a refuge where they can wait until the wind is favourable and weather clear for their passages to Talaut, and this is perhaps the original cause of the islands being considered sacred.

¹ I can find no accurate determination of the height of this volcano, but I should think it must be over 5,000 feet.

Several of the small islands are recognised as holy throughout the Eastern seas. There is an island called Massape,² near Siau, which has been considered sacred from very ancient times. The natives not only bring their offerings there to secure a favourable wind, fine weather, or other seamen's blessings, but even when they are ill or unlucky they make a pilgrimage to Massape, and by offering a goat or a few chickens to the presiding spirits they hope to be speedily cured or to secure better luck.

The islands Mandako² and Mahangetang, lying between Great Sangir and Siau, are also looked upon as holy. They believe that a great doctor lives there who can cure everything. He is considered to be either an *ampuang* (deity) or an *orang petenong* (priest) (14).

Sangir is connected with Celebes by a very complete chain of islands, so that even small canoes can by creeping along from island to island make very long voyages. The widest passages to be crossed are the Siau passage between Siau and Tagulandang, ten miles, and the Banka passage between Biarro and Talisse, eighteen miles. But even in making these short passages canoes are not infrequently drifted many miles out of their course by the strong sea currents and contrary winds.

Unfortunately so few soundings have yet been taken between and in the neighbourhood of these islands that we are unable to say for certain whether they are connected by submarine banks or not—whether, in fact, they should be looked upon as the peaks of mountain ranges now sunk beneath the sea, which formerly perhaps connected the ranges of Minahassa with those of Mindanao, or simply as volcanic peaks rising from the bed of the ocean.

The only soundings we have are those taken by the 'Flying Fish' in Banka passage, and one taken by the

² I am unable to give the position of these islands.

'Challenger' in the Sea of Celebes, about thirty miles west of Siauw. The fact that in the passage the sea was in places as shallow as 232 fathoms, and that nothing deeper than 930 fathoms was found, whilst in the open sea the lead went down to the enormous depth of 2,150 fathoms, suggests that when these seas have been more thoroughly surveyed it will be found that there is a continuous submarine range running between Mindanao and Minahassa, which appears above water as the Sangir and Siauw chain of islands.

It is, however, by no means necessary to assume that there was at any time any land communication between Celebes and the Philippines. To obtain complete land communication between the two we should require an elevation of at least 6,000 feet, or in other words, if we believe that Celebes and the Philippines were at one time connected by dry land, we must presume that the land has sunk at least 6,000 feet—a presumption we are not justified in making, especially in a volcanic region, without some very good reason. The fauna and flora of the two islands do not afford us evidence sufficiently weighty to justify any such theory. If we found any striking correspondence between the heavy ground-feeding mammals of the two islands we might think differently, but we do not. The babirusa and sapiutan (31 and 70) of Celebes are not known to occur in the Philippines, nor is the *Cervus hippelephas*, whilst on the other hand there is no true cat, porcupine, shrew, or tragulus in Celebes.

The fact that many of the squirrels, rats, and bats are identical or very similar in the two islands is not to be wondered at, for these could easily be drifted across the narrow straits separating the links in the chain of connecting islands on drifting timber.

The opportunities afforded to arboreal animals to migrate from one island to another in these regions are not so in-

frequent as might be supposed. During the heavy rains of 1882 the Manado river brought down vast numbers of mighty forest trees, and many of these must have drifted far out to sea with a very considerable crew of squirrels, mice, caterpillars, and other animals. Around the active volcanoes whole forests of trees are occasionally floated off into the sea. Dr. Guillemard told me that at the Batu Angus opposite to the island of Limbé he has seen trees standing in the lava which had flowed from the volcano, and that these trees were so burnt round their bases that they could be toppled over by a push. It is quite certain that during the eruption of the island volcanoes, numbers of trees are in this manner carried down the hillsides by the lava and floated off into the sea. It might be urged that the animals which are accustomed to live in the trees would under the circumstances of a violent volcanic explosion all be killed by the heat or by sulphurous fumes. It is possible that this is so in very many cases, but not always. Some days after the eruption of Krakatoa in 1883 a female green monkey was found floating on some drifting timber in the Sunda Straits. She was terribly scorched, but completely recovered, and is, I believe, still alive.

We cannot fairly deduce any argument either for or against any former land communication between Celebes and the Philippines from the evidence afforded by the distribution of birds. The straits between the several islands are so narrow that they afford no insuperable geographical barrier to the passage of even the smaller birds, and many of the peculiarities of the avi-fauna of the Sangir islands must probably be attributed partly to the absence of certain mammals, such as the apes and the paradoxurus, and partly to the peculiarities of the vegetation.

There are, according to Blasius (5), twelve birds peculiar to Sangir and one to Siau. Some of these, such as the

starling (*Calornis sanghirensis*) are little more than varieties of Celebean birds, but only one (*Oriolus formosus*) is closely allied to a Philippine species. It is not going too far to say that of the peculiar Sangirese birds, the majority show stronger affinities with the birds of Celebes than with the birds of the Philippines. Let us see how these facts are supported by other peculiarities in the avi-fauna. There are, as is well known, several birds in Celebes which, having but a limited geographical distribution beyond the main island, may be said to be characteristic Celebean birds. Of these no fewer than ten are found in the Sangir islands. These include the scissor-tailed bird (*Chibia leucops*), the green parrot (*Tanygnathus Mülleri*), the maleo, and the 'Maspas' shrike (*Graucalus leucopygius*). Of characteristic Philippine birds, on the other hand, there are only three found in Sangir: the luçon parrot (*Tanygnathus luçonensis*), a nectar bird, and a variety of the Mindanao *Eudynamis*.

From these facts, we can say that the greater portion of the birds of the Sangir islands have been derived from Celebes, a smaller portion only having come across the straits from the southern peninsula of Mindanao.

The fauna of these islands, then, does not afford nearly sufficient evidence to enable us to decide whether there ever was a former land communication between Celebes and Mindanao or not. To attempt to solve this problem we must have far greater knowledge of the character of the sea-bottom between the islands than at present we possess.

But while we must be content to wait for the solution of the problem, some of the natives of Celebes are quite prepared with an explanation.

'In olden times,' they say (63), 'when Makapoedellock, the son of Batahansorong, was *datu* or prince of Mahangetang, a great part of the land was sunk into the depths of the sea because he had outraged his sister Taroara.

Since this time only the highest land has been inhabited, which the people call Sangir, or Soemangi, tears from the lamentations of the great disaster.'

Concerning the early history of the islands of the Sangir group there is, as might be expected, much obscurity, and the brief account I give below, compiled with some difficulty from the accounts of several writers, can only be regarded as approximately correct.

Originally the island of Great Sangir was ruled by only two kings, those of Kalongan and Tabukan, but towards the close of the seventeenth century it was split up into six kingdoms and a vice-royalty under the king of Siau-w. These were the names of the kingdoms: Taruna, Manganiu, Cajuis, Limau, Tabukan, and Saban, and Tamakko, under the king of Siau-w. These were subsequently reduced to four—Candahar, Manganiu, Taruna, and Tabukan, Tamakko still remaining under the king of Siau-w (79).

The kings of Sangir were for many years the rulers of the greater part of the Talaut islands, and were able in time of war to draw from them a considerable number of fighting men as auxiliaries.

It is doubtful when Europeans first came to Sangir, but it is interesting to note that some of the ships which had discovered the route to the Spice islands by way of Cape Horn under the gallant and enterprising Magellan were among the earliest arrivals on the scene (74).

Magellan died in the Philippine islands on April 27, 1521, and after his death the Spaniards sailed to Cagayan, Sulu and Borneo, but returned to Mindanao, and thence sailed to Sangir and Tidore (74).

'We reached a beautiful island called Sanghir,' we find recorded in the journal (44) of the voyage. In 1525 one of the ships of D'Elcano's fleet was wrecked on Sangir, and from the treatment the sailors received at the hands

of the natives, the Sangirese obtained for many years an evil reputation. In 1563 or 1568, the Portuguese priest P. Diogo Magalhaens was sent to Manado by Pedro Mascarenhas, Bishop of Ternate. He found the natives of Manado a warlike people, and the terror of the district. From Manado he went to Siauw, where he baptized the rajah and six thousand warriors. From Siauw he went to Sangir, where he baptized the king and queen of Kalongan and raised a large wooden cross.

At the beginning of the seventeenth century there was trouble between the Dutch and the Spaniards at Siauw. The brave and famous Kaitsjil Ali, admiral of the fleet of the Sultan of Ternate, rendered valuable aid to the Dutch against the Spaniards. In 1614 the combined forces of the Ternatees and the Dutch drove the Spaniards out of Siauw, but the natives fled into the forests, because they could not remain as Christians under the Ternatees. Two years later there seems to have been an attack upon the natives by the Dutch, when many of them were barbarously murdered and others captured (74).

In the year 1646 Governor Seroyen placed a garrison in Tagulandang, and commanded the natives to plant cloves; but the trees were destroyed in 1653 by order of the Governor of the Moluccas (54). The final act by which Siauw was made over to the Dutch by King Amsterdam of Ternate was signed on November 2, 1677.

The Sangirese people are divided into nobles (*papung* or *bangsa*), free men (*kawanæ*) and slaves (*lang*). The nobles are again divided into the *papung tuwas*, the children or grandchildren of rajahs lawfully begotten by their wives of royal blood; the *papung beka*, the illegitimate children of rajahs by slaves; *papung timbang*, the children of the *papung beka* by slaves; and the *bobatos*, or chiefs of lower rank (14). The upper classes have no special privi-

ages except at feasts. The slaves are well treated, and either live with the prince as servants or simply bring a share of their produce to their masters. The oldest and most trustworthy slaves get the title *sahada manjura* or *marinjo* (39 A).

Mr. Steller told me that in Manganitu there are two kinds of slaves, the slaves that are bought (*budak-budak pemblian*) and the slaves that are simply inherited (*budak-budak pusaka*). It seems, according to his account, that men were made slaves for comparatively trifling offences. Thus the process of the preparation of sago³ is done in secret, as it is thought that a stranger takes away its spirit. If a man passed by the boat-shaped trough in which the rajah's sago was being prepared, he and his whole family were seized and made slaves. Again, the ground over which a fisherman was accustomed to fish becomes after his death *pilih*, or holy, and if anyone fished there, or even went over the place in a canoe, he was seized by the family of the deceased and brought before the rajah, who generally condemned him to be a slave of the deceased man's family.

When a prince died the whole village went into mourning; umbrellas and all finery were laid aside and the women wore their hair loose down their backs. If any of these signs of mourning were abandoned before the proper time the offenders were liable to be seized as slaves.

The system of slavery which still persists in many parts of these islands where the Dutch flag flies is, however, a form of slavery of the very mildest character; and it is the opinion of those who are competent to judge that the slaves are just as happy as the faithful attendants of their princes as they would be as free men.

³ This is most probably not the true sago, but the pith of the *Arenga cachariferum*.

Right and proper as it undoubtedly is to abolish every form of slavery, however mild it may be, I cannot help thinking that the Dutch are wise and just to allow the system to remain in Sangir until the people have more fully benefited by the influence of civilisation. A sudden and sweeping reform in this direction might lead to political catastrophes, which would throw the natives back for generations and lead to untold mischief to the prestige of the Dutch Government. By the establishment of elementary schools and the encouragement of missionary work, the Government is preparing the way for a certain and permanent reform in the future, and I have no doubt that in a few generations slavery will be extinct in Sangir, as it is in many of the more thoroughly colonised possessions of the Dutch in the East Indies.

The food of the Sangirese consists of trepang, turtle, various kinds of fish, the pith of the sagoweer palm, rice, Indian corn, papaya (*kowle*—*Carica papaya*), batatas (*B. edulis*), a kind of pea called siafu (probably a species of *phaseolus*), and yams.

A curious implement (fig. 27) is used by the Sangirese for flaking out the pith of the arenga palm. It is made of bamboo, and is held in both hands like a chopper or axe. When the native has felled his tree and split it in two halves, he sits down across the half which retains the sago or pith, and plies his sago chopper. By striking rapidly and sharply with the edge formed where the bamboo has been cut across transversely, the pith is

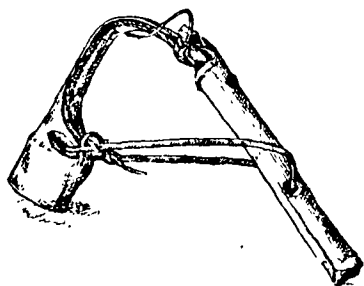


FIG. 27.—Bamboo implement used by the Sangirese for flaking out the pith from the trunk of the sagoweer palm.

separated in thin flakes, and in that condition it is ready, to be cooked and eaten.

On special occasions such as feasts the natives eat pigs and chickens and other forms of animal food.

The Sangirese suffer from many kinds of disease. Besides the ordinary forms of fever and dysentery, the most prevalent and terrible diseases are the *boba* and the *kaskade himpank*. The first shows itself at first as small sores like pock-marks all over the body, and this is followed by a swelling of the joints, which subsequently ulcerate. The *kaskade* begins with a peeling of the skin of the hands and feet, and this spreads over the whole body.

As a remedy against fever they use a decoction of the leaves of the daun bari muda (*Cratereva magna*), and they rub their bodies with sap of a species of *Psychotria*. They also use the mushroom *Pachyma tuber-regium* as a remedy for diarrhœa, fever, and other complaints.

For *kaskade* they use an ointment made of leaves of the daun burong (*Rhinacanthus communis*) mixed with sulphur and lemon juice, and they drink a decoction of the root of the same plant (14).

I have not been able to find any very clear account of the religions of these islands; but the natives seem to believe in the existence of a number of spirits, the Ampuangs, who are probably mythical ancestors like the Empongs of the Minabassers. There are a number of priests who perform certain quasi-religious functions, and that their office is probably inherited appears from the following account of a custom given by Van Doren. They maintain that anyone who is so inquisitive as to climb up the mountains must atone for it by death. An exception to this rule, however, was made in the case of certain persons whose forefathers were permitted by the gods to climb the mountains and to work miracles. People belonging to this

family made a pilgrimage every three or four months to the top of the Awu volcano, and tested by means of a stick the heat of the water of the lake which is found in the crater.. If the water was hot enough to boil their rice they considered it to be a sign that an eruption would soon follow.

The marriage customs throughout the Sangir, Talaut, and Siau archipelago are based on the old matriarchal system—that is, when a man is married he becomes a member of his wife's family, and must leave his own and go to live in the village or the house of his wife's parents. There seems to be no law of exogamy, for a man may marry a woman belonging to his own village or not, as he pleases; but in Nanusa I understood that marriage was not permitted between members of the same household. The enormous households of the Nanusa archipelago are probably the remnants of a much more complete system of intra-tribal clanships, which has become almost obliterated in the more highly developed races of Sangir and Siau.

Before a man is able to take a wife, however, he is obliged to bring a certain amount of property—or, to use the common Malay word, *harta*—to the parents of his *fiancée*. The amount of the *harta* varies of course with the locality and the rank of the contracting parties. Thus a rajah's daughter in some parts of Sangir expects a dowry of twelve slaves, twelve gongs, twelve shirts, twelve china plates, one hundred small plates, twelve swords, and one kati of gold, or its equivalent in money (85).

Divorce is by no means an uncommon proceeding, and is very readily granted. Mr. Gunther told me that in Mangarang a man is sometimes married two or three times in the course of the year. The rajah of Morong in the Talaut islands told me that in case of a divorce the children go 'where they do not cry,' and in the case of

the wife's adultery the offending man must pay a fine to her parents.

In Great Sangir if a man lives with another man's wife he must pay the husband the full harta; but if he is unable to do this, and his friends will not help him, then both he and the woman become the slaves of the husband. The only persons who are free from the matriarchal system are the sons of the rajahs, who do as they please about following their wives.

The dignity of rajah passes from father to son, but not necessarily to the eldest son. If, for example, there are three legitimate sons, the people are called together and the most fitting son is chosen as the future rajah.

Property is inherited communally by the children (14).

On the death of a rajah the body is placed in a coffin, but is not buried at once. For some days it is watched by a number of young maidens of good family, and all the people put on black garments and exhibit other signs of mourning. A great feast is also held, and the days are passed in eating and drinking and frolic of different kinds. At last the body is placed in an outer coffin, and carried to the grave with considerable ceremony.

Murder and homicide were formerly punished in Manginitu by death, the form of death being the same as that of the deed. In other parts the death punishment was by hanging to a gallows. Small thefts were punished by fines, or by cutting off the fingers, or by flogging with a rattan cane, and the punishment for incest was drowning, the victim being thrown into the sea with a stone tied round his neck.

The Sangirese have been from time immemorial a hardy and fearless race of mariners, as might be expected from the insular nature of their country. Their forests abounding in excellent timber for shipbuilding, they construct not

only the little double outriggered coasting canoes, called *lepa-lepa*, but also large sailing vessels of some 4,000 lbs. freight, called *koyangs*, which are able to go long journeys and stand very considerable seas.

Being great mariners they are also great fishermen, and wonderful and ingenious are the numerous methods by which they ensnare and capture the many kinds of edible fish. One of the most important fisheries is that of a species of herring (*Clupea atricauda*).

These herring pass in very large numbers along a constant and well-defined route, and a party of Sangirese follow them from place to place, catching large numbers of them with an ordinary round throw-net in the shallow shore waters. I cannot, unfortunately, give any accurate account of the movements of these fish, for my various informers gave me very different, and in many cases contradictory, reports. All that I know is that they appear on the coasts of Talisse during the month of January or February, and disappear again in March or April. During the herring season, if I might so call it, the favourite place for the fishermen is a little shallow sandy bay facing due west at the northern end of the island Banka. The fish, when caught, are laid out by the women in rows on strips of wood to dry, and are protected from sun and rain by a thin attap roof.

Flying-fish are considered by these people, and with justice, to be very palatable, and several methods are employed to catch them. One method is of great interest, as it seems to be precisely the same in its details as a method employed by the natives of Santa Cruz in the Solomon islands.

A considerable number of wooden floats are connected together by a string, and to each is attached a line and a single unbaited hook. Each float is weighted at one end

by a stone, fastened to it by a rattan binding, and the other end is fashioned into an angular odd figure exhibiting many variations. They are called *lawak* by the natives. I have reason to believe that originally the figure carved on these floats was that of a long-necked sea-bird, such as a heron or whimbrel, and the figure we now find is merely a conventional representation that has gradually come to be used instead of the more elaborate carving.

‘Another common method of fishing,’ says Guppy in his book on the Solomon islands, ‘which resembles in its idea that of the kite-fishing, consists in the use of a float of wood about three feet in length, and rather bigger than a walking-stick. It is weighted by a stone at one end, so that it floats upright in the water. The upper end of the float, which is out of the water, is rudely cut in imitation of a wading bird, and here we have the same idea exhibited which I have described above in the case of kite-fishing, the figure of the bird being supposed to attract the larger fish. There is, however, this difference: a glance at the figure will convince anyone that a fish is not likely to be deceived by such a sorry representation of a bird. Doubtless we have here an instance of a survival of a more effective mode of fishing, in which the idea has been retained, but the utility has been lost. This plan is in fact nothing more than the employment of a float which is thrown into the water by the fisherman, who follows it up in his canoe and looks out for its bob’ (28). In the figure the two floats on the right-hand side are from the Sangir islands, the two on the left from Santa Cruz. It will be seen at once that the bird design is much better preserved in the larger specimen from Santa Cruz than in either of those from Sangir.

The hook is a simple piece of bent twig. It is precisely similar in shape to that used by the natives of Santa Cruz, where it is made of bone or tortoiseshell. No bait is used.

The movement of the sea causes the floats, the lines, and hooks to be in a constant state of agitation.

The ordinary fishing spear, common to nearly all the Malay races, is also used in Sangir. This consists of a

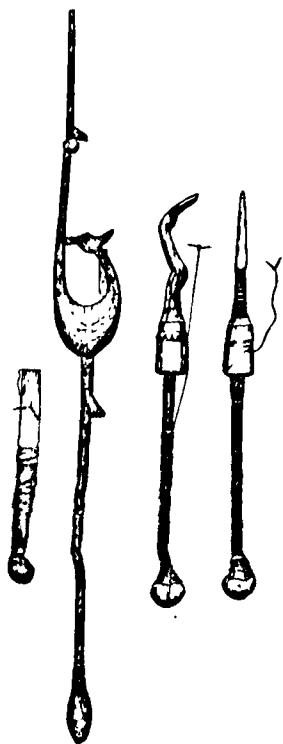


FIG. 28.—Fishing floats from Sangir and from Santa Cruz in the Solomon islands.

The two on the right from Sangir, those on the left from Santa Cruz.



FIG. 29.—The head of a Malay fishing spear.

A very common implement, used throughout the archipelago.

bundle of short hard pieces of pointed wood, fastened on to the end of a stick, so as to be separated from one another at the end by wedge-shaped spaces. This is thrown with considerable force into shallow water, where there are shoals of

small fish disporting themselves, on the chance that some of them may be wedged in between the pieces of wood or pierced by them. At best it is not a very effective weapon. .

The Sangirese also fish with the hook and line in water as deep as two hundred fathoms. The line is made of twisted *gumutu* from the arenga palm, and for bait they use pieces of pork and chicken. The fish they catch by this means are often very large. I have seen some in the hands of Sangirese fishermen that must have weighed as much as fifteen or twenty (English) pounds (14).

I am not able to give a complete account of the weapons used by the Sangirese, for when the Resident of Manado is in the neighbourhood the natives keep their fighting implements in the background.

The most important weapon, however, both for fighting and hunting, seems to have been and to be the spear. As it is impossible to obtain iron, or indeed any other form of metal, in their own country, those who can afford it are obliged to buy or steal iron-pointed spears from other islands, but the majority of the people are contented with the wooden spears mentioned above (see fig. 21).

Bows and arrows are not seriously employed by any of the Malays. In some parts of Minahassa (22) bows and arrows are used as a game for children, and this may be also the use of similar weapons that have been brought from Talaut (10).

In some parts of Sumatra the Malays use the bow and arrow for killing small game and fish, and for shooting fire-balls at the gods of sickness (48), but I have not yet come across an account of any people, undoubtedly belonging to the Malay race, who use them as their principal weapons in battle, as the Papuans do.

Iron swords are possessed in Sangir by those who can

afford them, and heavy wooden clubs are sometimes used by the lower classes.

The club in fig. 30 was taken from a man who, the police asserted, was lying in ambush to murder one of the Dutch officials as he passed by. It is made of a heavy black palm-tree wood, and remarkable for the ornamentation on the handle of the Roman capital letters A and B. It is not an uncommon thing to find savage men copying the white man's 'pictures' on to his own weapons and implements.

The Sangirese are slow in their movements and thoroughly phlegmatic in their disposition. They are but rarely seen to laugh or to become animated in conversation, and their expression is generally one of vague wonder or weary sadness. Their skin is of a light brown colour, of rather a darker tint than that of the Alfürs of Minahassa. Originally the dress of both men and women was probably a simple robe of native-made koffo, hanging from the shoulders and reaching to the knees, but since the introduction of cotton goods by the Chinese traders the men wear a pair of cotton trousers, and the women a sarong of dark blue or black material wound round the waist, and in the more civilised parts a jacket or *kabaya* of the same material. The more brilliantly coloured materials are, I was told, only worn by the wives and concubines of the Chinese.

The women, when young, are occasionally rather good-looking, but both men and women are greatly disfigured by a very prominent upper lip, produced by the constant habit of betel chewing. With us the quid of tobacco, when not in actual use, is commonly held in the cheeks, but the Sangirese hold the betel quid between the upper lip and the front



FIG. 30.
Palm wood
club from
Taruna, Gt.
Sangir.

teeth, and hence comes the hideous disfigurement of the mouth which may be seen in nearly all adults in these islands.

The women usually wear their long black hair tied in a loose knot, called *botto*, on the top of the head. Many of the men I saw had shaved the back of the head, and wore only a fringe of hair, called *paku*, reaching from ear to ear over the forehead. In some districts the children have the hair shaved off a patch on the top of the head, which they call *kusi*. The custom of shaving off part of the hair of young children is found in many other parts of the Malay archipelago. Thus the missionaries Wilken and Schwartz relate that amongst the natives of the Bolang Mongondu, which lies to the west of Minahassa, the same custom prevails, and the lock of hair is hung up in a young coco-nut under the front roof of the hut (90).

The opportunities I had of learning the Sangirese languages were so few that I must refrain from suggesting on my own responsibility any possibilities of their relationships, and for the same reason I must withhold from publication the short vocabularies of words I collected for my own use. The gospel of St. Luke has been translated into Sangirese by Mr. Kelling, of Tagulandang, and published by our British and Foreign Bible Society in London, and I understand that the whole Bible is now being translated into the same language by the daughter of Mr. Steller, of Manganitu.

CHAPTER IX

JOURNEY THROUGH MINAHASSA

Minahassa—The capital Manado—Heerendienst—Manado as a port—Exports—Start for the interior—Tondano—Condition of affairs a century ago—Ballottos—The Great Lake—*Atya Wyckii*—Kakas and Langowan—Arrival at Kelelonde—The coffee garden—Mapalus—The Tompusu pass—The forests of Minahassa.

AFTER my return from the Sangir islands I remained on Talisse island and continued my work in the forests and on the reefs, but in the beginning of January I was obliged to leave for Manado on account of an illness I contracted at the commencement of the rains, which required not only proper medical advice, but also better fare than I was able to obtain in my little island home. I will not weary the reader with an account of my long and tedious convalescence; suffice it to say that I returned twice to Talisse, once with the vain hope of being able to continue my work and a second time to pack up what remained of my collections. From January 1886 until September, when I finally left Celebes for my journey home, I lived either in Manado itself or in the mountains, and it is my purpose in the concluding chapters of this book to give a brief summary of my travels and some account of the present condition of Minahassa, together with a description of some of the customs, legends, and fables of the inhabitants, both in the past and present time.

The word Minahassa means a country that has been formed by the binding together of a number of territories into one. The principal word in it is derived from 'asa,'

meaning 'one'; the verb 'mahasa' signifies 'to join into one,' whilst the prefix 'ni' turns the verb into a substantive. The original form, Nimahasa, has since become changed into Minahassa. The chief town is Manado, or Menado, as it is more commonly spelt, pleasantly situated on the shores of a wide open bay of the same name, and divided into two parts by the river which brings the overflow waters from Lake Tondano to the sea. Its position was approximately determined by P. de Lange to be $124^{\circ} 49' 44''$ E. by $1^{\circ} 29' 39''$ N. It is divided into five districts: Manado and Bantik on the north bank of the river; Aris, Klabat bawah, and Negori baru on the south. The most important of these and the centre of the trade and government is Aris. Here we find the church, the schools, the fort, the prison, the government offices, and the houses of all the principal Europeans.

The business quarter, where the market, the *tokos*, or shops, of the Chinese and Arab traders, and the establishments of the two principal European merchants are situated, lies on the river side of Aris; the Chinese quarter extends from the market out towards the Klabat bawah district, whilst the official residences and offices extend along the shore towards Negori baru.

The market is always a scene of activity and animation, and the gay garments of the women lend colour and brightness to a spectacle which is never devoid of a certain picturesqueness and beauty. The fruit-sellers stalls are filled with the produce of the season—bananas, oranges, rambutans,¹ mangoes, pineapples, and the evil-smelling but delicious dorians. The fishmongers exhibit their stock of fish,² many of them coloured with every colour of the

¹ *Nephelium lappaceum*.

² The fish commonly seen in the market-place at Manado belong, according to Bleeker, to the following genera: Mesoprion, Lithrinus, Sicydium Julis, Leptocephalus (7).

rainbow. The cloth-sellers exhibit their sheetings from Manchester, and the red and blue *kains* printed with wonderful and grotesque patterns for the sarongs and tjelanas for the fashionable natives.

But besides those who are occupied with the business of the market, there may always be seen a number of loafers who have been attracted simply by idle curiosity or a desire to indulge in a mild dissipation. These may be found standing or squatting in little groups playing at top or drinking sagoweer, the native wine of the country, from the long bamboo vessels of the sagoweer sellers. Then there are the Chinese pedlars with their long pigtails, the Arab traders with their gorgeous turbans, an occasional European in his white duck suit and straw hat, and a crowd of car-drivers, country folk, servants, soldiers, and policemen. Stretching from the market-place up towards the district of Klabat bawah is the Chinese quarter, and at the head of it is the little Chinese temple where dwells
*the Tapi-kong.

The dwellings of the principal Europeans are, as I mentioned above, situated in the centre of Aris in the neighbourhood of the church and residency. They are well built and roomy timber houses, each surrounded by a little compound or garden, which is often prettily laid out with roses, hibiscus shrubs, crotons, and other foliage plants, whilst palms and other lofty trees afford a welcome and pleasing shade from the fierce rays of the mid-day sun.

The population of Manado consists of a very small percentage of white Europeans, a number of half-castes who are also called Europeans, Chinese, Arabs, Christian and a few Mahomedan natives, and the Bantiks, a race of Alfürs who still retain their old religion. Most of the Mahomedans and the Bantiks live on the right bank of the river in the districts Manado and Bantik.

It is impossible to give the exact numbers, but I should judge that the population of Manado must be between five and six thousand.

Two fine roads run out of Manado, one to Kema on the opposite side of the peninsula, and another to Lotta and the mountains of the Tondano district. These roads were well made in the first instance, and are kept in good order partly by the prisoners and partly by the *heerendienst*, a service which the free men of the country are obliged to perform as part of their taxation.

The system of *heerendienst* has been very severely criticised by many well-meaning persons as tyrannical and unjust, but I cannot help thinking that everyone who is really acquainted with the circumstances of these colonies and the character and condition of the people must admit that it is a service which is both necessary and just. The Dutch Government has brought to the people of Minahassa not only the blessings of peace and security, but also the possibilities of a very considerable civilisation and commercial prosperity. The natives are now able to sow their rice in perfect confidence that they will gather the harvest in due season; they are able to send their corn, their chickens, and other produce to the markets without fear of being plundered on the road and without experiencing the horrors of war and bloodshed; they pass their lives in peace and quietude from the cradle to the grave. In return for this it is only just that every able-bodied man should be compelled to lend a hand in maintaining this happy condition of affairs. In a land where the necessities of life are so easily obtained, and the wants of the people are few, poverty is inexcusable, and starvation unknown. Under such circumstances it would be impossible for the Government to obtain a sufficient number of men to labour on the roads at a reasonable wage, and in consequence they

would be either neglected or extremely costly to maintain. The *heerendienst* is, then, the only system by which the roads can be kept in a proper state of repair without overburdening the exchequer or increasing the taxation of the people beyond their capabilities. If it is true that some of the Dutch officials have occasionally used the *heerendienst* for their own personal service, it is the abuse of the system we should deprecate, not the system itself.

Turning our attention for a moment from the land communications to the sea, it seems strange that the government of a nation such as the Dutch, famous for many centuries for their nautical genius and their marine enterprises, should have paid so little attention to the necessities of Manado as a port.

It is true that the bay is and always must be an exceedingly unfavourable one for the locality of a great port, owing to the very limited and difficult anchorage it affords, and any considerable quay works would be extremely costly. But it is quite possible, at comparatively small expense, to remedy two very great disadvantages from which Manado suffers. The first of these is that none of the lights of the town are visible from the sea. On several occasions I have arrived at Manado by sea after dark, and on each occasion I noticed that not a light of any sort or description was to be seen until we were quite close to the shore. No wonder, then, that the steamers which visit Manado often waste hours in the bay waiting for the daylight to show them the way to their anchorage. If two lights were fixed, one at the river-mouth and the other in the *Negori baru*, they would be of great service to steamers approaching Manado by night, as they would indicate to the captains at least the locality of the roads. Of very great service too to mariners, especially to the masters of sailing vessels, would be a few firmly fixed buoys in the roads.

I remember watching a German barque approaching Manado one evening as the sun was setting, and wondering if she would be able to make fast before the darkness set in. She approached within a few yards of the anchorage, and I was expecting to hear every moment the rattle of the chain, when the land wind set in, and she drifted out to sea again. The next morning at sunrise she was far away on the horizon, but by the evening was again within a few yards of her anchorage. Again she failed, and again; and it was not until the fourth night after her first appearance that she reached the anchorage and made fast.

The captain afterwards told me that had there been a buoy in the roads to which he could have fastened a hawser he would have been able to get in on each of the four occasions. It was only the fear of the land wind getting the upper hand before he was able to send his hawser ashore that compelled him on each occasion to go out again into the bay.

Manado, it must be remembered, is not only the chief town of an extremely fertile and promising land, but is also within a few miles of the direct route between the centres of commercial activity of China and Australia, and it is quite possible that if a little more attention were paid by the Dutch to the development of the marine accommodation of this town it might lead to a very considerable increase in her commercial prosperity.

At present the exports from Minahassa are copra, coffee, cocoa, nutmegs, vanilla, and a few other spices, rattan, copal, ebony, and other wood, and it is quite possible that within a few years tobacco and perhaps tea will be added to the list. But Minahassa is capable of doing more than this, and with a better service of steamers trading directly with the civilised world, might in time become one of the principal centres of the trade in tropical produce.

At the beginning of April 1886 I received an invitation from a gentleman named Rijkschroeff, a former opzichter of the M. H. V. in Talisse, to visit the coffee garden of which he was then the manager, at a little village on the slopes of the Kelelonde mountain in the Tondano district. I was very glad to be able to accept this invitation, for I was very anxious to see something of the beautiful mountain scenery of Minahassa before I left, and I also had hopes that the cool breezes of that high district would so restore my health as to enable me to return to my work on the coral reefs of the coast.

The Resident of Manado kindly offered me a seat in a carriage that was to take him and two of the government officials to Tondano and the neighbourhood. We started at about ten o'clock from Manado on April 3, and after a long and rather tedious journey we reached the house of Mr. Broers, the Controleur of Tondano, at about eight o'clock the same evening.

Starting from Manado in a small carriage drawn by two oxen, passing by the little market-place of Negori baru, and the nutmeg and vanilla gardens of some of the leading planters, we arrived at Lotta, our first halting-place, a distance of six paals,³ in about two hours. The road from Lotta to the next station, Tomohon, is very steep, and runs circuitously along the slopes of the Lokon mountains. Some of the views the traveller gets as he is slowly dragged along are extremely magnificent. At one spot the wide expanse of Manado Bay, with its deep blue waters and evergreen guardian islands, Manado tuwa, Siladen, and Bunakin, spreads out beneath his feet; at another the broad and fertile plains of the river valley, extending from the Lokon to the distant Klabat mountains, form a magnificent panorama of fine rich scenery; and a little farther on

³ One paal is approximately equivalent to one English mile.

he passes along the brink of a deep ravine filled with lofty palms and other trees. In many ways this portion of the road between Lotta and Tomohon affords more magnificent views of hill and dale, of plains and distant mountains, of coast and sea than any I can remember to have seen. If it has a rival anywhere, it is the road from Kakas to Remboken, where the waters of Lake Tondano take the place of what would otherwise be missed in sea and coast scenery.

Our journey was not without incident, for before we had proceeded more than half-way one of the six oxen we had brought with us from Lotta fell down exhausted with the heat. Soon afterwards another fell, and, as a final blow to our misfortunes, the shaft broke about two miles from Tomohon, and we were obliged to complete the distance on foot. Perhaps our misfortune was as disappointing to the natives as to us, for many of the leading people had come out to meet us on horseback, and in honour of the Resident had decorated their houses and the roadside with numbers of Dutch national flags. It must have been a disappointment to many of them that our entrance into their village was so unceremonious. After a meal with a German trader and a cup of tea in the beautiful and tastefully-decorated house of the Hukum besar (chief of the district), we proceeded on our way to Tondano, but, as it was quite dark and a light misty rain was falling, we saw nothing of the beautiful scenery of this part of the road.

Tondano is a large and prosperous town situated on the banks of the river which carries off the overflow waters of the great lake. It is the centre of the coffee district, and the wide fertile plains on the shores of the lake produce an abundance of rice and Indian corn to support the large and thriving population.

The Tondanese were in olden times true lake-dwellers; they lived in houses built on piles driven into the shallow waters of the lake. The name Tondano is composed of *toi*, men, and *dano*, water, the letter *u* indicating, according to Graafland, a form of the genitive. The Tondanese, then, are the 'men of the water.'⁴ They are a branch of the great family of Minahassers, who were called *Touloûrs*, or 'men of the lake.' They were brave and warlike people, and, with perhaps the exception of the Bantiks, were the last of the Minahassers to accept the yoke of the Dutch. Unable to attack them on the land, the Dutch, under Commander Weintr   (56), with the help of the natives of other districts, brought praus and corracorras from Manado and Tanawangko, and met them on the lake. The Tondanese were eventually completely defeated after a siege which lasted nine months, and their lake-dwellings burned to the water's edge. This was at the beginning of the present century (1809), and ever since then they have, with the exception of a couple of smaller troubles in later times, remained peaceful and quiet subjects of the Dutch Government. The introduction of Christianity and civilisation by the missionary pioneers has reduced them to a condition of obedience and subjection which to colonists in many parts of the world might truly be considered to be ideal.

What a wonderful change has come over these people within the last century! As I walked through the town of Tondano on that lovely Sunday morning (April 4, 1886), enjoying the bright sunshine and cool crisp air, I could not but be deeply impressed with the order, peacefulness, and beauty of the place. The rows of pretty little houses, each one—almost a model of neatness and cleanliness—surrounded by a garden of flowers and shrubs, the quiet

⁴ The old form *Toudano* or *Todano* has become changed to *Tondano*.

and respectful demeanour of the people, who raised their hats and greeted us with 'Tabel, tuan'⁵ as they passed, the busy little market-place, and the great church with its huge bell calling the pious and sombre-clad Christian natives to the morning service, were but symbols of the general condition of peace and prosperity of the country on the Tondano lake.

Almost within the memory of some of the older inhabitants this same country was in a perpetual state of trouble and disorder.

Let us pause a moment to consider the condition of these people before the advent of the Dutch East Indian Company. The Toïloûrs were the people of the lake, and most of them lived in pile-dwellings built in the shallower waters of its shores, while the Tombûlûs, or the 'people of the bamboo,' dwelt in houses grouped together in small hamlets hidden far away in the recesses of the forests and the mountains. The Toïloûr houses were protected from the attacks of their enemies by their position on the waters, whilst the houses of the Tombulus were defended by pointed sticks of bamboo stuck in the ground all round the village, and by festoons of thorns wound round the tall piles on which their houses were built. In time of war—and it was nearly always war-time in those days—every man's house was, indeed, his castle, and no one dared to go outside the village unless accompanied by a band of armed companions.

The houses were large, as they are to the present day in Nanusa, and the compartments in which the ten or more families lived were separated from one another by mats or cloths suspended on ropes stretched across the room. On the east side of the house a spot was set apart for a square altar (*temboan*) made of bamboo sticks, and to the corners of this strings adorned with young coco-nut

⁵ The universal salutation of the Malays : ' Good morrow, sir.'

leaves were attached, which were connected with an open space in the roof of the hut or a neighbouring tree (91). These strings were, in fact, god-ladders. They were for the purpose of allowing the gods to slide or step down from the tree or the roof to the altar.

Every opportunity was taken to hold a feast, or *fosso*, as it was called, whether it was to celebrate a victory won, or to implore the assistance of the gods in an expedition that was about to start, to save the life of anyone who was dangerously ill, or to initiate a youth into the duties and responsibilities of manhood.

On such occasions the members of the family were called together, food and wine with betel-nut and its accessories were placed upon the altar for the refreshment of the gods, and the walian, or chief priest, took up his position in the centre of the group as the director and master of the ceremonies. When everyone was silent, the children ceased their play and laughter, the walian commenced by calling all the gods to be present on the occasion, and inviting them to eat and drink and to chew the betel. Then he worked himself into a state of frenzy; his own spirit, it was supposed, left him, and its place was temporarily taken by the spirit of one of the gods. Then in this half-unconscious hypnotic state, when all around were thrilled with feelings of awe, he would utter the commands of the gods, springing bodily with gigantic leaps into the air, or swaying his arms, filled with long palm leaves, delivering his words in a dull monotonous sing-song voice or yelling them out with vigour. At last he fell exhausted on his stomach and lay as one dead. The spirit of the gods had fled, and left him without one. Then another priest endeavoured to charm back his spirit by whistling for it as one would for a dog. Then they waited until he again sprang up, this time in a dazed condition, but dumb until after he had drunk

copious draughts of sagoweer and silently chewed the betel. Thanksgiving for the recovery of the priest concluded the ceremony, and the evening passed in feasting, dancing, and debauchery.

The fossos were often the occasions of the most revolting barbarity. A human head, or the body of a child, specially obtained for the purpose, had to be placed beneath the principal pile of every new house, and when the house was finished a fresh head had to be obtained to hang up in the roof (102). Victory was celebrated by the drinking of the blood of the captured enemy, or cutting his body into fine pieces (*tumuktok*) (22).

Before every expedition the locks of hair (*bõtõ*) of an enemy previously slain were stirred up in boiling water to extract the courage, and this infusion of human courage was drunk by the warriors.

Those, however, were the days of song and romance, and specimens of a rude art, characterised by what appears to us as gross obscenity, have been found.

We can picture to ourselves those terrible raids. The half-naked savages starting out by night armed with iron swords and bamboo-tipped spears, and narrow shields rather broader at the ends than in the middle, creeping silently through the forests, and re-

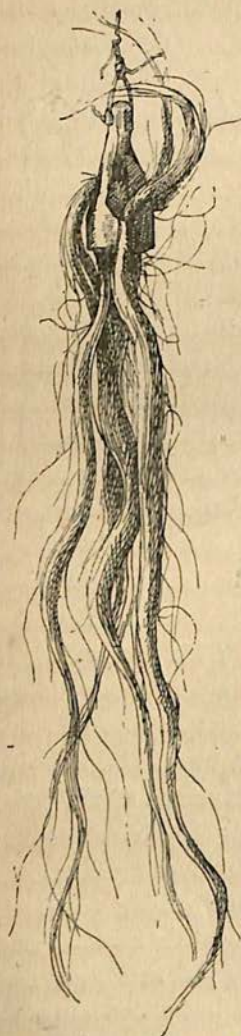


FIG. 31.—*Bõtõ*, a tuft of the hair of an enemy, usually fastened to the *sago-sago*, or sword of the priests, at the fossos.

turning wounded and blood-stained, laden with the ghastly spoils of human heads or scalps, and dragging with them piteous little children in their wake. When we remember that this was the condition of affairs at the commencement of the nineteenth century, and that at the present day life and property are quite as secure in the district of Tondano as they are in any civilised country in the world, we may well wonder at the change.

There are but few Europeans in Tondano besides the Controleur, the missionary, and a few other officials. The inhabitants are nearly all the descendants of the old Tondanese who dwelt in savage days in the old pile-dwellings on the lake. They are typical Malays in feature, remarkably fair for Orientals, strong, tall, handsome, and upright. With a curiously sad, but at the same time not unhappy or discontented, look, they are, nevertheless, far more energetic in word and action than the natives of the low-lying districts of the coast. For two days I enjoyed the hospitality of Mr. Broers, the Controleur, and the light invigorating breezes of Tondano, and then I left for Kelelonde.

The canoes that are in common use on the lake are of the most primitive and unstable type. They simply consist of a semi-cylinder, hollowed out of a tree stem, with the ends filled up with mud and grass. These canoes are called *blotto* or *ballotto* by the natives. They are not only extremely easily capsized, but require, even in the calmest weather, constant baling to keep the water out. They are of every size, from the child's *blotto* of ten or fifteen feet in length to the fisherman's craft of fifty. The rowers stand to their work, balancing themselves and the canoes at every stroke. The paddles are from six to eight feet long, provided with a flat round blade made usually of wanga wood (*Metroxylon elatum*) (56). It is really an extraordinary thing that a people so advanced in some respects

should be so conservative as still to construct and use such obsolete canoes. It is true that even boys amongst them can navigate these frail vessels with astounding skill and speed, but there can be no question that a more stable and secure canoe might safely be introduced to the notice of the Tondanese with considerable advantage to them. As an ethnological curiosity and relic of the past they are extremely interesting, and it is to be hoped that one of the controleurs who is stationed at Tondano will take care, before they are supplanted by more modern types, to preserve a few examples of the blottos for the national and colonial museums.

It was happily unnecessary for me to think of crossing the lake in one of these, for Mr. Bakker, the President of the Landraad at Manado, was about to cross the lake in a well-built European gig, lent to him by the Major of Tondano, and he very kindly offered to take me with him.

The only outlet to Lake Tondano is at its northern end. Here a lacustrine delta is found, consisting of a number of low marshy eyots and a couple of shallow channels which unite together to form the swift Tondano river. The river passes through the village of Tondano, where it is called the Temberan (22), literally 'swift flowing,' and then plunges from a height of over sixty feet into the dense jungle of the ravine, forming the famous waterfall of Tonsea lama, one of the many beauty spots of Minahassa. From Tonsea lama the river takes a northerly course to Ajer-madidi, and then bends to the west and discharges its waters in the sea at Manado.

Leaving a little landing-place on the river just opposite the house of Mr. Broers at seven o'clock in the morning, our boatmen rowed against the rapid stream towards the lake, showing us thereby how easy it is for them to learn to manage a European boat. Passing through the shal-

lower waters of the mazes of the lacustrine delta, where our course was shaded by the gigantic leaves of palms and lofty timber trees, where kingfishers and other birds of brilliant plumage, startled by our oars, flew across the bows and disappeared in the dense luxuriant foliage of the banks, we came at last to the great lake itself, a glorious expanse of calm green water, surrounded on every side by fine mountain ranges, glistening and sparkling in the rays of the morning sun.

At the northern end of the lake the water is generally very shallow, and even our experienced kamudi had some difficulty in steering clear of the numerous sandbanks which are formed there. In places, too, great tangled masses of a green confervoid growth hampered our movements and impeded progress.

Upon these floating islands of green weed and on many of the sandbanks stood troops of handsome white and grey herons (*Bubulcus coromandus*), majestically preening their feathers or fishing leisurely in the shallow waters. A little farther on and we were free from all obstacles and difficulties, and as our boat sped over the deep waters of the lake towards Kakas, our kamudi started one of the old and weird Alfür boating songs, and the rowers as they plied their oars took up the melancholy refrain.

I am absolutely ignorant of the Tondanese dialects, so I cannot tell for certain what they were singing about ; but it was probably somewhat to this effect if translated literally into English :

Pull now and let her go,
 eh-h-h-h-h,
For the waves are high,
 eh-h-h-h-h.
Forward our boat
With lightning speed,
 eh-h-h-h.

And then as we approached the shore :

Give honour, all ye villagers,
eh-h-h.

Here comes the great Tuan,
eh-h-h-h.⁶

The lake, although situated among mountains of volcanic origin, is probably not an old crater, as some persons have supposed. It is about nine miles long from Tondano to Kakas, by about three and a half broad at Remboken. It is 696 metres above the sea-level—that is, approximately 2,000 feet. The depth is said to be nowhere more than ninety feet, and over the greater part of the area the waters are very shallow. These facts suggest then that the lake is simply a portion of the tableland of the central mountain range, which lies at a rather lower level than the land immediately surrounding it, and has in consequence accumulated the waters of the neighbouring watersheds, and thereby formed a lake. The crater theory is not supported by any feature that I can call to mind.

It has been pointed out that it would not be a matter of insuperable difficulty to drain the lake, leaving in its place a vast plain of fertile land admirably suited for coffee, rice, or Indian corn culture. No one can truly say that the district of Tondano is as yet so densely populated that it is necessary, or even desirable, to undertake any such stupendous engineering work for the sake of a few square miles of fertile land. Apart from questions of economy, however, what a pity it would be to interfere in any way with this beautiful spot! The thought of turning this

⁶ Molemo wo mapatoromo éh
Maam bangko im balolongan éh
Eh londej nami
Tember i pamajang
Sumigi éh makawanua éh
Ijaimo si Tuwan wangko éh.—(22)

lovely lake into a gigantic Dutch polder is enough to give the English traveller a shock. It may be that, when a Dutchman visits for the first time a great expanse of inland water such as this, his national emotions overcome him, and he thinks unconsciously of a plan to drain the water off, and intersect it with rectangular dykes and ditches, and pictures to himself a score or more of green and white windmills, ever pumping water in or out, and a floating population of barges, armed with long punting-poles. Whatever may be the feelings of the traveller, however, the resident Dutchmen of Celebes are proud of their Lake Tondano; they love its calm peaceful waters and the panorama of the surrounding hills and mountains of unrivalled beauty and luxuriance, and they like to spend their holidays in the cool invigorating climate of its shores, and rest awhile from the cares and worries of official duties in the tropical heat of Manado in a region where everything speaks of peace and contentment. We may safely predict then that Lake Tondano will remain 'a thing of beauty' for many generations yet to come, and we may add a fervent hope that it may remain to Dutchmen a 'joy for ever.'

Three kinds of fishes are commonly caught in Lake Tondano. The kebos (*Ophiocephalus striatus*) sometimes reaches a length of two feet. It is characterised by possessing a covering of large scales over its head and by remarkably long pointed dorsal and anal fins; the betok, here called *geteh-geteh*, is the well-known climbing perch (*Anubas scandens*); and there is also a species of eel (*Anguilla Elphinstonei*). All of these fishes are very generally distributed over the East Indies.

In many parts of the Tondano river the large prawns previously mentioned as occurring in Talisse are found, but I have no certain information that they occur in the river above the Tonsea lama falls.

In the lake itself, however, there are found in great numbers a small fresh-water prawn, which I have named after the Jkhr van der Wyck, Resident of Manado, *Atya Wyckii* (38). This species differs very considerably from other species of the genus *Atya*, and some carcinologists have expressed an opinion that it should be separated from them in another genus.

The species of fresh-water prawns which are collected together in the genus *Atya* have a very wide geographical distribution, being found in Mexico, West Indian Islands,

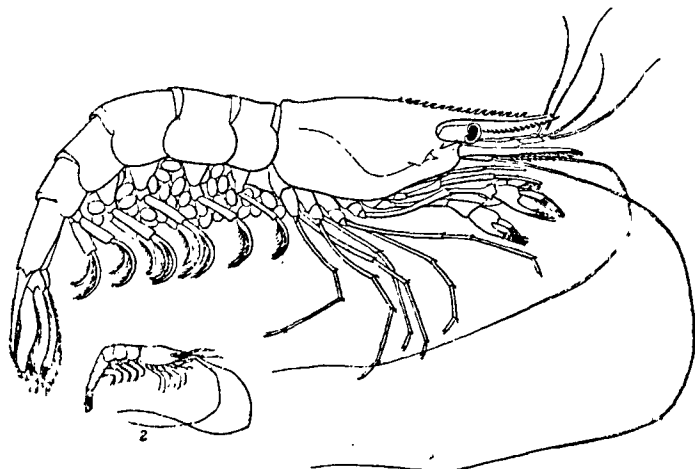


FIG. 32.—*Atya Wyckii*, a small prawn found in Lake Tondano.
2. The same, natural size.

Cape Verde Islands, the Moluccas, Philippines, Samoa, Tahiti, and elsewhere. A curious feature of their distribution is that they are but rarely found in continental rivers and lakes. The cause, whatever it may be, which confines them to the fresh water of the islands has not yet come to light. Our information is at present unfortunately not very exact as to the localities inhabited by these curious forms. *Atya sulcatipes* is said to live at a height of 300 feet above the sea-level at San Nicalao, in

the Cape Verde Islands, but I cannot find it mentioned anywhere that any other species lives as high above the sea-level as my species from Tondano.

One of the most interesting points about these Crustacea is the curious tuft of hairs found on each of the pincers of the first two pairs of claws. If these hairs be examined with the microscope, it will be found that every one of them is provided with a number of tiny recurved hairlets, shaped like a sickle. As every hair is provided with some thirty or forty of these hairlets, the tufts at the end of each pincer must act as a very efficient scouring-brush, every tiny particle of dirt and every microscopic animal and plant with which they come in contact being retained in the hairy mesh. It is very probable that the animal feeds by means of these tufts of hair, first scouring the water-weeds and mud for particles of food, and then, with the help of its hairy mandibles and maxillæ, cleaning them off into its mouth. In correlation with this habit of eating tolerably small and soft food is the structure of the mandible, which is much more delicate and hairy than most of the mandibles of the sea-prawns.

Atya Wyckii differs from other species of the same genus in its small size and in the structure of the chelæ. The entire length of the largest specimens is not more than seven-eighths of an inch, the females being usually one-eighth of an inch longer than the males. The next largest *Atya* is the *Atya bisulcata*, which is nearly an inch and a half long; many of the other species being twice or even three times as large. In *Atya Wyckii* the chela is set straight on end on to the carpal joint, as it is in a lobster or a prawn, but in all the other species the carpal joint is somewhere near the middle of the chela, so that its long axis lies almost at right angles to the long axis of the limb. It may be that the prawn in Tondano, isolated in this mountain

lake, 2,000 feet above the level of the sea, with few competitors in the struggle for existence and plenty of food, has retained the primitive condition of its fore-limbs, whilst the others, situated in places where the struggle is more keen, have undergone certain modifications of structure to fit them better for their environment.

In other words it is quite possible that the *Atya Wyckii* more closely resembles in structure the original ancestral type of the genus than any of the other species, all of which have, within comparatively speaking recent generations, become considerably modified.

As an article of food these small prawns are much prized by the natives, and the Dutchman is very glad to add the *kleine garnalen* to his list of comestibles at the *rijsttafel*.

As our boat approached the wooden pier at Kakas many interesting and beautiful sights were to be seen in the shallow weedy waters at this end of the lake. Besides the little prawns above mentioned there were countless numbers of small creatures skimming through the waters. In some places the water was quite black with mosquito and gnat larvæ, and in others hundreds of swift dragon-fly larvæ could be seen darting amongst the water reeds and weeds.

What an immense field for research there is in this lake ! I dare say that the life-history of not a single one of these numerous larvæ has yet been worked out, and there must be thousands of minute forms of animal and vegetable life that if brought to light would be of immense interest and importance. It was my hope and desire at the time to return again to Lake Tondano to investigate the fauna of its shallow waters, but, for reasons it is unnecessary to enter into here, I was never able to do so.

To continue the narrative of my journey. Arrived at

Kakas, we were received and hospitably entertained by Mr. Veen, Jun., who kindly helped me to engage a carriage to convey me to my destination, Kelelonde. I have so often spoken of the genial and hospitable character of the Dutchmen in the Indies that it is hardly necessary to add that Mr. Veen's kindness and hospitality to me was not exceptional.

The road from Kakas to Langowan might be called uninteresting were it not for the fact that it presented a remarkably different type of country to any I had yet traversed in Minahassa.

The road is broad, level, and straight. On either side of it there are vast fields of corn and plains of wild grass. There are but few patches of forest land, and those that remain are rapidly being cleared for plantations of coffee. Of the familiar palms the traveller notices that the sagoe-weer palm grows well and in abundance, but the coco-nut is scarce, and the few specimens there are seem weak and slender compared with those of the warmer regions of the coast. Birds, as might be expected, are there in thousands. Turtle-doves and pigeons, crows and scissor-tailed birds, thousands of little rice-birds, and many other kinds may be seen on every side. It was without exception the richest district for birds I had hitherto been in.

As a naturalist and sportsman I was eager to examine the avi-fauna with greater care than was possible when driving along the road in a little gig, but it was necessary to reach my destination before sunset, and I was consequently obliged to press on. Even if I had been able to study birds in this region, it is more than probable that I should not have found a single new form, for a former Resident of Manado, the late S. C. Van Musschenbroek, made such a sweeping investigation of the ornithology of Minahassa that but little more remains to be done.

Langowan is a pretty little village, and like all the other

villages in this region composed of well-built comfortable looking houses. In the middle of the high road at the centre of the village is a handsome wooden church, in some respects one of the most pleasing edifices in Minahassa, and not far from this are one or two large houses belonging to the planters and the village chiefs. In nearly every compound round the houses of the natives may be seen a number of healthy coffee-trees, some of them well-trimmed and neat, others growing in wild and disorderly profusion. In some of the better gardens there are seen roses, poinsettias, bougainvilleas, castor-oil plants, with pansies and many seedlings sent from Europe, whilst potatoes, beans, asparagus, and other vegetables are cultivated for the table. One gentleman whose garden I visited had a fine collection of birds in large wire cages, and prided himself on the great variety of flowers, shrubs, and vegetables he was able to raise.

Not far from Langowan there are some hot-water springs, and these, together with the numerous deposits of sulphur which abound in many places, tell the story of the volcanic nature of the district. Soon after leaving Langowan there is a low steep hill of a fine golden gravelly soil, and beyond that the road gradually slopes up to the highest level of the Sapūtan Pass.

This little hill of gravel looks very much like a former lake beach, and I think it is very probable that Lake Tondano, now nearly five miles off, once reached across the plains of Langowan as far as this point. The aspect of the whole country round the lake had previously caused me to believe that it must have been at one time far more extensive than it is now, but I had no evidence before of the position of its former banks.

Three miles and a half from Langowan we turned off from the high road into a track which led through the

forest to Kelelonde. The track was a very bad one for a light gig such as ours, and we jolted and pitched about in a manner that was anything but pleasant after a long day's journey. We reached Kelelonde shortly after sunset, and were received by our host, Mr. Rijkschroeff, the opzichter of the coffee garden, and the only European in the little mountain settlement. Before retiring to bed that night we played a game of cards, the recognised method of spending a pleasant evening in the Dutch East Indies. The company I cannot forget, for it struck me at the time as perhaps the queerest mixture of nationalities it had ever been my good fortune to be in. There was a Chinese trader, a friend of Mr. Rijkschroeff, who made, I fancy, a handsome income by peddling goods among the native people of the mountain districts. His partner in the game was the Arab Omar, who had driven me over from Kakas in his gig. My friend and partner Rijkschroeff was a Dutchman, born in the Indies, but nevertheless well educated and intelligent. He had served as a soldier in South Africa and Sumatra, and was full of stories and anecdotes of the varied scenes of his life and adventures. We four then—an Arab, a Chinaman, a Dutchman, and an Englishman—sat down together to play at whist in the little village of Kelelonde, situated in the heart of the primitive forest of the mountains of Celebes. We played steadily until the early hours of the morning, and the end of it all was that the Chinaman came off victorious. The next morning Omar and the Chinaman went away, and I was left alone with my kind host and the little party of native plantation labourers. The village consisted of some eight or nine houses, and a shed-like hut that was used for a school on weekdays and a church on Sundays.

I do not propose to give a detailed account of my life and experiences at Kelelonde. I was very weak and poorly

the greater part of the time I was there, so that my opportunities for investigating the natural history of the forests were limited. The coffee garden is situated upon the mountain slopes about a quarter of a mile from the village. The path to it through the forest is extremely grand, the trees being as tall and magnificent as they are in the forests of the low-lying lands, and, owing, perhaps, to the greater humidity of the climate, their trunks are even more richly covered with parasitic ferns and orchids than they are elsewhere.

A coffee-plantation is formed by clearing the forest with fire and axe, and then allowing a certain number of young wild trees to grow again until they reach the height of ten or twenty feet. These trees are for the purpose of protecting the young coffee-trees from sun and heavy rain, those most valued for this purpose being the common walantakka trees (*Erythrina lithosperma*) (17). The young coffee-trees are planted in circular beds about six feet in diameter, which are carefully kept clear of weeds.

The coffee berries are first of all allowed to germinate in properly sheltered and protected places, and the young seedlings, called the *bibits*, are then transplanted to the coffee beds. It is said that if the radicle is able to grow straight down into the soil, the tree will probably become a strong and healthy one, but if it becomes deflected by a stone or root, then the tree is usually found to be a poor one and liable to disease. If the bibit shows itself to be weak and sickly after twelve months' trial, it is taken up and a new one planted close to the same spot. A coffee bed is not abandoned until it has been tried two or three times, and it is a curious fact that very often after two or three failures the same bed will support an exceptionally good tree. The coffee-trees are allowed to grow to the height of six feet, and then the tops are cut off, so as to strengthen the growth of the lateral branches which bear the fruits.

The most favourable soil for coffee is the rich black volcanic ash that covers the mountain slopes in many parts of North Celebes. The trees grow and produce fine large berries up to 4,000 feet above the level of the sea. The finest and largest plantations are in the Tondano district, at a height of between 1,500 and 2,500 feet.

Until quite recently, coffee was a Government monopoly in Minahassa. The plantations were chosen by and in the charge of the Controleurs, all the labour being performed by the natives under the direction of their local chiefs. The Government paid the chiefs a certain price per pikul for the coffee, sufficient to pay the wages of the labourers and leave a small surplus for their own benefit, and then it was brought down to the magazines in Manado and shipped to Holland. At the present time there are a few plantations held by private firms, but the majority of them still belong to the Government. First-class Manado coffee is said to be the finest the world produces. It certainly commands a very high price in the Amsterdam market, where the Austrian and Russian buyers compete with one another to obtain it.

A few years ago Minahassa was quite free from that terrible scourge, the 'coffee-leaf disease,' but it has since made its appearance in the southern districts, and notwithstanding the efforts that are being made to stamp it out, it is greatly to be feared that it will spread.

Besides the fungus disease, the coffee has many other enemies. In the Kelelonde gardens rats and mice were a great scourge. These rodents seem to have a fancy for the succulent stalks of the berries when they are nearly ripe, and they nibble at them until the berries fall. The large long-haired black rat (*Mus xanthurus*) is one of the worst offenders in this respect.

In every garden there are a certain number of ordinary

cats which have run wild, and these, it may be supposed, have a tendency to keep the numbers of the rodents down.

The natives are unfortunately very fond of cats, not as pets, but as articles of food, and it is consequently necessary to make a strict rule in every plantation that the labourers are not allowed to catch and eat them.

Unless he knew beforehand the links in the chain of argument, a stranger might be considerably puzzled should he be asked to explain what harm it would do the coffee if the natives were allowed to eat cats.

Kelelonde is about 4,000 feet above the sea, and it takes its name from the mountain peak on the slopes of which it stands. Mr. Rijkschroeff told me that Kelelonde literally means 'a canoe turned upside down'; but I must confess that I could see but little resemblance to such an object in the broad flat peak of the mountain.

The whole range is very volcanic. Hot-water springs and sulphur deposits, found in many places in the district, tell only too plainly the tale of the hidden fires; but, if further evidence were needed, it could easily be found in the fine old crater of the sister peak, where dwells the god Saputan, the Vulcan of the Alfür's mythology, whose mighty hammer may be heard from time to time as he works in his mountain smithy.

I stayed at Kelelonde about a fortnight without materially benefiting my health, and then returned in Omar's gig to Manado.

Just before we came to Kakas we met a man waving a large Dutch flag, followed by two others beating drums and a crowd of natives. I asked Omar what the fuss was all about. He told me it was a *mapalu*.

The *mapalus* are very interesting gatherings, and, as they play an important part in the life of the natives of

these parts, I must ask for the attention of the reader while I endeavour to explain their meaning. The mapalu may be briefly stated to be a gathering of the natives to work gratuitously in the fields of a neighbour—to sow, to reap, or to dig for a member of the village community without receiving any reward beyond a certain amount of food and hospitality.

The mapalu system is so closely connected with the idea of communal or tribal possession of the land, that it will be well first of all to consider the laws of land tenure of the Minahassers. It seems probable that in early times the ancestors of the Malay races which at the present day inhabit the peninsula of North Celebes were divided into a number of tribes, or rather large family clans, each of them inhabiting certain given districts with definite limits. They lived upon the fish they caught, the produce of the chase, and what fruits and roots they could gather in the primeval forest. Every individual member of the clan had the absolute and complete right to anything he could capture or find within the limits of the district. There was no division of the wild uncultivated land, but all the members of the clan had equal rights to enjoy its benefits. In time of war they joined together under the leadership of the elder or chief to defend the common property, and with one heart and hand they often fought together to steal a portion of their neighbours'. With the development of the territorial idea there came a rude form of agriculture. Portions of the forest were cleared and cultivated, and new laws were introduced to regulate the possession of the land thus opened up. It must have been at about this stage in the history of their social development that the simple family clans grew to be more complicated tribes. The land laws were, however, still based upon the central idea that the land belonged communally to the people, and they

conceded only certain rights of use and profit to individuals and their heirs for ever under certain definite conditions.

We find, then, under those conditions of society that the district was divided into (a) lands which had never been opened up and cultivated, *i.e.* primitive forest, called *talun*, and (b) lands which had at one time been cultivated, called *uümaan*, which were again divided into (1) lands which were actually at the time in cultivation (*uma*); (2) lands which had lain fallow for one or two years (*rekat*); (3) lands which had lain waste for four, five, or six years, and were yielding crops of young short wood (*sawukaw*); and (4) lands which had lain waste for many years, and were already covered again with large forest trees (*kakaian*).

All the members of the tribe had equal rights over all the *talun*, or primitive forest, in their district. In this respect the noblemen and chiefs were no better off than the humblest individual. It was never sold to members of a neighbouring tribe, and could only be let to them for a year at a time by the consent of all the people.

Every man could demand a portion of the forest to cultivate, and it then became his own private property, and was inherited by his heirs. He could not make any claim upon it unless he opened it up. No man had any claim to any portion of the primitive forest he had not cleared and cultivated. If any portion of the land remained uncultivated for many years after it had once been opened up it reverted to the tribe.

In former times cultivated land was usually held communally by families in the tribes. This was owing to the prevailing custom that when a man who had opened up a piece of forest land died, the real property was not divided among his children, but descended undivided and communally to them as the *pusaka*. Nowadays, however, it is becoming much more common to divide the real

property among the heirs, and it then remains the private property of individuals, or *tanah pasini*. But traces of the old family system still remain in the custom of leaving a small portion of the property communally to the heirs to form a bond of union between the members of the family.

It must not be supposed that even in olden times a man could seize upon any piece of forest that he fancied, and forthwith commence to clear and cultivate it. The choosing of the ground was always left to the agricultural priests, who were guided in their choice by the cries of birds. In modern times it rests with the administrative chief under the Controleur to allot new land to the people.

The *pusaka*, or land held as common property by all the members of a family, was under the same kind of control as the *talun* of the tribe. It could not be let or sold to anyone without the consent of all the members of the family, and, furthermore, the tribe always retained the right to forbid the families to sell or let their property to persons of another district (98).

With this general conception of the unity of family and tribal life running through all the laws of the people of Minahassa, the system of the *mapalus* is perfectly consistent. It must be a survival of the days when a man regarded all the members of his village as his relations, and was as willing to help them in their work and wars as they were to help him. 'We must be careful,' said the beautiful Mogogunoi to the King of Bolang, who wished to abduct her, 'for the whole population of the district belongs to the family of (my husband) Matindas' (see p. 310). When anyone finds it necessary, then, to sow or reap or plough his field, he does not hire labourers for a wage, but he goes all round the district carrying a large Dutch flag, followed by his sons or brothers beating drums (*tifa*)

and gongs (*kolintang*). The men and women of his village—for field-labour is by no means restricted to the sterner sex—come to join him, and, when there are enough of them, they proceed with songs and laughter to the field, where each one has his work allotted to him.

When the sun sinks to rest, and work for the day is done, the merry party of free labourers repair to the house of the owner of the field. A pig is killed for the occasion, a sumptuous allowance of rice and sagoweer provided for each guest, and the evening is spent in feasting, singing, dancing, and general fun and frolic.

The social part of the proceedings in the evening is no doubt considered by the younger people to be the most important part of the *mapalu*. It is on such occasions that the young maidens win the hearts of their faithful swains; it is then they learn to dance, to sing, and to recite; at *mapalus* they learn the gossip of the district. All the old songs of love, romance, of peaceful agriculture and terrible war are repeated, the legends of their ancestors and the stories of their gods are recited, the village poet reads his compositions, the musician plays his variations on the bamboo flute, while the *walians*, or priests, sanction by their presence the proceedings of the night, and secure the blessings of the gods on the labours of the day.

When we reached Kakas Omar changed his horse and brought with him a spare one for the journey. For the first few miles our road ran between low marshy fields, where several men and women could be seen up to their knees in mud, sowing rice or trudging leisurely beside the buffaloes that dragged the plough. Approaching the village of Paso the road began to rise a little, affording pretty glimpses of the surrounding country, but it was not until we had passed Remboken and were mounting the hillside which leads to the Tompusu Pass that the glorious panorama of the lake,

the forests, and the mountains burst upon us in its full magnificence. Nowhere in the wide world, I thought, can there be a scene which equals this. The brightness of the blue sky and the broad waters of the lake, bearing an image of every fleecy cloud that crossed the arch above it, were each perfect of their kind ; and then the green luxuriance of the plains, the endless forests stretching over hill and dale, and melting in the purple mists of the distant mountain-tops, which stood like giant guardians of the land, together formed a picture that no pen can adequately describe.

Everyone, however dull and emotionless he may be, must at times be moved by noble scenery, and I know of none which fills the breast with livelier feelings of hope and happiness than does the mountain scenery in the tropics. It was on the crest of the crater of the Gedeh in Java, when the rising sun first tipped the clouds below us with red and golden crests, and then burst in all its glory upon the wide expanse of rich and fertile fields of that happy land—it was there I first experienced the feelings that were afterwards to be repeated on Tondano lake.

The snowy fields and imposing precipices of the Norwegian fiords, the bold and fascinating scenery of the west of Scotland, the wild mountain ranges of the north of Wales, grand and glorious as they are, did not affect me in precisely the same way. It is perhaps the sense of vast and unexplored resources in these lands of vigorous and luxuriant growth, the prospect of a future for humanity in these wild domains, a feeling that with all its misery and troubles the world is not exhausted yet of things which lead to happiness and prosperity, which makes the traveller's heart beat quicker with a sense of gladness as he gazes on a scene like that from the Tompusu hill.

The sun was shining brightly as we harnessed the fresh horse to the gig, and drove in tandem up the steep hill.

As we crossed the pass, however, we saw some heavy clouds hovering over the fields around Tondano, and by the time we reached Tomohon the rain came down in torrents.

During the worst part of this shower we were fortunately able to take refuge under the roof of a little bridge which crossed a rivulet. It often strikes people who visit these regions for the first time as a strange thing that all the bridges should be protected by roofs of attap, but one can readily see the necessity for it. Exposure to the cold and soaking rains and the burning rays of the tropical sun would soon work irreparable mischief even to a well-built wooden bridge. An ample roof of attap, although it cannot defend them from insect pests, protects from the worst effects of exposure to sun and rain, and keeps them safe and sound for several years.

As we drove past the wild forests of the Tompusu Pass, and then descended into the more cultivated plains around Tomohon, I could not but deplore my lack of botanical knowledge. Most of the trees, many of them strikingly beautiful in growth and foliage, were absolutely strange to me, and I cannot even indicate to the reader their position in the vegetable kingdom. An oak tree (*Quercus moluccensis*) could be recognised, and a small tree with poplar-like leaves, which I took to be Reinwardt's *Carumbium populifolium*. The difficulty which the naturalist has to contend with in such a country as Celebes is that the forests are composed of a large variety of trees belonging to different orders, and it is only with the greatest difficulty he can obtain specimens of the leaves and flowers for identification. The forests are not mainly composed, as is usually the case in Europe, of a number of trees belonging to one or two species only, but it is really not an exaggeration to say that every tree one comes across in the Celebean forests is specifically different to all its immediate neighbours.

A square mile of forest in Celebes is as a patch of turf in England, composed of many different genera and species belonging to widely different natural orders (11). The reason of this may be that the soil and climate of the mountain slopes in the tropics are particularly and equally favourable for the growth of forest trees; and as the struggle for existence in a given area is known to be more severe between plants of the same species than between plants which are not, the forests have in the course of time, by a process of natural selection, assumed their present heterogeneous aspect. It is only in areas where it requires some special or extraordinary power of the trees to resist unfavourable conditions that we find one species or genus flourishing in large numbers in the same forest. Thus but few trees in the world possess the power of resisting the action of salt water; and consequently we find that the mangrove forests are composed of, comparatively speaking, few species, and in that respect offer a striking contrast to the neighbouring forests on the dry land. It is, perhaps, some exceptional power possessed by the pines, firs, oaks, &c., to resist cold or heavy winds or to subsist on a poor soil which has caused the paucity of species in the forests of cold and temperate climes.

It is a curious thing that at present our knowledge of the botany of North Celebes is very scanty. The ornithology and entomology of Minahassa have been very thoroughly investigated by several competent naturalists; but since the time of Reinwardt scarcely a single botanist has devoted himself to a study of the plants of this district. Considering the unexampled facilities the colony offers for quiet and uninterrupted work in natural history, and the many forest-clad mountain peaks which probably support a flora of exceptional interest, it is to be hoped that this hiatus in our knowledge will soon be filled up.

CHAPTER X

MYTHOLOGY OF THE MINAHASSERS

Stone implements—Cosmologies—Legend of the origin of sun, moon, and stars—Story of Wailan wangko—Religion—Story of Warereh—List of the principal gods—Spirits—Native prayers—Demons—Priests—Holy birds—Fossos—Shamans—Giants—Story Parepej—Story of Utahagi.

In the previous chapter I have referred to the marvellous changes which have taken place in Minahassa since the arrival of the Dutch colonists. Wars, assassinations, and revolting savage customs have disappeared, and the people have now become peaceful, industrious, and law-abiding.

Much of this improvement must be attributed to the wise administration of the Dutch officials, but the burden of the task has fallen on the shoulders of the missionaries, whose heroic and self-sacrificing efforts to civilise and educate the native population have produced results unequalled in the history of Christian missions. It is not the native only, however, who owes a debt of gratitude to these noble men, for our scholars are indebted to them for the painstaking way in which they have collected and recorded the myths, legends, anecdotes, and fables of the heathen period, and thus saved from inevitable destruction a mass of facts of ever-increasing interest and importance. I am not exaggerating when I speak of the 'inevitable destruction' of these things, for the rapidity with which savage man forgets not only the myths and religions of his forefathers, but even their customs and appliances, is really surprising. The Indians of Guiana, for example, are ignorant of the

use and even meaning of the stone implements which were actually used by their ancestors only three generations ago, and Professor Haddon (30) has recently called attention to the remarkably rapid pace at which the natives of Torres Straits are losing all acquaintance with their former customs and weapons.

We have an example of this forgetfulness of the natives of the weapons of their ancestors in the so-called lightning stones (*watu-ing kilat*) of the Minahassers. These are undoubtedly stone implements that must have been used by former inhabitants of the country, but are now said to be found in bamboos which have been split by lightning. In some districts they are wrapped up in dry leaves and placed in a pot of water to cause rain (66), but by the Tombulus and Mongondus they are used as preventives against lightning (55). This shows conclusively that the Minahassers have so forgotten the use of these stone implements as actually to attribute to them a supernatural origin. We are, it is true, not perfectly certain that the ancestors of the natives now living in this peninsula ever used stone implements. It is more than probable that the stone men did not inherit the iron weapons, but were defeated, and possibly destroyed, by them; but, nevertheless, the Malay who conquered must have also seen and probably felt the use of the stone weapons, and it really is remarkable that he left no record of them in the stories or romances he handed down to his descendants.

Not the least interesting of the many queer things which seem to cast a halo of interest around the old stone implements is the fact that so many races have considered them to be in some way or another connected with the thunderstorm.

Here in Minahassa we find them called lightning stones; in England, even to the present day, there are many good

country folk who firmly believe that the flint implements that they from time to time find upon their fields are thunderbolts. Strange as it may at first seem to many of us, this is but one example out of many which help to support the view that the fundamental ideas of primitive man are the same all the world over. Just as the little black baby of the negro, the brown baby of the Malay, the yellow baby of the Chinaman are in face and form, in gestures and habits, as well as in the first articulate sounds they mutter, very much alike, so the mind of man, whether he be Aryan or Malay, Mongolian or Negrito, has in the course of its evolution passed through stages which are practically identical. In the intellectual childhood of mankind natural phenomena, or some other causes of which we are at present ignorant, have induced thoughts, stories, legends, and myths that in their essentials are identical among all the races of the world with which we are acquainted.

The first series of beliefs I shall deal with are those concerning the origin of the world, of mankind, and of the heavenly bodies, and the current ideas concerning the present support or basis of the world. In other words I shall now briefly describe the cosmogony and cosmology of the Minahassers.

The first legend is, or rather was, for most of the natives are Christians now, current in the northern districts of Minahassa.

It may be thought a very unsatisfactory explanation of the origin of the world on account of the vague reference in the beginning to Lumimuüt's home and parents, but after all it is quite as good as any other explanation offered by primitive man. The mind is finite and the universe is infinite, and consequently it is necessary for man when he attempts to explain universal problems to draw the line somewhere. The line is most generally drawn between the

god who made the world and his parents. It is so in this cosmogony. It is so in many others.

The story of Lumimuüt, then, is as follows :

When Lumimuüt could walk she left her parents and birthplace in a canoe, taking with her a handful of earth, which she threw on the sea to the great god, saying, 'If I am indeed your offspring let a great land arise where I can live.' And immediately there sprang up out of the sea a great land. The ground, however, was soft and slippery. Thereupon she struck a great rock, which split in two, and out of the split came forth Kareima. 'Who are you?' said Lumimuüt. 'I am the priestess Kareima,' said she. 'But who are you?' asked Kareima. 'I am called Lumimuüt.' 'How many people are with you?' asked the priestess. 'I am alone,' was the answer of Lumimuüt.

After some days Kareima said to Lumimuüt, 'Turn your face to the south!' While she did this the priestess prayed, 'O Cause of the east wind, fertilise this woman.' Lumimuüt, however, perceived nothing. Then, on the command of the priestess, she turned to the east, to the north, and finally to the west, and each time the priestess prayed that the deity of the wind would fertilise her.

Her prayer was answered, and Lumimuüt by the god of the west wind begat a son named Toar. When Toar grew up Kareima took two sticks, one of the plant called *tuis* and one of the plant called *assa*, and cutting them of the same length gave one (*tuis*) to Lumimuüt and one to Toar (*assa*) saying, 'See here are two sticks of the same length. Go you, Lumimuüt, to the right and you, Toar, to the left, and whenever you meet anyone measure sticks. Then if they are of the same length you are mother and son, but if one is longer than the other come to me immediately at the centre of the earth.'

Both went on their way, but after a time Lumimuüt

and Toar met without knowing one another, and on measuring sticks they found that Lumimuüt's stick was longer than Toar's, for the tuis stick had sprouted out and grown. Thereupon they returned to Kareima, and when she had measured the sticks she said, 'You are not mother and son, therefore you must become man and wife. Be fruitful and populate the earth.' So Lumimuüt and Toar became man and wife. They begat many children, 'twice nine, three times seven, and once three.' The 'three' are the Pasijowan, of whom one was the priest Leleen at Waren-
dukan in the air, from the other two the people of Minahassa trace their descent.

When these children had multiplied and spread over the earth, Lumimuüt called them together at Pinahawëtëngan, and divided the country amongst them. One quarter in the north-west she gave to the Tombulus, another quarter in the north-east to the Tonseas, another in the south-east to the Toütumaratas, and the fourth quarter to the Toütemboan (22).

This legend of the origin of the earth and its people is full of interest to the student of cosmogonies. The story of the conception of Lumimuüt by the god of the west wind, as Wilken (91) shows, exhibits traces of the very common myth of the marriage of Heaven and Earth. Lumimuüt is the earth goddess, the fruitful mother of all things; the west wind is the one which brings the rain and fertilises the earth.

The people of Minahassa seem to have kept very complete genealogies, and traced their descent directly from Lumimuüt, the mother of all men. Wilken was able to give the complete genealogy of Albert Waworuntu, the Majoor of Sarongsong, and of Roland Ngantung, the Majoor of Tomohon. These genealogies commence in precisely the same way, and prove conclusively that, although the

custom has now changed, these people originally traced descent through the mother.

Thus, commencing with Luminuüt, we find in the family tree of Waworuntu, that her daughter

Pasijowan by her husband Rumengan begat Kinaambangan,
Kinaambangan Mokointempai begat Manembu ;

and then the genealogy changes, and the descent is traced through the father :

Manembu by his wife Retawene begat Winutaan,	
Winutaan	Roror begat Pandeiro,
&c.	&c.

And in the genealogy of Ngantung we find precisely the same thing :

Pasijowan by her husband Palapa begat Rinengan,
 Rinengan „ Lumainang begat Rindengan,
 Rindengan by his wife Intoring begat Menembu,
 Menembu „ Kinetar begat Waturijamassen.

In the cosmology of the Minahassers we find it mentioned that the whole earth is borne by a pig belonging to the god Makawalang, who dwells in the under-world. Earthquakes are caused by the pig rubbing himself against the trees.

Another version of the story, however, says that the world does not stand on the pig itself, but on a number of piles, and the earthquakes are caused by the pig rubbing himself against them (91).

A similar belief to this occurs in the cosmology of many of the Malay races of the Archipelago. Thus the Bolang-Mongondūs believe that the world rests on the horns of a great buffalo, and whenever a fly settles on his ears he shakes his head, and so causes the earth to quake (90).

According to the inhabitants of Roti island, the Niasers, the Bataks, and even the Fijians, the earth rests upon a gigantic snake. The Menangkabawan Malays of Mid-

Sumatra believe that the earth rests upon an ox, and that the ox stands upon an egg, which is borne by a fish, which swims in the water contained in a stone cup (91).

This is the story of the origin of the sun, the moon, and the stars (89).

‘Lingkambene lived at Kinupit with his daughter Pandagian. During the celebration of the Mahatatambulelen it happened one evening that Pandagian remained at home and took no part in the fun. Her mother rebuked her for this, saying, “Are you satisfied to see only the shoulders and backs of your friends who are amusing themselves with singing and dancing?” Then Pandagian arose, went to her acquaintances and joined in the fun. When the fun was over after midnight she returned home, but found the ladder drawn up. Then she cried, “Mother, mother, let the ladder down”; her mother replied, “Ask your father.” “Father, father,” she cried, “let the ladder down”; he replied, “Ask your grandfather”; but her grandfather bade her ask her grandmother. Her grandmother referred her to her eldest brother, but, as he would not help, she besought in turn her younger brothers, her sisters, her uncle, her aunt, and so on through all her family. Receiving no help, she laid some leaves one upon the other, and began to pray, saying, “O Rimasa, lower the ladder for me. O Rimasa, lower the ladder for me.” After she had said this three times she heard a noise coming from above like the sound of golden chains, and saw a golden chair suspended by golden chains lowered from the sky. Having seated herself on the golden chair she prayed, “O Rimasa, take me on high.” Having reached the height of the windows of her parents’ house, she cried out, “Parents, grandparents, brothers, sisters, uncle and aunt, none of you would help me; now I have no longer need of you, remain where you are.”

'When she had reached the top of the house she again cried out words to the same effect. Then the whole family came out from the house deeply distressed at seeing her carried away on high, and cried, "O Pandagian! come down again; here are nine pigs that shall be slaughtered for you." Then she answered, "It is too late, too late, I have no more need of them," and as she said this she rose higher and higher in the air, until at length she disappeared from sight.

'When she arrived at the heavenly village Kasendukan, her hands and her feet were bound together, and a stick of the Lahendong tree passed through them, and thus she was carried to the river and there washed.¹ Then she was killed, roasted, scraped, again washed, cut open and her entrails removed—treated, in fact, just like a slaughtered pig. But all this painful treatment redounded to her honour. For from her forehead and face arose the sun, from the back of her head arose the moon (the spots on the moon are the wounds she had on her head), her right eye became the star of the year, her left eye the star Pamusis, her heart the morning star, her liver became the three stars, her lungs the seven stars, and her body, which was chopped into fine pieces, became the other stars. The glow-worms received their lights from the scraps that fell from the chopping-block.'

In many of the legends of the people of Minahassa, we find traces of the influence of the Catholic priests. This influence seems to have caused in many cases both a change in the names of the heroes and a considerable modification in the character of the legends.

The following legend is an example of this (22): 'The

¹ This is a method of binding pigs, which was formerly employed in Minahassa. A picture in the narrative of the voyage of the 'Astrolabe' (78) shows a babirusa pig bound in this way.

empung² Wailan wangko was alone in the world. Then an island became visible which rose from the water. A coco-nut tree was cast upon the island, and a tree grew there called Mahawatu. Then the empung Wailan wangko took the coco-nut tree which had been driven ashore and broke it in two, when lo! a man came out, whom the god called Wangi.

'Then the god Wailan wangko spoke to Wangi and said, "You remain now upon the earth whilst I climb into the tree Mahawatu." Then said Wangi, "It is good." But Wangi considered with himself, and climbed up into the tree Mahawatu and said to the god, "I have come to ask Wailan wangko why I must remain all alone upon the earth."

'Then the empung answered him and said, "Go back again and take some earth and make two figures, one a man and the other a woman." This Wangi did, therefore, and both the figures were human, and they could walk about, but they could not speak. When this was done, Wangi again climbed into the tree and asked the empung Wailan wangko, "How now! both the figures are well made but they cannot speak."

'Then the empung Wailan wangko said to Wangi, "Take this ginger and blow it into the skulls and ears of your figures that they may speak and give them names also; to the man you shall give the name Adam, and to the woman the name Ewa."

The Wailan wangko of this myth is the great god of the southern districts of Minahassa. He is generally nameless, the 'I am that I am' of the Alfür, the Almighty Lord who made the Earth. He is sometimes represented as sitting in a tree on an island from the principal event in the above legends (23).

² 'Empung' literally means a grandfather, and is used as the generic name for the gods.

It is a curious circumstance that whilst in the northern districts the principal deity and her first offspring are represented as women, in the southern districts both the Wailan wangko, the great god, and the miraculously formed first human being, Wangi, are both men.

It should be noted, however, that in the story of Wailan wangko no attempt is made to trace any blood-relationship between him and Wangi, nor between Wangi and Adam and Ewa, so that the natives of the southern districts do not trace their descent from the first gods as they do in the north.

From this fact, and the undoubted traces of some Christian influence, it seems probable that the story of Wailan wangko has been profoundly modified within comparatively speaking modern times, that, in fact, some of the teachings of the old Catholic priests have become grafted on to the native myth, and some of the names of the native heroes changed to those of the Hebrew scriptures.

The religion of the Minahassers was a differentiated form of animism. They believed not only that certain trees, rocks, waterfalls and other objects were possessed of souls, but also in a number of free wandering spiritual forms of various ranks, powers, and capabilities for good or evil.

There is little reason to doubt that the origin of the religions of savage races may be traced to a form of fetichism, a belief that every natural object with which the savage came into daily contact possessed a soul or fetich. These fetiches were the cause of the growth, the flowering and the fruiting of the trees, the sound of the waterfall, the dangers of the rocks, and the perils of the mountains. It was the belief in them which caused, under certain circumstances, the tabu of the South-sea islanders, and the same thing occurs in Sangir under the name 'pilih,' and in Minabassa and Bolang Mongondu under the names 'lii' or 'poton.'

A further advance was marked by the introduction into their spiritual world of the spirits of deceased chiefs who lived for ever, not in the form of the fetiches of places so much as in the form of wandering ghosts haunting the scenes of their former triumphs and experiences. Then, when men began to record with greater accuracy their genealogy, their remote ancestors were elevated to the rank of powerful gods dwelling in the heavens or the under-world, to whom prayers must be said and sacrifices offered to avert disasters and secure blessings, and a crowd of lesser deities and spirits introduced from some of those who were more recently deceased.

It was in this stage of religious belief that the missionaries found the people of Minahassa. They believed in a series of ancestral ghosts of the rank of first-class gods, in a crowd of lesser deities, protecting spirits and demons and a few fetiches connected with certain holy trees, the forests, dangerous or prominent rocks and cliffs, noted waterfalls and streams and other natural objects.

The principal god of the natives of the northern districts was Lumimuüt, the universal mother of all men; and next to her came her first-born children, the twice nine group of the Makaruwa sijow, the thrice seven group of the Makatëlu pitu and the three Pasijowan.

These were the principal empungs or gods. Most of them dwell in four villages in the heavens called Kasosoran, Kalawakan, Kasendukan, and Karondoran (89). In former times it appears the gods were not exclusive, but would at times leave their heavenly abodes to walk amongst mankind on earth. The following legend of the bold bad Warereh explains the reason of their latter-day exclusiveness (58):

‘Once upon a time the Lokon was very much higher than it is now, in fact so high that it reached into the

heavens. In those days the gods frequently turned their steps earthward to walk amongst mortals, and rich blessings ever followed in their footsteps.

“I wonder what it is like above there in the dwellings of the immortals?” said the proud and inquisitive Warereh.

‘His curiosity gained the mastery over his prudence, and he went to the Lokon to see. Higher and higher he climbed over the rocky and difficult ground, until at last he reached the top and gazed on the noble mansions of the heavenly choir. Prouder than ever he returned to earth and boasted of all he had seen. But he always wished to make the ascent again and gaze once more on the pleasant places of the gods. At last he was discovered and the immortals swore to be avenged. But Warereh fled and hid himself in the mountains for a long time. Eventually he felt a superhuman strength in his limbs and dared to venture forth to meet the angry gods.’

‘Armed with a terribly long sword he hastened to the mountain, and with one lusty stroke the top of the Lokon was cut off. Taking it up on his shoulders he carried it beyond the Tonsea and set it up as the mountain which is now called Klabat. Not satisfied with this exploit, he tried another stroke, and the portion he cut off he threw into the sea near Wenang (the modern Manado), and there it remains to this day as the Manado tuwa Island.

‘The punishment for his misdeeds, however, speedily followed. Shunned and hated by all men, he had to pass the remainder of his days in solitude.

‘Ever since the time of the bold and wicked Warereh the immortals have lived their lives apart from mortals, and the blessings which followed on their footsteps are sought by men in vain.’

According to another legend (89), it was the Klabat

mountain that was formerly the way from the earth to the heavenly village Kasendukan. ' In olden times, there was no rice in Minahassa, but a certain man, Tuleng by name, heard a rumour that this cereal was grown in Kasendukan, so he paid the gods a visit to see if he could persuade them to sell him a few seeds. After several fruitless attempts to buy them, he at last decided to steal some. He succeeded in doing this, and brought the stolen grains to earth. When, afterwards, the dwellers in Kasendukan heard of the theft, they determined to kill Tuleng; but before they had started for this purpose, Sumangi, the brother of Tuleng, succeeded in cutting off the top of the Klabat and thus effectually frustrated the immortals in the execution of their fell design.'

It must not, however, be supposed that all the empungs dwell in the heavenly villages. Thus, the Makawalang dwells in the under-world, Saputan dwells in the volcano of that name, Rumengan dwells in the Mahawu, and Pinoutoan up the Lokon.

Other gods of considerable importance were : Muntuuntu, in some places recognised as the chief of the gods. He seems also to have been the guardian of the gate of the heavenly village Kasendukan. Lembej was the distributor of riches. The empung Totokai was the patron of the head-hunters. Tingkulengdeng, the herald of the will of the gods, and Mualongan, the empung who combated the evil spirits or sakits (16).

One of the most important of the gods was Mandej (22), the first-born of the Makaruwa sijow. He dwelt at Lamperan in Tomohon, and had the control of agriculture. He was born at Tuür-in-tanah, literally the "tree of the earth," and had one true wife Rawembene, by whom he begat five children, Reko, Menso, Runtulumingkan, Runturumosok, Porong nimiles.

The agriculturist always found it of the greatest importance to pay due reverence to Mandej, and on every important occasion to give great fossos or feasts in his honour.

In the neighbourhood of the fields the priests placed holy stones about a foot in height, upon which the little quadrangular altars or paposanan rested, and anyone who violated those holy places, or neglected to bring to them the necessary offerings, was liable to bad fortune, violent sickness, or even death.

Of the minor spirits, we find two well-marked classes, the empung-rengarengan, who were the protecting or household gods, and the demons—*se sakit*—the evil spirits of sickness and bad luck. Each man had an empung-rengarengan, who was born with him and grew up with him, who accompanied him on all his journeys, and was ever present to protect him against injury, evil spirits and sickness. The empung-rengarengan literally mean the gods of the same age (91). As Wilken points out, they correspond very closely with the 'genii' of the Romans.

These guardian spirits are constantly referred to by the natives for protection and advice, and are appealed to in their prayers after the true and mighty gods. Some examples will serve at the same time to illustrate this point and to show the character of the native prayers.

O empung è wailan ! O empung-rengarengan ! Turuan-ei u lalan karondoran, wo tija u lalan kaengkolan.

O mighty gods ! O protecting spirits ! Show us the right way, and turn not from us.

O empung è wailan ! O empung-rengarengan ! Kuman wo mëlèp wo lumema—Pikipikian an sakit, wo kelu-kelungan ung kelung ijow watu ;—wo jajo-ajo mange witi si Lokon telu katuaan wo kalakawir nami.

O mighty gods ! O protecting spirits ! Eat, drink and chew

the betel-nut. Turn away sickness and protect us as with a shield of stone. May our lives be as long, and our years as lucky, as the three Lokons (23).

The last part of this prayer refers to the three crests of the Lokon mountain, whose crowns are as bald as an old man's head.

The evil spirits or demons are called *se sakits*. They are the cause of all disasters, sickness and mischief. They are powerful, wicked and vindictive; but, as the following legend shows, they are not devoid of some of the elementary principles of fair play.

The place where Kakaskassan now stands with the Lokon mountain on the west, and the lofty peak of the Rumengan on the east, was in olden times the abode of the gods. It is a wide and extensive plateau, admirably suited both for agriculture and for residence. The ground is fertile, water continually flowing, and the climate is invigorating and healthy.

No wonder then that a band of our forefathers chose this spot for rest and peace, and in time raised a magnificent city inhabited entirely by Tombulus.

This was Kenilo, of wide and proud reputation amongst the ancients and feared by all the neighbouring tribes on account of the mighty deeds of the thousands of her braves.

Notwithstanding her glory and her deeds of war, there was one enemy who was a terror to both old and young. He struck his blows both by day and night, and no one could withstand him.

This enemy was—*se sakit*—of the race of demons. He brought sickness and death to the camp, and, although the elders were consulted about leaves, and barks, and roots, nothing could be found to resist him. Kiolor the chief was at last roused to anger, and called all his warriors together

to try to remedy the evil ; but when they arrived and he wished to count them, he was embarrassed, for the number was so extremely large. In order to form an approximate estimation of the numbers of his host, he adopted a method which has been in use from the oldest times. A large waringin tree was felled in full leaf, and then as they passed by every warrior plucked one leaf from it. Only a portion of the warriors had done this when the supply of leaves came to an end, so the remaining ones each took up a handful of earth and threw it on the ground. Before the counting was over a mountain of earth had arisen from the plain.

Such a great multitude could well engage in conflict with any enemy, however cunning, so when everything was prepared they challenged the sakit to commence the war wherever and whenever he pleased.

The enemy, notwithstanding his bloodthirsty nature, was not without a certain pride, and before beginning the conflict he gave them a piece of salutary advice.

‘It is not possible,’ se sakit cried, ‘for you to combat with us here as if we were like men. We can see you, and you cannot see us, so that the combat would not be fair and we should most certainly win. Go therefore out in the open plain and wait until you see the assa (a species of reed) trembling, and then you will know by that sign that I am present and you can wage war on me. Moreover the best weapons you can use are not your swords, but the rere (leaf-stalks of the seho—a palm).’

Thereupon Kiolor commanded the people to gather the reres, and when the warriors were all armed with these the host started out once more to meet the enemy. When the sign was given the Tombulus fell to, and with shouts and screams they thrashed the waving reeds. At last drops of blood appeared on the rere and the assa, and then Kiolor knew that the sakit had been struck.

At last, the people grew tired of trying to murder one sakit and turned homewards, whilst the sakit fled away to bring the news of his defeat to the others.

But now followed the vengeance of the sakits.

That night scarce a house in the camp was free from mourning, for of the thousands that had fought the fight not a tenth part remained alive, and thus the splendour and renown of Kenilo passed away.

And now follows the moral of the story, 'Henceforth, No! There shall be no more fights between men and the sakits. In future men shall look for comfort only to the gods, and, by duly honouring and propitiating them at feasts, hope to check the power of the demons (23).'

In a religion such as this, with a formidable array of deities and spirits, whose wills have to be made known from time to time to erring humanity, we have, as might be expected, a number of priests, who officiate at the feasts and religious ceremonies, and act as mouthpieces of the gods.

In early times it was only the members of the oldest families who officiated at the services, but with the gradual distribution of the clans over a wider area, and the increase in the number of ceremonies and liturgies, priestcraft became a profession, practised only by those who had given a considerable time to the study of the gods and their ceremonies.

In the northern districts the priests were chiefly men, but in the south they were principally women. The chief priests were the walianes, whose duty it was to preside over the fossos, to lead the singing-declamation of the names of the gods and their history, to teach the young, to advise and help the sick, to maintain the holy fire, and to officiate at all ceremonies of a religious nature. As a symbol of their office, they carried a notched stick, by which they

could reckon the number of days since the last fosso, and the time the next was due. In payment for their services they received large presents of rice, flesh, linen, pottery, and other things, so that they frequently became the richest as well as the most influential people of the tribe.

The minor priests were the Tounahas, whose business it was to listen to and note the cry of the birds, for the guidance of the hunters; the Teterusan, the chiefs of the braves or headhunters, who played an important part in many of the fossos; and the Potu-usan, or elders, who were consulted upon the mysteries of religion, the meaning of the extraordinary cries of birds, the tracing of poisonings or thefts, and on other occasions (23). The Mawasal (89) was the priest who presided over the funeral ceremonies. He made a small sacrifice for the dead, gave him half a betel-nut to chew, threw the rest of it away, and drove away his spirit with a sword. His services were paid by a gantang of rice ($3\frac{1}{2}$ lbs.). The Weeres was also a funeral priest. He recounted the ancestral histories on the last night of the mourning. The Menanalinga was the priest who listened for the cries of birds. His help was required at the commencement of wars, and at the selection of sites for new fields and houses. The Tumutungep looked after the opening of the rice fields. The Leleen was the peculiar priest of the rice fields actually in cultivation. His work commenced a month before the seed was sown, and ended when the grain was garnered. He sowed in every garden of his division the first seeds, and gathered the first ears when the rice was ripe.

The principal holy birds were the Totonbara or Bakeke, the foreteller by day (*Phaenicophaes calorhynchus*), the foreteller by night (*Eudynamis melanorhyncha*), and the 'year bird' (*Cranorrhinus cassidix*).

The fossos, posos, or feasts of the Minahassers were so

numerous that it would be only wearisome to the reader if I were to attempt to give a list of them. They were given not only in honour of the gods and to secure good fortune in war, or in more peaceful pursuits to drive away sickness and secure the blessings of good health and worldly prosperity, but on the opening of every new field or garden, the building of a new house, and, in fact, upon every occasion that offered itself. Some of the feasts lasted from twelve to fourteen days, and during the whole of that time all work was at a standstill, and the whole population gave themselves to the dancing, singing, feasting, playing, scrambling or praying that composed the fosso.

The following account of a feast at Sondei is given in the 'Life of Riedel' (58) :

'The man who had arranged the feast was one of the richest men in the country. Shortly before he had bought at great cost a third wife, who was quite thirty years younger than himself. Fourteen days after the wedding-feast she had run away, in order to try and gain for her parents a repetition of the sum of money her husband had paid for her. This had made him so angry that he had struck her, and, a divorce following, he was obliged to content himself with his other two wives, one of whom was already an elderly matron.

'Shortly afterwards his son was killed by head-hunters in the forest, and his second wife became sick unto death.

'Then the walian threatened him with the anger of the gods, and said that unless he gave a fosso other and greater disasters would follow.

'This he had now done to save the life of his second wife.

'The feast was in full swing and had already lasted four whole days.

‘In front of the house of the feast-giver there was a quadrangular footstool made of bamboo, and to this a cord was attached, decorated with flowers and leaves, which stretched to a neighbouring tree. This was to allow the gods to come down from the tree to receive the offerings. Within the house were all the friends and relatives of the old man, attired in holiday costume, and in the midst of them were several walianes, of whom one was obviously the chief. The chief priest danced about on two planks like a lunatic, singing the while, and swaying bunches of palm leaves hither and thither. I was told that he was possessed of the god Lembej, and had been in that condition already five hours. At last, he fell exhausted to the ground. “He is now dead,” cried the spectators. Four other walianes covered him with a cloth, and the people said that they should now see a wonder—that they would cut off a piece of his tongue. It is true that they showed a piece of red flesh which they threw into the air and caught again, but in a moment I could see that it was only a piece of a cock’s comb. Then one of the walianes swung a censer calling upon the god Lembej, in a mumbling tone, to give him back his life, and then they began to whistle for his soul to come back again.

‘But the soul seemed to be still unwilling to hear them, for the chief priest, stupid with sagoweer wine and heavy with sleep, snored aloud.

‘At last he awoke and sprang up, but for a considerable time remained as if he were dumb. Afterwards, amidst smoking and singing, the missing piece was fastened on to his tongue again. He then chewed betel for a while, and finally raised his voice to thank the gods for his deliverance.

‘All this time the sick woman lay upon a mat in a corner, but nobody troubled about her. She was in the

last stage of consumption. In the evening there was a great feast, and later the gongs and kolintangs were heard, and the people began a shameless dance.

‘The following day the sacrificial feast came to an end. Nine pigs were slaughtered with much ceremony, and a piece of the heart of each of them was placed by the priests upon the altar, that the gods might bless the giver of the feast with long life, sound health, and many children. Thereupon each of the walian received one pig, and the chief walian two, and the evening was spent by all in the grossest forms of debauchery.

‘The following morning the woman was dead.’

The central idea in the above is that the priest acts as the mouthpiece of the god Lembej. He works himself up in a condition of hypnotism by monotonous songs, the powerful perfume of incenses, and the regular swaying of his limbs. When he is in that state it is supposed that his own spirit has fled, and is replaced by the spirit of the god. When the god leaves him he falls to the ground like a dead man, and the other priests have to coax back his own soul by whistling for it, as one would for a dog. It is quite possible that during a considerable part of the ceremony the walian is really in a state of unconsciousness, and that he is afterwards quite ignorant of what he has been saying or doing as the medium of the god. He is in a mesmeric sleep, and performs in that state, and without knowing it, a series of antics, similar to those he has seen performed by other priests on like occasions, and utters the same incoherent and unintelligible sentences that have been handed down from generation to generation.

Amongst illiterate races language probably changes very much more rapidly than it does amongst the literate ones, and it is quite possible that within a few generations a language may become so altered as to be quite unintelli-

gible even to the direct descendants of those who originally spoke it. Now, we find it mentioned that amongst many of the Malay races the language used by the Shamans or mediums is quite unintelligible to their audiences. We find this to be the case amongst the Bataks, the Olo-Ngadjus, the Buginese, and the Malays of Malaka (92). Amongst the Minahassers I was told by several authorities that the language used by the walian was frequently not completely understood by the people, owing to the use of many words which are now no longer spoken.

This is quite consistent with the view that the utterances of the priest, when supposed to be possessed of the god-spirit, are merely repetitions of phrases used by the older priests, and in no way, either consciously or unconsciously, the real thoughts or opinions of the man who utters them. The wild and senseless antics of the Shaman during the utterances have frequently been compared to the tricks of a lunatic. How is it that such grotesque performances should be regarded as a part of a solemn religious ceremony? The reason for this can only be discovered by a comparative study of the various forms of Shamanism found throughout the world, and this leads us to believe that the antics of the walian are really derived from the antics of real lunatics. Among the ancient Egyptians, many Arab tribes, the ancient Greeks and Russians, and many savage races of the present day (92), lunatics and idiots are held in high honour, as being specially favoured by the gods; and those who suffer from the many forms of hysteria and epilepsy are believed to possess the gift of prophecy. We can readily understand, then, why it is that the Shamans, when they wish to be possessed of the spirit of the god, work themselves up into a hypnotic state resembling epilepsy or the different phases of lunacy. It may be going too far to say that the office of the priest was origin-

ally held by the lunatic, but it is nevertheless true that many of the actions and gestures of those who act as mediums between the gods and mankind may be distinctly traced to the unconscious movements of the mentally afflicted.

Besides true supernatural beings, such as the gods, spirits and demons described above, we have evidence to show that the Minahassers also believed in giants, hobgoblins, and fairies.

Of the race of giants Parepej is perhaps the most famous. He is described in the following legend (22):

‘Many years ago there lived a man in the mountains, named Parepej. He was a man of extraordinary strength and courage, and the pride of his native town Remboken. The people there had never any fear of war or feud, for Parepej, their great and powerful champion, was always with them to decide the fortunes of the fray. Remboken might well look to him for aid, for he was of the race of giants, and all men paled and fled before his sword. His head was in the middle two feet broad, and his arms, like the banana tree, bore ten dread fingers which spread fright and consternation amongst those who gazed upon them. His feet were as long as banana leaves, and as they trod the earth they made it vibrate as beneath the fall of heavy weights, frightening both friend and foe. Now, in the time of Parepej a war broke out between Remboken and Tomohon because the giant was always encroaching on his enemies’ territory, robbing them of anything he could lay hands upon, devastating their possessions, and causing great grief and sorrow to the people of Tomohon. For a time no one dared to attack a giant one sweep of whose sword would annihilate ten ordinary men; but at last Tomalūn, to the great joy of the people of Tomohon, determined to avenge his people and kill the giant. But

such an undertaking could not be heedlessly begun. First of all they must carefully train their hero, and give him the fat of the land. Day by day Tomalūn waxed stronger and braver, and joyfully anticipated the combat. He swore to humiliate the giant and set his people free.

‘Now followed proofs of the hero’s strength and agility. First he struck at the soft banana tree, and with one blow his swift and glittering blade cleft through the stem and buried its point in the ground. Then they selected another pisang tree, smaller in size but of harder wood. This Tomalūn with gigantic force also cleft in twain, and his sword once more was buried in the earth. Next they chose the seho tree, whose wood is as hard as that of any tree. With breathless anxiety the people watched this proof of his strength, and great was their joy and admiration when the sword went again through the stem, and the seho tree came tumbling to the ground.

‘Lastly, he had to cleave a bamboo filled with the gumutu of the seho tree, a feat which was to be the crown on his former exploits, and a sign for the people to go to war. This, to the astonishment of everyone, he successfully accomplished, and the people felt prepared to face the enemy.

‘The crowds shouted at every proof of Tomalūn’s strength and agility, the gongs sounded, and copious draughts of the divine sagoweer wine raised their spirits to enthusiasm.

‘It was then determined to commence the war, the field of battle was chosen, and the people anxiously awaited the result. It was agreed that it was better to let the war be decided by a duel between Parepej and Tomalūn than to fill the battlefield with dead bodies and with blood.

‘The night hung heavily on the slumbering earth when gongs and drums announced the commencement of the battle. Parepej the strong, dreaming only of victory,

knowing no fear, afraid of no danger, came bellowing and snorting at the head of Remboken's united bands.

'Who was this who ventured to measure swords with him? What mortal dared to defy the giant Parepej who was feared alike by friend and by foe?

'The two heroes, both of them eager for the fray, eyed one another with curiosity for some time.

'“What earth-worm dares to put himself in front of me?” said Parepej. “What do you want, you dwarf? I am ashamed to fight with anyone I can crush like I can crush you. Cannot I annihilate you with the end of my finger? One of my feet will cover the whole of your body. I will trample you to the dust. Out of my sight, you dwarf, or the hour of your death has come.”

'“I know very well,” said Tomalūn, “that I am smaller than you are; but I am not afraid either of your bellowing voice or your sharp sword, for you must learn that my arm has also shown its strength, and the virtue of my sword has been tried. It is true your fame has resounded from afar, and I am small and insignificant; but look up at the Kios yonder, a mountain which is small and light but still plucky——”

'The ruse succeeded. The giant was taken off his guard. A javelin pierced his foot, and with terrible rage the monster tumbled to the earth. With lightning speed the glittering steel cleft through Parepej's neck, and the point of it was driven into the earth.

'Then Remboken fled and Tomohon shouted. The battle was decided. Louder and still louder came the praise of Tomalūn—the hero who had delivered his people.

From Bolang Mongondu we have also the following story of a giant-killer (90):

'At the beginning of his reign, Loloda-Mokoago, King of Bolang, decided to pay a visit to the Sultan of Ternate,

and sailed for that purpose from Kema in a canoe accompanied by seven braves.

'The Sultan of Ternate received him with great honour, and held a cock-fight for his pleasure. On the second day a combat was arranged between the champion warriors of the Sultan and Loloda. The champion of the Sultan was named Pata-besi. He was a giant in size, of revolting aspect and covered with hair. He was already famous for his skill and bravery in many battles. Heavily armed with a huge sword he came forth to meet Loloda's champion, a slight, active little man named Banton, who was armed only with a small dagger.

'The appearance of Banton and his little weapon caused laughter amongst the assembled multitude, and the people foresaw an easy victory for the Sultan.

'The giant, with a certain oriental politeness, invited Banton to commence the fray, "For," he said, "if I begin I shall not give you a chance, but shall cut you in two with the first stroke." Banton, however, refused, and the giant commenced by swinging his huge sword. Three times he swung it, but on each occasion Banton avoided the stroke. When it was Banton's turn to attack he made one spring and pierced the giant with his dagger on the right side, so that he died before the eyes of his humbled Sultan and the astonished multitude.'

The following story (41) shows a belief in goblins: 'An ape, a buffalo, and a wéris (a bird) were friends. One day they went down to the sea to fish. They were very successful and came back laden with spoil. The fish were put into a hut to dry, and the first night the wéris was told off to watch. In the course of the night a great goblin or adjiganti, a fine strong creature, all covered with hair, came and ate up all the fish. The two friends were very angry when they came back the next morning

and found the hut empty, and, to prevent a repetition of their loss, the second night they set the buffalo to watch. When the adjiganti came the buffalo fought valiantly, but he was defeated, and was found the next morning with his horns sticking in the ground. On the third night the monkey took the watch. The adjiganti came at the usual hour, nine o'clock, and was much struck with the appearance of the guard who was sitting with his hands on his hips, showing his teeth. "How is it, my friend," said the adjiganti, "that you have such small loins and that your teeth are so white?" "Well," said the ape, "it is easily done. All you have to do is to tie yourself up to a tree with fresh young rattans, so that you cannot move, and then you can polish up your teeth until they shine like mine."

'The adjiganti determined to try the experiment, and allowed the monkey to tie him round the waist to a tree, so that he could no longer move. Then the monkey scoffed at him and said, "Well, my friend, how do you like the fish this evening?"

'When the friends returned to the house the next morning they found that the adjiganti was caught at last, so the buffalo pierced him with his horns and the wéris picked out his eyes.'

There are several stories in Minahassa which contain references to certain heavenly nymphs of the race of angels. It is, perhaps, hardly correct to call them fairies, on account of their relationship to the gods of Kasendukan.

The following story is current amongst the Bantiks.

'While Utahagi and some other heavenly nymphs were bathing, a certain Kasimbaha stole the clothes which gave her the power to fly. When the nymphs had finished bathing they all flew away with the exception of course of Utahagi, who could not find her clothes. Kasimbaha then came forth and asked her to become his wife. She consented,

but warned him to be careful of a single white hair which grew on the crown of her head. Kasimbaha seems to have paid but little attention to this warning, for after a time, either accidentally or purposely, he pulled it out. Suddenly a great storm arose with thunder and lightning, and, when it had cleared away, Utahagi had disappeared.'

The above is but a brief *résumé* of the story of Utahagi, as told by Graafland (22).

The following is another form of the same taken from the writings of Van Doren (13) :

'A certain man named Walasindouw, who dwelt at Ajer Madidi in the Tonsea district, nine miles from Kema, was the owner of a field there which he had planted with yams. One day, when he came to work as usual, he was very much astonished to find that a number of his yams had been stolen, and, as he could not imagine who it was that could have done the deed, he determined to keep watch by night to discover the thief. Whilst he was watching, there came nine women down from heaven, and these he endeavoured to retain. But eight of them returned immediately on high; one only he managed to capture by her clothes. It happened that this one was the youngest, and when she was in his power she asked forgiveness of him (for the theft), pleading that she was a child of heaven.

'Walasindouw, being unmarried, immediately made her his wife under the following conditions: That he was never to open a rice pot she had brought with her nor measure its capacity, and that she was never to clean his head, for as soon as the rice-pot was opened, or if, in the cleaning of his head, a single hair fell upon the ground, then would she return immediately to heaven.

'Some time after this, when coming from the bath, Walasindouw pressed her to clean his head, and whilst doing this a hair of his head must have fallen to the ground,

for she suddenly disappeared, leaving behind her a little son. Walasindouw was inconsolable over his loss. He wept day and night, and prayed incessantly that he might be taken up to heaven.

‘One day he saw a fly with yellow eyes, and he besought it to take him and his child to heaven. The fly, in answer to his request, told him that it would be willing to help if he could find no one else to do so. Finding no one, after long searching, he persuaded the fly to carry a rattan for him towards the heavens. The rattan was not long enough, however, and the fly and rattan were driven about by the wind. The fly, however, returned to him, saying, “This attempt has failed; nevertheless I believe I can bring you and your child to heaven yet. When we get there be on your guard, for you will see all the nine sisters, who are so much alike that it is impossible to tell one from the other. Take care, therefore, that you hold fast to the one upon whom I shall settle, for she is the mother of your child.” Walasindouw and his son were then carried heavenwards by the fly, and when they came to the house containing the nine nymphs, the father watched carefully to see upon which of them it would settle. As soon as the fly had alighted on one of them, Walasindouw handed over to her the child, and she immediately gave him the breast. After he had been suckled for a time, God came’ (this is perhaps Muntuuntu) ‘and said to Walasindouw, “You have behaved badly, for you have not followed my command (that you should never allow your wife to clean your head). Go now and cut down a seho tree, hollow it out, and make it into a water-butt.”’

‘Walasindouw did this, but, having no implement to hollow it out, he used a parang for the purpose, and, as soon as the butt was ready, he filled it with water, threw

in the parang, and brought it to God. Then God said to him, "You are not one of those who know how to obey my orders. Return now to the earth."'

This concludes the account of Walasindouw's experience in the heavenly village. The narrative of his subsequent adventures upon earth does not present incidents of any particular interest or importance.

CHAPTER XI

CUSTOMS OF THE MINAHASSERS

Marriage customs—Infant betrothal—Courtship—Use of the betel-nut in courtship—The harta or dowry—Laws of inheritance—Shunning the parents-in-law—Teknonymy—Divorce—Adoption of children—Comparison of the marriage laws of Minahassa with those of other parts of the Archipelago—Birth customs—Makehet—Sickness—Death—Burial customs—Driving away the spirit.

No STUDY of the ethnology of a race of men can be considered complete without reference to the customs attending betrothal and marriage, and the laws which regulate the inheritance of property and titles. In many respects these branches of the subject open up fields for research and speculation unequalled in interest and importance throughout the vast range of human customs and ceremonies.

We are fortunate indeed in possessing in the works of the distinguished Dutch writer, Wilken, a very complete summary of our knowledge concerning these customs among the races of the Malay Archipelago, and in the following pages I am greatly indebted to him for much of the information I have gathered concerning the marriage rites and customs of the people of Minahassa. I do not propose, however, entirely to confine myself to the Minahassers, but, by bringing forward some of the knowledge we have gathered about these customs amongst the people who inhabit the neighbouring districts and the other islands of the Malay Archipelago, to indicate to the reader the

lines of evolution along which we may suppose the Minahassers have travelled in arriving at their present social condition.

Many difficulties beset the path of the evolutionist who attempts to work out the development of human customs; for man is a wandering animal, sometimes migrating in thousands from place to place, driving before him the original possessors of the soil, or sometimes straying in smaller parties, which ultimately amalgamate with the primitive inhabitants. In consequence, we find in almost every race fusions of physical structure, language, and custom which verily try the patience of the ethnologist to unravel.

We have evidence for believing that the Malays migrated at some period before the Christian era from Southern Asia. This migration alone must have had very considerable effect in modifying their language and social customs. The Malays of Java and Sumatra were profoundly influenced by the adoption of Buddhism in the third and fourth centuries A.D., which gave way before a flood of Mohammedanism in later times.

Mohammedanism has made its influence felt all over the Malay area, and even the Christianity of the earlier Roman Catholic priests has left its marks in the legends and songs and probably also the customs of these people.

It is no easy task, then, to pick out from the maze of customs and ceremonies those which are characteristically Malay, and separate them from those which were adopted from the primitive inhabitants they conquered and supplanted, or from those which have more recently been introduced from continental Asia and from Europe.

In the following pages I have collected together many of the most important ceremonies and laws connected with the matrimonial institutions of the people of Minahassa.

The introduction of Christianity is exercising in modern times a very considerable modifying effect upon them, but enough remains in the writings of travellers and missionaries to build up a fairly complete account for the consideration of English readers. In the neighbouring states, it should be remembered, the people still remain in a very wild and uncivilised condition, and, by the study of the few scraps of information we possess about their marriage ceremonies, we are able to fill in many of the missing chapters in the history of the people of Minahassa. Commencing with the first signs of matrimonial contract in the lives of the people of Minahassa, we find a curious and interesting custom, in some districts only, called the *Pesendeen* (22). This is a sham marriage ceremony held in honour of the sham nuptials of children of from five to nine years of age. The *Pesendeen* must not be confounded with true child-marriage, for, on the conclusion of the feast the children return to their parents, and are perfectly free, when they reach maturity, to marry whom they please. True infant-marriage is a custom which is found, not only in British India, but also among several of the Malay races, such as the Bataks, Sundanese, Menangkabawer Malays, Atjeans, and others; but in all these cases the marriage is binding, and not a mere ceremony. When a *Pesendeen* is held, the two families come together in the house of the bride's parents. She is dressed in a *kabaia* and *sarong* of a pattern as elegant and gorgeous as can be provided, and the little bridegroom is dressed in a *kabaia* and trousers of a colour as red as possible. Then the parents commence the business of the occasion by a long talk over the dowry of the bride and other necessary details, and after this the religious part of the ceremony is performed. The gods are humbly invited to be present; their praises are sung, and they are besought

to pour down on the young couple all the blessings of life—good luck, health, wealth, and, of course, many children.

Now the young pair take some cooked rice with a piece of pork or chicken and put it on a plate saying, 'Eat gods !' Then they go down to the river as if to bathe, but in fact only just make their feet wet, and finally the young bridegroom takes a piece of wood, some sagoweer and a sword, while the bride takes some food for pigs, some wood and greens as symbols of worthiness and independent position in the married life.

When this part of the ceremony is concluded, they go into the house and dine together. The following morning they again go down to the water, and go through the ceremony which is called 'seeking for a mouse' together (*see* p. 276). The *fosso* lasts five days after this, drums are beaten, *kolintangs* sounded, and the time is passed in eating, drinking, dancing and other festivities.

It is the general opinion of those who have written about this sham infant-marriage that it must formerly have been a true and binding one ; but it may be that in this ceremony of the Minahassers we have after all rather a precursor than a successor of strict infant marriages. It is a generally recognised axiom of sociology that every custom has been developed not by any sudden change but by a slow and gradual process, a building up, in fact, of modification upon modification until the variety is produced. *Natura non facit saltum* is as true when applied to the laws which govern social progress as it is when applied to those which govern animal and vegetable life.

During the change, then, from a state of society with no infant marriages to a state of society in which there are, we must suppose there have existed a number of

intermediate stages gradually leading up to the form in which we now find it.

It is possible that a sham marriage ceremony such as the Pesendeen of the Minahassers may have been one of these; or, to put it in other words, in the course of the development of the binding infant-marriage, there was a series of stages in which an arrangement between the parents of two children to protect them from the disgrace of remaining unmarried throughout life gradually assumed the formalities of a true marriage contract similar to those of the Pesendeen.

True courtship or love-making does not of course take place in Minahassa until after the Pesendeen. It is, in fact, the preliminary to true marriage. It may take place between young men and maidens who have previously been joined together in the Pesendeen, but it is always strictly an affair of the heart and not in any way dependent upon the consent or even wish of the parents.

Two young people meet at the mapalus, and over the feasting and singing become interested in one another and fall in love. Then follows the courtship, which is not supposed to be open and above board, but is nominally at least carried on in secret. It consists in nocturnal visits of the young man to the young woman's house, visits which, although frequently attended by immorality, are not necessarily so, and are often perfectly decorous and formal.

The young woman prepares a mat for her lover, and after dark he comes to visit her. The parents are of course aware that their daughter is thus receiving a visitor, and are indeed proud that she should be so sought after; but at the same time they warn her to be cautious. The lover departs again before daybreak in order that there may be

no gossip in the village about their engagement until all is settled. These visits extend over some weeks, and at last one morning he remains until the day has broken as a sign that the engagement may be formally announced (22).

We find many references to this custom in many of the mapalu love songs. Here are some of them :

‘Tuminting-o tare mej satengah polon-o-lah
Mange polon-na-mej sambe lumamo irojo.’

‘The clock has struck the half-hour’ (5.30 A.M.?) ; ‘she wakes her friend that he may go down’ (before daylight without the neighbours seeing him).

And again :

‘Lalej-o kimukuk eh tare mej se koöko rei pinolon-na ;
Karengan en wanamo tena ni lalej kanaraman.’

‘The cocks have crowed—and (she has) not waked (me). Certainly there is an agreement with (a friend) to whom she is long accustomed.’

This means, if I rightly understand Graafland’s translation of it, that the young man believed there was another lover in the habit of visiting her whom she did not wake before the cock-crow, and consequently he was ashamed to be seen leaving her house after daybreak.

The betel-nut plays an important part in courtship in Minahassa, as it does all over the archipelago.

When the young Minahasser falls in love with a young woman, he sends her a prepared betel-nut. If she accepts it, it is taken as a sign of encouragement, and the young man sends an emissary asking her to send him one. If she refuses to do this, or sends him one which is not prepared for chewing, then it is a sign that he is rejected ; but if she wishes to become his wife, she sends him a well-grown nut with the necessary ingredients, and the lover knows that he is accepted.

Thus the word 'to court' is in Tombulu language *pahaleijaleijan lemaan* and in Tompakewasch *pangiteng-ilekkan tenga*, which means 'to continually ask for betel-nut of one another' (94).

We constantly find the betel-nut mentioned in the love songs and romances :

'Ajohan-o-mej tetengaan sambe eh rumojoro
Aku rumojor-o mange-mo witi walenamij.'

'Give me the betel-nut box, my friend, and I will go.
I will go below, and I will go to our house' (22).

And in the songs I have quoted on pp. 303, 304 we find the stanzas :

'Place one half of the young betel-nut you have cut in two in my mouth, and my feelings will be always well towards you.'

'If a man could fly like the wind I would take this betel-nut out of my mouth and send it to him.'

Before leaving the subject I will quote a passage from the writings of Mr. Spencer St. John to show how common is the custom of nightly visits during courtship, and the important part the habit of betel-chewing plays in the love affairs of the Malay races.

Speaking of the Dyaks of Sarawak he says (71): 'Besides the ordinary attention which a young man is able to pay to the girl he desires to make his wife, there is a peculiar testimony of regard which is worthy of note. About nine or ten at night, when the family is supposed to be asleep within the mosquito curtains in the private apartment, the lover quietly slips back the bolt by which the door is fastened on the inside and enters the room on tip-toe. He goes to the curtains of his beloved, gently awakes her, and she, on hearing who it is, rises at once, and they sit conversing together and making arrangements for the future

in the dark over a plentiful supply of sirih leaf and betel-nut, which it is the gentleman's duty to provide. If, when awoke, the young lady arises and accepts the prepared betel-nut, happy is the lover, for his suit is in a fair way to prosper, but if, on the other hand, she rises and says, "Be good enough to blow up the fire," or "to light the lamp," then his hopes are at end, as that is the usual form of dismissal. Of course, if this kind of nocturnal visit is frequently repeated, the parents do not fail to discover it, although it is a point of honour among them to take no notice of their visit, and if they approve of him matters take their course; but if not they use their influence with their daughter to ensure the utterance of the fatal "Please blow up the fire."

When the courtship is satisfactorily concluded, and it is decided that the girl shall be definitely asked in marriage, then, with the parents' consent, a day is fixed upon which they shall meet together to discuss the *harta*, or price that is to be paid by the young man for his bride.

As a preliminary to this, a present of nine betel-nuts, nine sirih fruits, and some gold or silver ornaments has to be sent to the girl. In the olden times of the head-hunters, a fresh human head was an indispensable preliminary to any marriage negotiations; but this abominable practice was effectually stamped out by the Dutch Government many years ago. It is probable that this ghastly present was intended not only as a proof of personal bravery on the part of the young hero, but as a promise that in the world of spirits the young bride would have at least one slave to wait upon her (102). The *harta* was in former times usually paid in land, houses, sagoweer trees, pigs, cloths, &c. Nowadays it is often paid in money, one thousand guilders (84*l.*) being about the highest *harta* known (22).

At the appointed time the members of the young man's family repair to the house of the bride, bringing with them the *harta*, and after that comes the bridegroom himself. They mount the steps of the house and take their places at a long table in the principal room, the bride and bridegroom sitting side by side at one end of it. At first everything is very stiff and formal. Food is served, but not a word is spoken by the young couple; not a muscle of their faces moves, not even a stray glance passes from one to the other.

Then comes the priest, who takes a piece of betel-nut and solemnly chews it for some time with the *sirih* and lime; this he removes from his own mouth and puts it into the bridegroom's mouth, who continues the process for some time and passes it on to the bride.

When this is done the *walian* gives the bride and bridegroom rice and pork to eat and *sagoweer* wine to drink, and the official part of the ceremony is concluded. At this moment the couple retire to the nuptial chamber, while the guests amuse themselves by feasting, drinking, and singing, and the priest implores the *empungs* to pour blessings on the happy pair.

When the wedding-breakfast is over, the bride and bridegroom, together with all the guests, repair to the house or village of the bridegroom, and the night is spent in merry-making. The following morning the marriage *fosso* commences, and lasts in some cases for many days, the duration of the *fosso* depending to a great extent upon the resources of the host. In the course of the *fosso* the following ceremony is usually performed. The priest takes the young couple to the boundary of the district, and sticks a piece of bamboo in the ground, saying, 'Here is a mouse.' Then they arrange themselves around the bamboo, and the priest says, 'Your riches shall be as innumerable even as

the hairs of this mouse.' Other ceremonies of a similar kind are gone through in the course of the marriage fosso.

The Alfür of Minahassa was in olden times undoubtedly a monogamist; the occasional occurrence of polygamy in later times was a degeneration from the old customs brought about perhaps by Mohammedan influence.

It should be noted here that amongst the Minahassers there was no law of exogamy—that is to say, a man was not forbidden to marry a member of his own tribe. This is a fact of no little importance; for in many savage countries throughout the world the laws of exogamy are very strict. As a general rule, he did marry within his own tribe—for example, the Toulours, i.e. the inhabitants of Tolian, Tolimambot, Remboken, Kakas, * &c., usually married Toulours, but at the same time there was no strict rule of endogamy, and a man might marry out of his tribe if he liked (22).

The marriages, moreover, were true 'deega' marriages; the woman invariably followed the man after marriage to his village and his house. At the beginning of the century the young couple lived with the parents of the bridegroom in one of those large houses capable of holding two or three hundred persons to which I have already referred, but in later times the newly married people soon retired into a house of their own.

Marriages were in fact permitted between all persons except those who were very nearly related to one another, such as between brothers and sisters, uncles and nieces, or aunts and nephews, between cousins or combinations of these relations. It is said (58) that in olden times in the southern districts of Minahassa, in the neighbourhood of Tonsawang, even these marriages were not forbidden, and that father and daughter, mother and son,

brother and sister frequently lived together in bonds of matrimony.

The fact that many of the Minahassers trace their descent from the union of Lumimuüt with her son Toar shows at least that they did not at one time regard such unions with any great aversion.

I have said above that marriage was permitted between all persons except near relations; but nevertheless it must be remarked that marriages between persons of different rank were not favoured, nor generally approved.

We have numerous instances of this in the songs and proverbs of the people (94):—

Ja wasiang kantare um paparondor meillewo an suleng um bakan sombor.

The wasan (a hard wood) (is) excellent for the props of the rafters, (but it) has become bad by the supports of the young wakan (a soft wood).

Meikatijon witum panga pera.

He or she has been seized by a withered bough.

Kentur u Manado wo u Lembeh masuat uman ej owej !
saanah masungkud-o makentur-o rombu-rombunan ej owej.

The Manado mountain and the Lembej are of the same height; if they were joined together they would become a great mountain.

The first of these proverbs refers to a marriage between persons of different ranks in society, the second to a marriage of a man or woman with a slave, the third to the union of persons of the same rank.

The laws in Minahassa regulating the inheritance of property are rather complicated and difficult to understand, on account of an important change which has taken place in recent years in the tenure of possessions. In olden times, when the family held communal possession of the land and other properties (*pusaka*), the laws of inheritance

were simple enough, for the pusaka was not divided upon the death of any member of the family, nor did it in any way change hands. It was somewhat like our family heirlooms or entailed property, with this important difference, that no portion of it could be sold or otherwise disposed of without the consent of all the members of the family.

With self-acquired property it was naturally otherwise. Upon the death of a man or woman this was divided into two equal parts; the widow or the widower received one half, and the other half went to the heirs.

The house belonged exclusively to the man; it was never regarded as a part of the pusaka, and it always became, after his death, the property of his heirs. If the woman helped her husband in the building of the house, she received a certain compensation for her claim to it. This was sometimes paid in money, but more usually in land.

There was an interesting difference between the division of the self-acquired property of chiefs and of common people which should be noted here. When the wife of a chief died, he received not a half but two-thirds of the property which belonged to her (96), the heirs getting only one-third.

Of all the curious customs of savage races there is none, perhaps, which has excited more interest, and indeed amusement, than the practice of 'Shunning the mother-in-law.' Many people can call to mind the well-known picture which has been copied into nearly all the books of anthropology of the Kaffir warrior hiding behind his shield as he passes by his mother-in-law, who is crouching on the ground with her face down. The same custom in various stages of complexity and simplicity occurs among many of the wild races of mankind throughout the world. In Minahassa it is *posan*—that is to say, forbidden—for a man to mention the name of his parents-in-law. If by accident he does so, he spits

upon the ground and says, 'I have done wrong,' so that his body, particularly his nose, may not become covered with ulcers and boils. If it should be necessary for him to refer to or to call his father or mother-in-law, he will, perhaps, use half the name, or use another name of a similar meaning. Thus for Wenas he will say 'We'; for Mainalo, 'Maina'; for Waworuntu, 'Wawo'; or instead of using the word *wawo*, which signifies 'above' in the same name, he will use another word of the same meaning, such as *natas*. If his mother-in-law's name be Sijowan, then he says for 'Sijo,' which means 'nine,' 'Kehana' (amiss), or if her name be Ngisa, for the word *marisa* (Spanish pepper) he says 'Ngumetnget' (hot or sharp) (89). I can find no evidence that the Minahasser shuns or avoids his parents-in-law in any way than this. He has no hesitation in conversing with them, nor hides his face from them, nor shuns their presence. The custom is probably on the eve of total disappearance, and this formality about the mentioning of proper names is the last phase of a custom which was at one time much more prominent in its details and strict in its observance.

Dr. Tylor (77) has shown that there is now sufficient evidence to prove that customs such as these originated in the times and tribes where the husband lived in the house of his wife's parents. In such conditions of society the husband was not a member of their family, and he was always either ceremonially or actually 'cut' by them, and was expected in return ceremonially or actually to cut them. As I shall endeavour to show at the close of this chapter, we have reason for believing that it was the custom of the Minahassers many years ago for the man to reside in the house of his wife's parents, and we are justified in supposing that the 'avoidance' rule was much more strictly adhered to then than it is in modern times.

Of considerable importance in connection with the development of marriage institutions is the strange but very widely distributed custom known by the name Teknonymy (77), or the naming of the parents after the children. This is a common practice in Minahassa, and is distinguished by the very extraordinary fact that after the birth of the first child, not the father only, as is usually the case, but both parents take its name. If, for example, the child's name is Wangko, then the father drops his own name, and is afterwards known as Si-ama-ni-Wangko, the father of Wangko, and the mother, Si-ini-ni-Wangko, mother of Wangko (99).

This custom can also be traced to the days when the husband lived in the house of his wife's parents. As I have previously mentioned, he was not at first recognised as a member of their family; they shunned him when he came to visit his wife, turned their back upon him, and would not mention his name. On the birth of a child, however, he became *ipso facto* a blood relation of a member of their family (the child), and they began gradually to recognise him more fully. He was thenceforth known to them not by his own name, but as the father of the child.

When in the course of generations it gradually became the custom for the wife to live in her husband's family, this practice remained as a survival of the older system; and, the wife being now a stranger in her husband's family, the custom originated of the mother also taking the name of her child.

Divorce, which is an impossibility amongst tribes with deega marriages and a strict law of exogamy, is common amongst the Minahassers, where there is no law of exogamy. A man may readily obtain a divorce without any better reason than that he has fixed his heart on another woman. The woman, on the other hand, sometimes runs away in

the hope that her husband will pay another harta for her recovery ; if he does not, then they are divorced, and the original harta has to be returned. The children, when a divorce takes place, join either their father or mother according to their choice (22).

If a married couple are not blessed with children, or even if they are, they sometimes adopt the children of other people. This custom is called *maki-oki*, *maki-uran*, *maki-anak*, &c., according to the district, but each term signifies the same, namely, 'to recognise the child.' A child so adopted becomes a member of the family of the foster parents in every respect but one, i.e. he or she is allowed to marry with his or her foster parents' own children. The adopted children work in the fields, have their share of the common property of the household, and inherit the estate just as the ordinary children do (22).

It is of very considerable importance in connection with marriage laws and customs to consider the relative position of the man and the woman in the married life.

Certain features in the social conditions of Minahassa have led some travellers to adopt the erroneous view that the wife leads a life little better than that of a slave to her husband, but this is by no means the case ; the woman is, and probably has been for many generations, on a footing of equality with her husband. It is true that she performs hard manual labour in the rice fields, and carries heavy loads of garden produce or long bamboos filled with wine or water, but all these duties she performs as an ordinary member of the family, whose business it is to work upon the communal estate the family possesses.

It might seem also that the harta which is paid by the bridegroom for his bride is of a similar nature to the price paid for a slave, a beast of burden, or any other piece of property. The harta, however, should not be con-

sidered as a 'price'; it has rather the nature of a 'compensation' paid to the bride's family for the loss of one of its working and child-producing members.

As a proof that woman in Minahassa is not the slave that some travellers have supposed her to be, we have the evidence of Heer Tendeloo (72), whose long life and labours amongst the people give him the right to speak upon this subject with authority. He says with no uncertain voice that in Minahassa the woman is not considered to be inferior to the man, but that in all household affairs and matters concerning the interests of the family and its property her opinion is always taken as at least equal to that of her husband's. Even in such a simple matter as the sale of an egg, Heer Tendeloo found that it was necessary for the husband to consult his wife before a bargain could be struck. This equality in position of the man and his wife may be seen not only in many of the legends and stories of Minahassa, but also in the terms which are used in poetry and everyday conversation for the trusted wife. She is called *lumulutu*, the cook, or *tumetemu*, the stamper (of the rice), in reference to her household duties, in legends and in songs; *tetenden*, the support, or again, *mahatamu*, the nurse, as regards her children, or as regards her husband *kasende*, his companion at the table, but never do we find her mentioned as a person of inferior rank or quality in the house (94).

She is my goods, my chattels; she is my house,
My household stuff, my field, my barn,
My horse, my ox, my ass, my anything,

said Petruchio of his wife. The social system of the Alfürs of Minahassa entirely excludes the possibility of the husband regarding his wife in such a light.

The condition of affairs in Minahassa is fortunately

so peaceful and quiet that we can hardly judge of the part that women would play in the politics of the country, but in some of the legends we have evidence which shows that in the 'good old times' women played a part in the affairs of war and of the state.

We have seen then that in Minahassa the marriage laws are based on a system of patriarchy with cognate relationship and inheritance. The man marries whom he pleases, either within or without the tribe, brings his wife to live in his house, and the property after his death is divided either between his widow and children in fair proportions or is inherited as common property by the family he leaves. Titles and dignities descend from the father to the eldest son, and genealogies are traced through the males.

Was this always the system in Minahassa? Have we any evidence to bring forward to show that the system which now prevails, or rather prevailed at the time when the Christian missionaries first appeared upon the scene, was the original system of these Minahassa folk? The evidence that is forthcoming is definite and conclusive enough to prove that it is but a modification of an earlier and more primitive system which traced descent through the female line. I will give just two examples of the kind of evidence that guides us in these speculations. In the first place we find that the Minahassers of the northern districts trace their descent from a woman, Lumimuüt, and that in the genealogies descent is traced in the female line for at least two or three generations (p. 243). This shows undoubtedly that they have received their cosmology from a people who were in the habit of tracing their descent habitually through the female line. Then again, the name for the family is *sanatotoan*, which literally means those 'who have sucked the same milk,' a term obviously ignoring the man as the head of the household. It probably

arose at a time when the man followed his wife and lived in her house, as he does at the present in the neighbouring Sangir islands, and in the kingdom of Bolang Mongondu.

These facts, and many others which could be produced, prove then not only that patriarchy was not the original system in Celebes, but that matriarchy was; yet there still remains considerable doubt as to the way in which the change was brought about, and what the intermediate stages were.

In order to throw some light upon these doubtful points, we must consider some of the well-marked types of marriage systems which are found in other parts of the archipelago.

First, let us consider a prominent characteristic of what may be called strict matriarchy. Such a system is found amongst the Malays of the Padang highlands in Sumatra. Each district (*negari*) is divided into a number of villages (*kota*), and each village contains a number of family clans (*sukus*), each of which lives in a single large house called the *kumpulan rumah*. In most districts there is a very strict law of exogamy, it being considered little short of incestuous for a man to marry a member of his own *suku* or family clan. Upon marriage the man leaves his own clan and goes to live in the *kumpulan rumah* of his wife's clan, which after a time recognises him as a member. Any titles and property he possesses do not descend to his own children but to the *kumanakan*, i.e. his sister's children, and on the death of his wife he inherits none of her property, nor is he allowed to exercise any control over his own children (95).

Let us turn now to a case of strict patriarchy with exogamy. Such a system is found amongst the Bataks. Here we find that the children belong not to the mother's

clan but exclusively to the father's. Upon marriage the woman leaves her own clan and becomes for the rest of her life the property of her husband, and on his death of her husband's family. She can neither hold nor inherit any property or title, and is in many respects little better than a slave in her husband's family. When her true husband dies she becomes the wife of his brother as a matter of course, or if he has no brother, she is appointed by the chief to be the wife of some other member of the *marga*.

Wherever we find a strict patriarchal system with the law of exogamy, we also find traces of the 'capture' customs; thus amongst the Bataks the bridegroom steals into the village of his bride, and runs off with her, leaving behind him something as a sign that the capture has been effected. The sum of money paid to the bride's parents should be considered rather as an indemnity to the parents for the insult of the capture than as an actual price paid for the bride.

Let us now consider a third type of marriage laws, namely, that which is found amongst some of the Dyaks of Borneo. It is a system of 'beena' marriages without any strict rule of exogamy. Amongst the Dyaks we find large houses inhabited by some 250 to 300 people. Newly married couples do not go to live in a new house of their own, but a compartment is set apart for them in the house of the bride's parents.

Both the husband and wife possess their own property, and on the death of either of them it is inherited by the children. If either of them dies before there are any children, then their parents inherit the property.

Among the Dyaks of Sarawak we find, however, the idea of common property similar to that we mentioned when dealing with the Minahassers. Husband and wife and children work together on the land belonging to the

family, and share the benefits of it equally. On the death of the woman, the widower remains in the house of her parents until the funeral feast is over, and then the property which is left (when the expenses of the feast have been paid) is divided into two equal portions; one half goes to the widower and the other is divided among the children; if there are no children it goes to the next of kin of the deceased woman. On the death of the man, however, the whole of the estate remains as the common property of the woman and her children, but if there are no children it is divided into two halves, one of which is retained by the widow, the other going to the parents of the deceased man.

The children of the Dyaks are not considered to belong exclusively either to the father or the mother, and upon the death of the latter, although they would naturally remain in her family, they can choose which family they will belong to, the father's family or the mother's family.

This system is evidently a modification of the strict matriarchy found amongst the Padangers in Sumatra, the modification having arisen probably from a slackening of the laws of exogamy.

An important thing to note, however, is that in some cases the man does not follow the woman; but if he is of higher rank, or the only support of aged parents, the woman is obliged to come and live in his family.

A system very similar to this existed within recent years in the kingdom of Bolang Mongondou; but it has been rather corrupted of late years by the influence of Islamism (90).

Less modified than this is the system found in the Nanusa archipelago and in the Talaut islands. In Nanusa and many parts of the Talaut islands we find the large houses similar to those in Borneo, the marriages are truly

'beena' marriages, and there is no very strict law of exogamy. Unfortunately we have not at present very much information concerning the laws regulating inheritance of property, but we find in some places that the children, when their parents are divorced, can choose the family to which they will afterwards belong (35).

We have good reasons then for believing that the marriage institutions of these people are in a very similar state to those of the Dyaks of Borneo. In Sangir we find a modification in that the houses are smaller, and the rajahs and some of the nobles do not marry on the 'beena' principle, but bring their wives to their own homes. The smaller houses mean that the young married people start independent establishments, and that the idea of the clan, bound together by the ties of a common mother, is gradually becoming weaker.

The system we find in Minahassa which I have described at the beginning of the chapter is, I believe, a direct outcome of a system allied to that now found in some parts of Borneo. In Minahassa it has exhibited a tendency to become more patriarchal in character, in Borneo to become more matriarchal.

Some authorities believe that the patriarchal system of Minahassa has been derived from a stricter patriarchy with exogamy, such as we find among the Bataks, the Timorese, and others.

There can be little doubt that the change from a strict matriarchy to a strict patriarchy has in many tribes taken place by the introduction of the custom of capture marriages. The change may be seen in operation in some of the Malay tribes at the present day. 'In the Babar archipelago the men follow the women and live in their houses. The children also belong to the wife's family. If a man is rich enough he may marry seven wives, all of whom remain

in the houses of their parents. A man who has many wives is respected. The robbery of a wife from another clan is an honour, and the children follow the father with or without payment of the fine attached to the deed. Smaller or weaker clans even demand no fine. In the Kesar and Wetar island groups a like state of things appears, the maternal system being the recognised rule, but always liable to pass into the paternal system by capture, which brings wife and children into the husband's hands' (64).

Now, although it is very probable from this and from other considerations that the practice of capturing wives was the cause, in some parts of the archipelago, of the change from the 'beena' to the 'deega' form of marriage, from the genealogies being traced through the female line to the male line, we are by no means justified in supposing that this was the only cause. I will not now enter into all the arguments which might be brought forward to support this theory, but merely indicate that in the Alfürs of Minahassa we have races which at the present day have deega marriages, never having passed through the stage of capture marriages. The cause of the change with them was, I believe, primarily due to a breaking down of the strict observance of the rules of exogamy, but it is difficult to say what causes led to this. Furthermore, I believe that, when we have more information about the matrimonial institutions of the Talaut and Sangir islanders, we shall find that many if not all the stages in the process are now existent among those people.

But what reasons are there for supposing that there never was a strict patriarchal system with exogamy in Minahassa?

In the first place, there are no traces in the ceremonies, legends, or fables of such a custom. Now, as MacLennan has shown, capture marriage remains as a formal ceremony in very many races of the world long after its true origin

and meaning is lost or forgotten (48). It would indeed be strange, if capture marriage had been formerly a common practice, among the ancestors of the present Minahassers, that no trace of it remains in any of their numerous ceremonies, stories, myths, and legends which have been brought to light. Moreover, the position of woman in strict patriarchal families is a definite one. She is little more than a slave in the household, she possesses no property, has no claim upon the children, and cannot under any circumstances claim a divorce. She is in fact nothing more nor less than a portion of her husband's property. Such a position is one from which woman cannot free herself for countless generations. In fact, it seems that when a race of people has once regarded its women in such a light it is never afterwards able to replace them on the same platform as the men. Even in England and in other European countries, women are not considered to be capable of taking the same part in politics, in the professions, and in many other phases of social life as the men. Why? Because in the dim and distant past, a past which is revealed to us only in the shreds and patches of ancient history and in relics, our ancestors had capture marriages, and their family life was strictly patriarchal. It is not an exaggeration to say that there are comparatively speaking very few women in Europe at the present day who hold anything like the same position in the family and in the State as the women of the Pueblo Indians of America, the Padangers of the highlands of Sumatra, or the Dyaks. The fact that in Minahassa the wife is on an equality with her husband in the household, and in commercial matters, and very probably was at the commencement of the century in affairs of State as well, points to another line of evolution of their social institutions than through the strictly patriarchal one.

The details of the marriage ceremonies all lead to the same conclusion. The first part of the feast takes place, and the marriage is consummated, not in the husband's village, as it was in 'capture' times, but in the house of the wife's parents. The naming of the father after the first-born child, and the fragmentary survival of the custom of avoiding the parents-in-law, are relics probably of old matriarchal times, and tell against the supposition that there ever was a patriarchy with strict exogamy in N. Celebes.

How, then, are we to suppose that the changes were brought about? The evidence afforded us by the neighbouring tribes of Bolang Mongondou, Sangir, Talaut, and Nanusa seems to indicate that, soon after the law of exogamy broke down, the custom came in that the wives of rajahs followed their husbands; that this was later extended to the nobles, and from them it gradually spread to be the custom among all the common people of the tribe. Perhaps we have hardly sufficient evidence before us at present to prove that this was the true story of its evolution, but it seems more probable than the supposition that the Minahassers ever passed through an epoch of strict patriarchy. Further investigations of the marriage institutions of the people of the northern peninsula of Celebes and of the outlying islands might give to anthropologists a clue to the solution of this interesting problem.

The birth of a young Minahasser is made, as might be expected, the occasion for general rejoicing among the friends and relatives of his parents; and a *fosso* is, of course, given, when the name he is to bear is given him, his horoscope cast, and every precaution taken to protect him from the *sakits* or devils seeking to injure him.

Two or three days after birth the first part of the *fosso* is given; this is called '*irojor si okki*'—the bringing down

of the child, that is, from the room in which it was born to the ground.

Three or four walian come, and the child is brought down, and then either bathed or its head only slightly damped by the female attendant of the woman who has just been confined. It is considered to be a very unlucky sign if at this point anyone sneezes ; but, nevertheless, the luck can be restored if the priests and nurse take the child back again, chew betel for a little while as if nothing had happened, and then start afresh, saying, ' Now it is another day.'

When the bathing ceremony is over, the pig is brought out which is shortly afterwards to be sacrificed and eaten. The child is then made to kick with its tiny feet the pig three times, that the gods may know that the sacrifice is made on its behalf. In some districts the mother also kicks the pig three times, but this is not universally the custom.

The child, its parents and a few relatives are now taken to the river by a female walian, who brings with her some fire, a coco-nut husk, and an oily nut called kemiri (the seed probably of a species of *Hernandia*). With her golden cord of office round her neck, she carries the child into the river, and, taking the kemiri out of the coco-nut husk, dips them both into the river, just damps the child's forehead with the water, and rubs it with the oily nut. When this is done she throws the fire, the husk, and the kemiri into the water, muttering a formula for the exorcism of the evil spirits. The party next return to the house, the gong and kolintang are sounded, and a great noise of rejoicing and congratulation arises.

The pig is then killed and roasted whole, but it is not cut open until it has been allowed to cool for about three hours, and in the meanwhile the chief priest relates the names of the greater and lesser empungs, and gives an account of their deeds and prowess.

The heart of the pig is next examined with great care, and the fortunes of the child are told. If the signs are good, and the child is a little boy, the priest prophesies for him great strength and bravery, wealth, and prosperity; if it is a little girl, beauty, many lovers, and a handsome harta when she is married.

The feast concludes with the usual dancing, singing, feasting and general frolic (22).

The name is given to the child by a walian as he places in its mouth a little cooked rice and pork, which he holds between his finger and thumb.

In the districts of Passan and Ratahan the child's head is submitted to a process of flattening called in the Bentenansch dialect 'taleran.' A week or so after birth, a board, surrounded by folds of linen, is fastened tightly to the forehead, and every morning when the child is bathed the bands are loosened and immediately made tight again, so that the forehead gradually becomes very considerably flattened. This process lasts from fifty to sixty days (97).

A process of head-flattening similar to this exists in many parts of the world. The Chinese, many races of North American Indians, Mexicans, Peruvians, and Polynesians are known to have practised manipulations of their infants' heads for many generations, and even in Western Europe the cradle-board has not long been given up.

The next ceremony in which the young Alfür has to take part is the initiation into the secrets of the makehet, or the mode of obtaining the wine from the sagoweer palm. This he must learn when he is about twelve months old, or the gods will lose their interest in him, and he will never reach maturity or be lucky in life. When the time has come, the little boy is dressed up like a full-grown man, and bears in miniature the empty bamboo he is to fill with

wine, a knife to hack the tree, a little ladder to climb it, and arms to resist any head-hunting savages who may be lurking in the forest. The walian, his father, and one or two friends or relations take him to a sagoweer tree they have found in the forest, and the ceremony begins. The priest hangs the bamboo on the tree, places the ladder against it, and lifts the child three times, making his feet touch the steps of the ladder. He then gives the child back to his father, and runs through the names of the gods, and finally the whole party returns to the village, where a fosso is given in honour of the occasion.

The little Minahassa maiden does not learn the makehet, but nevertheless a ceremony is held for the girls of about the same age at which they are initiated into their household duties (22).

The next incident in the life of the young Minahasser is the *teütiken* or circumcision. The operation is performed in the depths of the forest by the father and uncle, but is not made the occasion for a feast (100).

Of courtship and marriage I have already spoken, so that the only remaining event of importance in the life of these savages is, to use a hibernicism, death and burial. But perhaps it would be as well, before dealing with funeral customs, to mention a few facts concerning the native treatment of disease:

Most diseases are, as I have indicated already, attributed to demons or sakits, and the cure for them depends upon the success the walian has in fighting the sakits and calling back the true spirit of the patient. Many others are treated with decoctions and infusions of roots, leaves, and fruits of plants, some of which have undoubtedly considerable therapeutical value, but others are of little or no use at all.

Since the settlement of Europeans in the country,

native medicines have to a certain extent given way before the more powerful and satisfactory patent medicines imported from Holland and England, and native doctors have been replaced in many districts by Malays, who have received a government training in medicine in Java, and are commonly known as *doctor jawa*. Nevertheless, there are at the present day many educated and well-informed persons living in the Dutch settlements who prefer to leave the treatment of their ills to uneducated natives. A gentleman I once met told me seriously, when advising me to try some native medicines, that when he had a headache a native whom he consulted took rusty nails and bits of iron out of his head, and, he added indignantly, 'With all their science and knowledge the European doctors can't do that!'

The roots and barks, leaves and fruits, are, however, to the natives but of minor importance; the important and final remedy for all serious complaints is the Manempeh or the fosso for 'the calling back of the soul.'

When anyone is seriously ill, a walian is called in who examines the patient, and then all the relatives go out into the fields and village to look for the soul. They make a fire in a likely spot and entice the spirit back by cooking rice and chicken or by whistling and calling as they would for a dog, whilst the priest goes through the list of gods and gives the ceremony a religious character. This goes on for some time; a rich patient who can afford many chickens has usually to wait a longer time for his spirit to return than a poor one. At last the walian sees it! It shows itself clearly here or there by a movement in the grass or by some other sign. The walian advances with the greatest caution, and catches it in a sarong, just as a school-boy catches a butterfly in his hat. They now turn homewards; a child leads the way carrying a woka leaf

(*Livistonia*) to prevent the priest and the spirit from getting wet, the priest follows carrying the spirit in the sarong, and then another priest armed with sago-sago (sword) and mumu, which he keeps swaying backwards and forwards to keep away the spiteful sakits who wish to recapture the patient's spirit. When they have reached the chamber, the priest opens the sarong over the head of the patient and says with great satisfaction and assurance, 'Now is your soul returned.'

This being done the patient should get well again, but if he does not it is a sign that his time has come and his spirit can no longer be retained (22).

Whatever men may do, however, in the way of medicines and prayers, the time must come when the Minahasser dies, and it is only natural to find that, as upon every important occasion in his life, the event of his death is marked by many curious and quaint ceremonies. Just as the birth of a child is regarded as a matter not only for family but also for general rejoicing, so on the death of a man or woman, the lamentations are by no means confined to the members of the bereaved family, but are heard all over the village. The gain or loss of a single individual is not a matter of slight importance or indifference to a savage race which is constantly on the war path. Every man and woman has an important part to play in life, a part which can be appreciated by the community at large, and his loss must be carefully guarded against, and wailed and bemoaned with fitting ceremony and style whenever it occurs.

The first thing that is heard when a sufferer brings his life's journey to a close is a piercing and unearthly wail of lamentation from those who are in attendance. Those in the house raise their voices and shout his name in the dead man's ears, those without join in the chorus and make the whole negori and the surrounding forests resound with their

lamentations. If they are fortunate enough to possess a cannon, a shot is fired to announce to the gods the death of their companion.

Soon after the death has been announced the body is prepared for burial. The corpse is placed in a sitting position with the arms crossed over the breast, with the knees drawn close up to the chin, and then it is wrapped and bound up with linen. The hair is commonly cut off, perhaps with the object of facilitating the escape of the life spirit. The body is, in many places, brought down to the ground not by the front door and ladder, but by a special hole made in the floor, which is immediately afterwards boarded up again. When the hour of burial comes, in the case of a woman, the widower is led to the corpse by an old woman, who throws a cloth over his head. He then takes leave of his wife, and as a farewell offering places a betel nut in her mouth, and is led away to an apartment in his house where he has to remain five, seven, nine, or eleven days (101). In other districts the widower sits and weeps under his house with his feet in a bowl of rice (22). Then come the walian and drive away the departed spirit by swinging a sword about in the air, after which the body is, amid continuous lamentations, placed on a bier and carried to the grave. On the bier and in front of the corpse sits a maiden who constantly tinkles some little bells she holds in her hands, and behind there follows a crowd of women lamenting the deceased. The nearest blood relations do not follow the body to the grave, they always remain away. The bier is carried three times round the house, and then to the grave. The grave varies considerably in different parts of the country, but is usually of stone or cement, and stands some four or five feet high, with a roof-shaped covering of the same material. There is not a separate tomb for each individual, one being considered sufficient

for some seven or eight bodies. Into the grave are thrown sarongs and other clothing, earthen pots containing food, a coco-nut shell containing sagoweer wine, an umbrella and other articles that may be useful to the deceased in the future life. In olden times one or more human heads were frequently thrown in with the body, the former owners of them being then compelled to serve the deceased for ever in the abodes of bliss.

In the course of the funeral ceremony the priests have many duties to perform. They must recount the genealogy and trace the descent from the goddess Lumimuüt ; they must pray to the gods to receive the spirit into the abodes of bliss, and drive it away from the abodes of the living.

The night is spent in gruesome dances and mournful feasts to invoke the blessings of the gods on the departed spirit and to persuade them speedily to send a new mate for the bereaved man or woman.

There are many customs following the decease of a friend or relative in Minahassa which might be classified under 'mourning customs,' but it must be borne in mind that in origin at least they are not expressive of grief or sorrow at the loss which has occurred.

In some districts at least the relatives of the deceased rub one another's faces with charcoal so as to make them quite black. This is called Mahawuwuringan (22). It is not, as one might expect, a solemn farce, but is accompanied by roars of laughter and considerable fun and merriment. Soon after this they go down to the river to bathe—a ceremony which is called Mahapasoösoh (22).

In olden times, too, the women wore their hair loose and unkempt for some days after the funeral.

The wearing of mourning clothes was not unknown in Minahassa in heathen days. The prevailing colour was black. In the neighbouring kingdom of Bolang Mongondu.

during the period of general tabu or *lii*, as it is called in the native dialect, for a princely personage, red, yellow, and other bright colours might not be worn. In Minahassa both men and women wore a large black hat called 'tindong' at the funeral, or in place of it black head cloths. There is a saying in Minahassa, 'Si loloheen tinindongan' (the moon is covered with a tindong). If there is a halo, i.e. a tindong, round the moon, then the woman who sees it takes it as a sign that she will lose her husband (101). Nowadays the Christian natives wear complete suits of black as in Europe.

Whatever they may be intended to express in civilised communities, there can be little doubt that the customary suits of solemn black originated not in grief or respect for the departed friend, but in the fear of his returning spirit.

In what has gone before we see clearly expressed the fear of the natives of Minahassa of the ghost of their deceased friend. At the funeral the priest drives it away with a sword, and the maiden who sits upon the bier frightens it by the sound of bells. Then everything is done to confuse the spirit if it attempts to return to its accustomed haunts. The ghost is always supposed to come back to the house by the same route that the corpse was taken away. We can see the reason then why the corpse is let down through a hole in the floor and carried three times round the house before proceeding to the grave. The spirit is so much more perplexed in finding its way back home by this circuitous route. Then, again, the nearest relatives do not attend the funeral in order that the ghost, if it is hovering around, may not suspect that it is its own funeral that is taking place.

Flowing water is supposed to take a ghost 'off the scent,' just as it does a foxhound. Hence originated the custom of bathing after a funeral, a custom which remains

even to the present day in Europe in a formal washing of the hands on such occasions (19). Among the Olo Ngadjus of south-east Borneo the priestess takes the whole funeral party in a boat into the middle of the river and upsets them into the water three times in succession (101).

Care must be taken, too, that, if the spirit should return to the house, it may not recognise the inmates. The friends and relatives, therefore, disguise themselves by painting their faces black, by wearing black hats, leaving their hair loose and unkempt, and in other ways.

It must not be supposed that black is the universal mourning colour. Among white and fair-skinned peoples it naturally is, because it affords them the most effectual disguise. Among the black-skinned Andamanese white is the mourning colour. They paint themselves with stripes of white paint.

The Spaniards at the time of the conquest of the Philippines found that many of the inhabitants used white as a mourning colour. Many of the races of Luzon and the Sulu Islands use white to the present day for this purpose (101).

From all these considerations, then, we clearly see that, whatever may be the grief felt and expressed by the natives of Minahassa at the loss of a friend or relative, the feeling predominating over all others on such occasions is the fear of the spirit or ghost of the deceased, and every care is taken to hinder and prevent it returning.

CHAPTER XII

SONGS AND ROMANCE IN OLD MINAHASSA

Love Songs—Stories—Story of Maengkom—Story of Matindas—Story of Kawalusan—Stories about Apes—Hair stories—Riddles—Proverbs.

I HAVE already pointed out in a previous chapter that the natives of Minahassa possess very strong poetical feelings. At the mapalus and the fossos the people frequently gather together to sing their songs of love and mourning, or to recount their stories of the gods, spirits, giants, and other heroes.

Some of the love-songs contain very beautiful thoughts and ideas, and are on the whole singularly free from coarse and ignoble sentiments. Greatly as they will undoubtedly suffer from the double translation they have undergone before appearing in these pages, I hope they will nevertheless convey some slight conception to my readers of the chief characteristics of their poetry.

The first I shall give is a love-song supposed to be sung by a young couple who love one another. The extravagance of the sentiment of love in the first part, and the extravagance of jealousy in the second, are skilfully toned down to a sentiment of mutual respect and affection at the reconciliation in the third. .

PART I

He. From the days when we were little children, my love, we determined never to renounce our love for one another.

She. Since you, dearest, first declared your love for me, I have never turned to any other.

He. From the moment that you came into the world you attracted me, and my thoughts were fixed on you.

She. Deceive me never, dearest, for my thoughts are fixed on you alone.

He. My mind is occupied by you alone, and I have even affection for your relations.

She. My thoughts also are filled with you, and I have even affection for your relations.

He. How beautiful it is indeed to see us two together ; for you are ever beautiful, my love, and how much the more so when we are together.

She. People know that we are united, love, and I would that it should be so regarded.

He. A year ago in our youth we were betrothed.

She. This year we shall be married, my love, and I know that you will not deceive me.

He. Whenever I think of you, dearest, I cannot sleep, even if it be the middle of the night.

She. In case I could not obtain you, dearest, I would prefer to remain in my maiden state, and not to marry.

He. If ever our agreement is broken, I shall follow you, for I love you.

She. If your words are true, love, I will follow you alone, for I love you.

PART II

He. I am willing to refresh the memory of our old love, for this will conduce to our being united.

She. I give no ear to your lies. How can I believe your lying tongue ? Another has already spoken to me.

He. Listen for a moment to your well-known playfellow, if you have still any love for him. I love you !

She. It is heartrending indeed to see my beloved playfellow. He is beloved, but what am I to do when I can no longer go to him ?

He. How can I efface my thoughts of you and forget you ? I may displace your memory, but still you will be ever by me.

She. Bear with her to whom you have already spoken. I also have been approached by another who has spoken to me.

He. Think well of the agreement we made when we were

young ; because when you have given your promise to another you may repent of it.

She. I have already reconsidered it, and know that what we had agreed to in our youth can no longer be accomplished.

He. From now and ever afterwards I will never more believe you, for I know that you are a liar.

PART III

She. Whenever I think of our former happiness I am sad.

He. I have already confessed to the injustice I have done you. If it will move you, learn it from the lips of him who has deceived you.

She. You think no more of our former happiness. Ah, I am always sad when I think of you !

He. Since you have treated me badly in our youthful years, I will no more think about your wrongs.

She. If you return to your former feelings, then shall I have better thoughts of you.

He. Love shines through your words, and on that account my thoughts return to you.

She. If your words are true, dearest, I need have no more heartache for you.

He. Weeping, cut the betel-nut in two. Weep no more, for I will truly take you to me.

She. A young betel-nut will I cut in two for you, my young love. The young betel will I cut in two, for I love you.

He. Place one half of the young betel in my mouth, and my feelings will be ever with you.

This song was sung at the time of the rice harvest in 1862 (61).

Here is another love-song, but of a very different description. It is the—

SONG OF A MAIDEN WHOSE LOVER IS IN A FAR COUNTRY

I wonder what my love is doing now. Perhaps he is enjoying himself, perhaps sitting still.

How far away, I wonder, is the object of my thoughts, and in what far land ?

Oh ! turn back again that we may see one another.
If a man could rush like the wind, I would wrap up the betel in my mouth, and send it to him.
If I were a bird, I would settle on the house of the object of my thoughts.
Oh that he could see his beloved playmate ! I am too sorely distressed that I cannot see him.
I go weeping into the middle of the road, but can see him not.
I can sleep no more. Even in the middle of the night I think of our (former) happiness (61).

The following are some examples of Minahassa stories :—

RIMBAH AND KOINGOTAN (41).

Once upon a time there lived a woman called Rimbah. Her husband's name was Rumimpunu. They had no children.

Every day Rimbah went down to the mouth of the river to fetch water. One day she saw in the river a crocodile, who, when he saw her, came ashore to speak to her. When he approached she saw that he was a man.

The crocodile then asked her to marry him ; but she replied that she was unable to do so as she was already married. But he besought her with much flattery, so that at last she consented to live with him as his wife. They lived for some time like this, and then he was obliged to leave her. Before going, however, he said, 'If you have a son, you must call him Rumambi.' He then went back to the sea, and became a crocodile again.

Rimbah then returned to her husband, and ten months afterwards she bore a son. Now, according to the custom of the country, the child must not go out of the room in which it is born until a certain time has elapsed, which is fixed by the old people. When this time has passed, a great feast is held, and the relations come to fix upon a name for the child. To this feast came the crocodile, and with him a number of other crocodiles all in the form of men, and they claimed relationship. A friendship was then struck between Rumimpunu and the crocodile, who said he was called Koingotan. Before Koingotan departed he said, 'Rumimpunu, my friend, when the child is grown up, tell him this, and let him tell his children and grand-

children, namely, that if any one of my offspring shall wish to cross the mouth of the river, let him not be afraid, for he has only to cry, 'O my grandfather, take care of your grandson,' and he shall be safe.

And so it happened that whenever one of the descendants wished to cross the river, and there were many crocodiles about, he was not afraid to swim across, for he remembered the promise of his forefather Koingotan. Thence comes the story that if a crocodile has four toes on its feet, then it has always been a crocodile; but if it has five, then it is a descendant of Koingotan, the father of Rumambi.

This story reminds us rather of the legends of some races of the world accounting for their totems or crests. But it is rather remarkable that in this region of the Malay archipelago totems are never used, and there is very little evidence to show that they ever were. It has been suggested from the meaning of the word that the bamboo was the totem of the Tombulus, and that some other tribal names have had a plant-totem origin; but these facts are capable of another explanation.

STORY OF A WIDOW AND HER TWO SONS (41)

There was once a very poor widow, who lived in a miserable hut she had made with her own hands and covered with melon leaves. She had two children; one was named Lakamalang and the other Lakasian. She collected the rags she found under the houses of other people to make clothes for her sons, so that she could dress them sufficiently to send them to school. When they were old enough they became the servants of a certain famous hunter named Prins.

Not long afterwards they went on a hunt with Prins, but found nothing until the evening, when they saw a cackling hen in a tree.

They passed the night there, and the following morning Prins shot at it several times, but always missed it; so at last he climbed up into the tree, and shot at it again. This time he hit the bird, and it fell to the ground.

Lakamalang picked up the hen, and found the following words written on its head : ' Whoever eats my head shall become king, and whoever eats my heart shall receive blessings.' Prins read this also.

Then they returned to the village, and Prins went to sleep, saying, ' Nobody may wake me, not even the king himself.' Prins slept soundly, and when the food was prepared he was not yet awake.

Lakasian then said to his brother, ' It is better for us to eat it all up. You eat the head and become king, and I will eat the heart and receive blessings.'

' Oh, no,' said Lakamalang, ' let us not get into trouble.'

' That is nothing,' said Lakasian, ' for we can take care to provide other food.'

Then Lakasian went and shot a dove, and prepared the head and heart like the head and heart of the hen. Then the elder brother ate up the head, and the other the heart of the hen.

Immediately afterwards they fled away until they came to a village they knew not. Lakamalang then said, ' Rest here awhile, brother, for you are certainly tired.' So they rested, and in the morning when they awoke they found three sacks full of silver in the place where Lakasian had lain. Lakamalang was afterwards made king of the country, and then the two brothers fetched their poor mother whom they had left, and brought her to live in a magnificent palace.

THE APE AND THE TURTLE (41)

The ape is a four-footed animal that lives on the land among the trees, and feeds chiefly on bananas, coco-nuts, and other fruits. The fresh-water turtle is like the Tutturuga (sea turtle), only smaller.

An ape and a turtle were once friends, and they agreed to make a banana garden.

Each took a portion of the garden and cultivated it regularly. One day the ape said, ' Well, comrade, how goes it with your banana trees ? '

The turtle replied, ' Oh, they are beginning to come up well and to show leaves. But how goes it with my friend's trees ? '

The ape answered, ' They have already begun to sprout.'

A little while afterwards the ape again asked the turtle how

his trees were getting on, and he replied that they were already quite high and had good leaves. But the ape's answers to the turtle's inquiries were not so satisfactory, for he had eaten away the young leaves as they sprouted, and he had to confess that his bananas, although high, were only stalks and stem.

Later on, when the same inquiries were made by the two friends, the ape's reply was that there were a few leaves on the stem, while the turtle replied, 'My trees are bearing fruit.'

Finally, when the turtle was able to declare that his bananas were ripe, the ape was obliged mournfully to declare that his trees were all dead.

'Now,' said the ape, 'if my friend cannot climb the tree to get his fruit, I can do so. Allow me, then, to climb your trees to get your fruit for you.'

The turtle was obliged to consent to this arrangement, and when the ape had clambered up into the tree he said to him, 'Now send me down some bananas.' But the monkey ate up all the flesh, and sent him down only the skins. This made the turtle very angry, so he put a number of *sungga* (bamboo sharpened to points) in the ground. Then, when the ape had eaten enough and wished to come down, he said, 'Don't go down on that side of the tree, for the ground is there soft and muddy.' The ape, being heavy with the fruits he had eaten and well contented with himself, came down heavily and carelessly, so that he fell on the *sungga*, and was pierced to the heart and died.

We generally find in the stories about animals that the apes have attributed to them a superior wit or cunning, so that they are able in some way or another to gain some advantage over other animals. In the following story the turtle gets the best of the monkeys :—

A turtle once asked a number of apes to come out with him to catch fish. The apes, knowing that the turtle was very clever at catching fish, consented, and they all went down to the shore together. The place they came to, however, was quite dry, so they asked the turtle how it was possible for them to catch fish there. The turtle replied, 'Oh, that is easy enough. Wait until you see a shell-fish lying with its shells open, then all you have to do is to put your hand in and pick it out.' The apes tried

this, but before they could drag the fish out the shells closed, and they were caught. When the tide rose the apes were drowned.

There is also a long story, partly legendary and partly mythical, of a wonderful person named Maengkom, who travelled about in various parts of Minahassa, performing miracles as he went. It is not necessary to give an account of the legend in detail, as it has been translated into the Dutch language by Louwerier, but a few of the incidents of the journey will indicate to the reader its general characteristics.

Maengkom (it is related) started on his journey riding upon half a pig, and went eastwards toward Parepej, calling the towns through which he rode Toulembo, Suiten, &c., until he came to the Rembokan (Tondano) lake, when the half-pig turned into a canoe. On the lake he met two men in a canoe fishing for prawns. He asked for some, but the man in front refused to give him any, because, he said, 'we have so few.' The man behind, however, urged him to comply with his request, but, as he still refused, Maengkom said to the man, 'Look out then for yourself,' and tipped up the canoe, so that the man in front fell into the water. When he came up again he was the rock Lūmelūtūt. Then he went on to Kakas, where he met a relation who asked him, 'Why do you come here?' 'Because,' he replied, 'my parents hate me, and I can no longer live at home in peace.' He stayed some time with his relation, and then parted from him joyfully and peacefully. He next came to a cape, but, instead of sailing round it, he went through it, so that it became an island. This island is called Tinulap, which means 'cut through on one side.' He rested there a little while, and chewed the betel-nut, and the saliva he spat out stained the rocks red—*Watu merah*. When he came to a mountain in his peregrinations, he did not climb over it, but went right through it.

In the course of his journey Maengkom performed other wonders, so that many of the names of the villages and natural phenomena are said to have been given to them by this mythical Celebean Baron Munchausen.

THE STORY OF MATINDAS (89)

In the negori Maarom there dwelt a man named Matindas and his wife Mogogunoi. She was an extremely beautiful woman, and Matindas loved her so dearly that he would never leave her even for a moment, and thereby he considerably neglected his work. Mogogunoi, noticing this, said to him, 'If you really wish to gaze upon me every moment of the day, make a picture of me, which you can carry with you wherever you go.' Matindas did this, and from that time forth whenever he went fishing or hunting he always carried with him the picture of his wife. For a long time everything went well; but one day, when he was fishing on the sea, a storm overtook him. The waves leapt high, and it was only with considerable difficulty that he saved his life. During the storm, however, he lost the picture of his wife. Shortly afterwards the followers of the king of Mongondou came off Maarom, and they found the picture and took it to their chief. Immediately the king saw the picture he fell in love with the subject of it, and straightway sent his followers to Maarom to find out who she was. When they arrived at Maarom they set two cocks to fight in the main street, so that many of the inhabitants, including the beautiful Mogogunoi, attracted by the fight, came out to see what was going on. In this way Mogogunoi was discovered, and the retainers of the king of Mongondou, rejoicing at the discovery, said to her, 'In nine days the king will come to adopt you as his daughter.'

As soon as these men had departed Matindas said to his wife, 'Let us fly away into the bush, for when the king of Mongondou comes he will most certainly kill me, and take you away, not as his daughter, but as his wife.'

His wife answered him, saying, 'How silly you are! Go and make a large box in which a man can comfortably lie, and then wait and see how I shall save you.'

In the meantime the retainers brought to the king of Mongondou the good news, saying, 'We have found the person you sought for, and she is indeed beautiful, but she is the wife of Matindas.' The king thereupon set out with a party of warriors to kill Matindas and capture Mogogunoi for his wife. As

soon as they came off Maarom the king sent his warriors and retainers ashore, ordering them to kill Matindas immediately they saw him. Matindas and his wife, however, overheard this dire command, and Mogogunoi said to her husband, 'Take your clothes off now and hang them on the wall; then go and lie in the great box, while I will go and sit down in front.' She had scarcely said this when the king came unattended to her house.

'Where is Matindas?' he said.

'He has gone into the forest,' answered his wife.

'I have come here to kill him, and to take you away as my wife. Would you consent, lovely Mogogunoi, to be my wife?'

After some consideration she said, 'Willingly, O king, for Matindas is an indifferent, good-for-nothing fellow. But we must be very careful, for the whole population of the district belongs to the family of Matindas, and they would kill us both if they discovered our flight. To avoid this you must put on these clothes and the mask belonging to Matindas, and then his family will take you for him, and we can reach the boats in safety.'

Considering this to be good advice, the king changed his clothes, and, holding the mask before him, said to Mogogunoi, 'Come now, let us go.'

'Very well,' said she; 'but my husband is accustomed to jump down from the third step of the ladder and dance a war-dance in front of the house before I follow him. Let us do this also.'

The king followed her instructions, but while he was dancing Mogogunoi called to the retainers and warriors, saying, 'See, there is Matindas; kill him!'

The warriors, who thought the war-dancer was really Matindas, struck and killed him according to the orders they had received. When they raised the mask and discovered their mistake they were seized with a terrible fright, and took to flight in the greatest haste.

In this manner, then, Mogogunoi saved her honour and her husband.

THE STORY OF KAWULUSAN (89)

Kawulusan, of Pasanbangko, wishing to fish in the sea, borrowed one day a fishhook from a friend of his. Soon after he had commenced he hooked a large fish, but when he came

to draw it in the line broke, and his hook was lost. Greatly disappointed with his misfortune, Kawulusan turned homewards, and told his friend of his loss.

'You must give me back my own hook, or give me ten others instead,' said his friend.

So Kawulusan went back to the sea to search for the hook. In the place where he had lost it he dived into the water, and when he came to the bottom he found there a level road leading to a village. In one of the houses he heard the noise of much lamentation and weeping, and the people were offering a sacrifice of a pig for a maiden who had got a fishhook in her throat. Kawulusan, who had entered, saw at once that she had got his fishhook in her throat, so he said to her parents, 'This is nothing. I will give her some medicine, and she will speedily recover.' He then bade everyone to go outside, and when he was alone with the girl he carefully drew out the fishhook and hid it in his clothes.

He then departed, having received from the parents many presents; but when he came to the place where he had jumped into the water he found that his canoe had disappeared. Whilst he was still lamenting over this new trouble he saw a large fish, which he immediately besought, saying, 'If you will bring me safely ashore, I will give you the name Pongkor sumesengkat.' His wish having been acceded to, he got on to the back of the fish, and was carried at an astounding pace though the water. Kawulusan was buoyed up with the hope that he would soon be brought to the shore, but instead of that he was carried to the extreme east where the sun is. Having found a road to the west, he travelled until he came to a country in the sky just above Pasanbangko. There he met three men, who asked him, 'Where do you come from?'

'I come from the earth,' he answered, 'and would gladly return there.'

They were willing to help him to accomplish his purpose, and lowered him to the earth in a basket. When he was still some distance from the earth he shouted out joyfully, 'Oh, father! mother! I am your son Kawulusan.' Full of joy and wonder, his parents came out into their garden, and were rejoiced to find that it was indeed their son who was calling them. The father then climbed to the top of a tree, and, cutting the rope some

fathoms from the basket, joyfully returned to the house with his son. The rope on further investigation proved to be a necklace of golden pearls. In honour of the return of his lost son the father sacrificed a large pig.

Soon afterwards Kawulusan gave the hook back to his friend, but considered over a means for returning evil for the evil he had received. This soon came to hand. He planted by the bathing-place Marompa a grove of bananas, which rapidly grew and produced fine leaves. Some days afterwards Kawulusan saw his friend going to the bathing-place. Then he prayed to the gods, saying, 'If I am worthy in your eyes let fall immediately a heavy rainstorm.' Being still in the bath, his friend cut a large banana leaf for shelter, and ran with it to his house. But, as he passed by Kawulusan's house, the latter said to him, 'Whose leaf is that you are using there?'

'I cut it by the bathing-place,' was the answer.

'Those bananas,' said Kawulusan, 'belong to me, and I will not allow them to be damaged. You must join the leaf to the tree again.'

Ashamed and afraid, he departed to try to join the leaf to the tree again, but do what he might he could not succeed. Not daring to return he remained there, and his body withered like the banana leaf.

Many are the stories of apes and crocodiles in Minahassa. Here are some examples:—

One fine day a monkey was swimming in a river when a crocodile caught him by the leg. 'Oh,' said the monkey, 'you haven't got hold of my leg; this is my leg,' showing him a piece of wood. The crocodile loosed his hold and seized the piece of wood, so that the monkey escaped. The crocodile was very angry, and vowed that the time would yet come when he would eat him up (41).

A monkey was accustomed to sleep in a mossy tree. One day, when he was away, a crocodile climbed up into the tree and lay in wait for him. When the monkey returned he saw the footsteps on the sand, and that the moss was torn away in places, so he cried, 'O moss! moss! Perhaps my lair is dead. If you are dead I will not climb up, but I will call "Moss! moss!"' The crocodile answered him to show that the moss was not dead,

but the monkey said, 'Whoever heard of the moss speaking? You would eat me up now if you could, but you won't have the chance' (41).

An ape was stranded on an eyot in the river, and a crocodile came and said he would eat him up. 'Very well,' said the ape, 'but you are too small. Go and fetch some companions first, and then you can feast on me.' The crocodile went away, and soon came back again with a number of friends. 'Now,' said the ape when they arrived, 'stand in a row side by side so that I may count to see if you have brought enough.' The crocodiles did this, and then the ape jumped on the back of the nearest one and then on that of the next, counting as he went, 'one, two, three,' &c., until he came to the last, when he jumped on to the opposite shore and escaped. 'Ha! ha!' he said, 'now I have trapped you and made you my slaves; you will never more be able to do me any harm' (41).

It is a curious and interesting fact that a story similar to the last of these is found in Japan. The hero of the Japanese fable, however, is a hare, and he does not get off scot free, for the last crocodile seizes him and tears his skin off.

The following is a modification of the same story as it is told in the neighbouring kingdom of Bolang Mongondou :—

An ape, who had been searching in vain for food, met a white heron who said to him, 'Why don't you go over to yonder island? There are mangga fruits there in abundance.' 'How can I get there?' answered the ape. 'I cannot fly, nor can I swim so far.' 'Never mind, my friend,' said the heron; 'come and sit on my back, and I will carry you there.' The ape willingly assented to this friendly offer, but when they came to the island there were no fruits to be found, for the heron had invented this fiction in order to see the ape starve to death. The ape waxed very wroth at the heron's deceit and refusal to take him back again, and, seizing him unawares, he pulled all his feathers out. The heron, no longer able to fly and unable to find any food, soon died of fear, as the ape had expected; but his own unfortunate position

was not improved by this, and he still had before him the chance of starvation. Fortunately, however, he was saved in the following remarkable manner:—

Wandering one day along the coast he met a crocodile. What! he said, 'is there only one of you left alive? The number of the crocodiles is always small.' 'Well,' said the crocodile, 'there are a great many more of us than of you.' 'I like that,' said the ape. 'Come now, you go and fetch all your comrades and I will fetch mine, and we will see who are the most.' While the crocodile was away calling his companions, the ape ran about hither and thither on the sand, so as to make as many footprints as possible. When the crocodile returned with his companions, he said to the ape, 'Where then are your comrades?' 'Oh,' said the ape, 'you were such a long time fetching yours that mine got tired of waiting and have gone away again.' 'You are deceiving us,' said the crocodile. 'Come ashore then,' answered the ape, 'and count the number of the footmarks.'

The footsteps being counted, it was necessary for the ape to count the crocodiles; and in order to facilitate this, he asked them to stand one behind the other. This they did, forming a bridge of crocodiles which reached from the island to the opposite shore. Now the ape began to count, and, springing from the back of one crocodile to the next, he reached the dry land. Thus the ape escaped from starvation on the island, and the crocodiles, sorely vexed at the trick that had been played on them, were obliged to confess that the ape was too clever for them (90).

The last class of stories to which I shall call attention is that which includes those based upon the common belief that the hair of the head, or a portion of it, is the seat of strength, courage, or even life. This belief may be found in almost every race of human beings, and in all times. We find it very strongly marked in many passages of the Old Testament, for example. Samson says to Delilah, Judges xvi. 17, 'If I be shaven, then will my strength go from me, and I shall become weak and like any other man.' Numerous examples might also be taken from

classical mythology, but one will be sufficient to illustrate the point.

Nisos, king of Megara, had upon the top of his head a single hair, which was purple in colour, and upon which, according to the oracle, his life depended. His daughter, Scylla, was acquainted with this secret, and when the city was besieged by her lover, Minos, king of Crete, she pulled this hair out, so that Nisos died and the city was taken.

In these two examples, from the Old Testament and classical writings, we have two important variations. In the former we have the belief that the man's strength is in some mysterious way connected with his hair as a whole; in the latter, that a man's life is in some way dependent upon the safety of a single hair growing on the crown of his head, which is of a curious or particular colour.

Both of these variations are to be found in Minahassa.

I have already referred to the *boto*, or locks of human hair, which are stirred up in boiling water to extract the courage, and the water is subsequently drunk by the warriors to give them courage. This ceremony is unquestionably due to the belief that courage—and in the savage mind physical strength is regarded as an accessory of courage—is in some mysterious way connected with the hair of the head.

The single-hair variation of the belief is seen in the Bantik story, 'Kasimbaha and Utahagi' (*vide* p. 264).

Here is a story told by the Alfûrs of Minahassa, showing another variation of the same:—

A certain Mamanua came across a woman named Luma-lundung in the course of a hunt, and straightway proposed to marry her. 'Very good,' she said, 'but you must promise me never to touch my head, for if I lose a single hair of my head, then am I lost to you.' Mamanua promised that he would not,

but after a time he forgot his promise, and unfortunately one day tore out some of her hair. 'O Mamanua, what have you done?' cried out Lumalundung. 'Now I must leave you; you will never see me again.' Hardly had she said this than the light faded and a thick mist came over the house. When this had cleared away Lumalundung had disappeared (93).

The continuation of the story, as it is given by the elder Wilken (89), is not uninteresting, although it does not bear upon the point in question. It resembles somewhat the story of Walasindou, but gives rather more details of the heavenly village, Kasendukan, and the way to get there.

When Lumalundung had disappeared, Mamanua hunted for her all over the house and everywhere else besides, but could not find her. Her weeping child, Walasendou, alone remained to him. Taking his son upon his arm, he went into the forest to search still further for his wife. He met there a bird to whom he said, 'If you will carry me to Kasendukan I will give you a handsome present of linen and rice.' 'You need not pay me for my services,' said the bird; 'give me only a name and I will do what you wish.' When Mamanua had given him the name of Tampanisi-walian, he and his son mounted on the back of the bird. The bird's strength failing him, however, he was brought no farther than the top of the papuan dang tree. Mamanua wandered with his son still farther until he came to a very high tree. 'Will you help us to Kasendukan?' said he to the tree. 'If so, I will give you a handsome present of linen and rice.' 'Give me only a name,' answered the tree, 'and your wish shall be fulfilled.' 'Moihow shall be your name, for you will become the loftiest of all the trees.' Higher and higher climbed Mamanua and his son in the tree, higher and still higher grew the tree, but before they had reached Kasendukan there came a strong wind which blew the tree over. Farther and still farther marched the disappointed spouse, until he came to a long thick rattan, to whom he said, 'Will you lead me to Kasendukan, to Lumalundung, the mother of Walasendou? If so, I will reward you with a present of fine linen and rice.' 'You need not hire me,' said the rattan; 'come now, I will bring you there.' Ma-

manua and his son mounted on the rattan, which grew and grew and grew until it reached the expanse of heaven, where, pushing against a stone pillar and finding no support, it turned down again and grew towards the east, where the sun rises. 'Wait here,' said he to Mamanua, 'until the sun begins his upward journey, and follow him ¹ to Kasendukan.' He had not long to wait, for soon he met a man named Makarehak going before the sun, who said to him, 'Why are you here?' 'I wish to mount into the sky with the sun,' was the answer. 'Very well; but if you do not wish to be burnt with the sun's rays, you must be provided with nine banana and nine arenga stalks.' Having no time to do this, Mamanua let the sun pass without using him, and waited for the moon instead. 'Why are you here?' asked the moon. 'I wish by your help to go to Kasendukan,' said he. 'Your wish shall be granted, but you will suffer considerably during the voyage, for a stinking vapour exhales from me as I move.' They thereupon commenced the journey, and soon came to Kasendukan. Here Muntuuntu stood in the way; asking him, 'Why have you come here?' 'I am searching for the mother of Walasendou,' said Mamanua. Then Muntuuntu took some assa (a reed), and, sharpening it to a point, thrust it at Mamanua; but as he could not strike him even once with it, he said, 'You evidently are a friend of ours. Go your way in peace. In the middle of the country you will find a great house which belongs to Marinojo, father of Lumalundung.' Mamanua, however, saw on all sides fine houses and was perplexed, not being able to find with certainty the house he wanted. A great fly settling on his head, he said to it, 'Show me the house of Marinojo, and I will give you fine linen and rice.' 'Give me only a name,' it said, 'and I will put you right.' 'Your name shall be Lalerlumeno (bright or shining fly), and if your dung be laid in wounds, in flesh, in pig's flesh, or in fish, it shall breed maggots.' 'Follow me,' continued the fly, 'and note well upon whose forehead of the nine sisters in the house of Marinojo ² I settle, for she is Lumalundung. Take Walasendou to her that she may embrace him. So said, so done. Lumalun-

¹ The sun is masculine and the moon feminine in the native languages (91).

² Marinojo seems to have been an agricultural deity.

dung, seeing her son, fell in joy upon his neck, took him to her chamber, and shut Mamanua out.

Being thus left alone and knowing not what to do, he saw fortunately a rat, to whom he said, 'Help me and open the door for me, and I will give you a quantity of linen and rice.' 'I do not want these gifts; give me only a name,' said the rat. 'Gnawing rat shall be your name, for you shall gnaw through everything.' 'Take care,' answered the rat, 'and as soon as you hear me gnaw at the door for the third time, push against it and it shall fly open.' Mamanua did so, the door flew open, and he discovered Lumalundung embracing her son Walasendou.

Lumalundung now prepared a meal, but she used only the vapour of the rice. Mamanua ate as usual. This food is, however, for those who dwell in Kasendukan a deadly poison, so that he died. Afterwards she prayed to the Empung Tumontulus of the Klabat to restore him to life; and when he was alive again, he ate nothing but the rice vapour even as his wife did, and lived with her happily ever after in Kasendukan.

Their son, however, did not thrive there, and notwithstanding that he was constantly nursed by his mother he grew thin and weak. Mamanua and his wife determined therefore to send him back to earth, but Walasendou, hearing of this plan, asked his parents whom he should marry at Mondolung. 'You will find,' answered his father, 'a large egg of a wood-pigeon in a climbing plant on the buwis tree. Break this egg, and a woman shall come out called Matinempun. She shall be your wife.' Walasendou then went down to earth, and it happened just as his father had said. Walasendou and Matinempun became man and wife and begat three sons and one daughter, who dwelt at Mondolung, in the Tateli district.

A very common and favourite pastime with the natives of North Celebes is the invention and solution of conundrums.

The following story told in Bolang Mongongdu (90) will give an idea of the nature of the Celebean conundrum:—

Once upon a time there dwelt in a mountainous district a rich and beautiful princess who had a wonderful talent for asking and

answering conundrums. Attracted by her beauty and riches, many princes sought her hand ; but no one could captivate her. In order to check the stream of suitors, she declared that she would never marry anyone who could not beat her in asking and answering conundrums ; and furthermore, whoever failed to guess the answer to her riddle, or gave her a riddle that she could guess, would be immediately hanged. Many noble princes fell victims to this cruel proclamation.

Far away from the dwelling of the princess there lived a king who had an only son, named Salmon. When he was a child, his parents had allowed him to become the playfellow of a slave of the same age, named Louis. Both youths were brought up with the greatest caution, and they scarcely knew that the world was any larger than their own little kingdom. It was with the greatest wonder therefore that they saw from time to time columns of smoke arise in the distance into the blue sky, and a burning desire came over them to climb the mountains to see what lay beyond. The distance, however, was so great that they could not reach the mountains on foot, and the king had carefully hidden his horses away that they might not use them. One day the king sent Louis into the forest to fetch his horse whilst he himself went into the fields. The slave quickly fetched it, and then sought for Salmon that they might ride away to the mountains together. The mother asked them before they started where they were going. ' We are going,' answered the son, ' to see what it is like on the other side of yonder mountain.' Then the mother cried aloud and threatened them with punishment, but it was of no avail. ' You and father have shut us up long enough, and now we will no longer put up with it,' said the son. ' Then is it better that my son should die,' said the mother, and at the same time tried to throw over them a strong poison. The youths, however, were already seated and moving off, so that it fell only on the hind-quarters of the horse.

But the poison soon began to work, and before they had got very far the horse fell dead by the wayside. The youths waited for some time to see what would happen to the dead horse. Soon afterwards two gluttonous crows that had been feeding on the carcase fell dead to earth. Salmon and his playfellow took these crows, cut them each in half, smoked them over a fire, and, wrapping them in woka leaves, started off on foot. When

they had passed the last mountain, they came to some large houses where they received a friendly welcome. The appearance of the people, however, did not favourably impress Louis, who warned Salmon to be careful. 'These people will rob us when we fall asleep, and perhaps murder us; we must therefore be on our guard and watch by turns.' The prince was a bad watchman and sleep overcame him, and while they both slept they were robbed of all their possessions. The thieves ate up the crows they had stolen from the lads, and as these were poisoned by the horse-flesh, the thieves to the number of forty died.

The two travellers then went on their way, and at last they came to the dwelling of the cruel but beautiful princess, and were received with much hospitality. The first evening the princess turned the conversation to her favourite pastime, but the young prince became uneasy, and was about to say that he was not clever at asking or guessing conundrums when Louis whispered in his ear that he should ask the princess to allow them to leave her presence for a moment. 'Now,' said the slave to Salmon when they were alone, 'first ask her this riddle: "One dead kills two, and two dead kill forty," and don't give her the slightest clue to the answer or she will ask you a conundrum. Returning to the princess, Salmon said, 'One dead kills two, and two dead kill forty.'

The princess could not of course give an answer to this conundrum at once, but she determined to spare no trouble to find out what it was. Louis, suspecting that she might use unfair means to obtain the answer, said to his master, 'To-night probably the princess will send some one to find out the answer from me. Keep awake, therefore, and when you hear me cough come out angrily and ask who is making such a noise.' Everything happened as Louis had foreseen, for no sooner did the household suppose that the prince was asleep that night than the wife of one of the chiefs came to Louis, and tempted him with a sack of money and caresses to give her the answer to the riddle. Louis coughed loudly, and Salmon came to the door and in an angry voice asked him who was making such a noise. The woman rushed away frightened, leaving behind her the sack of money and her sarong, which Louis had held on to. The same thing occurred on four nights; each time the wife of a different chief came to find out the secret. On the fifth night Louis said

to the prince, 'This evening the princess herself will come; you must therefore sleep in my place outside the door.' The princess came as the slave said, and on being disturbed left behind her in like manner her money and her sarong. She had, however, learned from the prince that he and his slave had left their home on a horse, and this was a sufficient clue for her to guess the conundrum. On the following morning she gave her answer, 'One poisoned horse kills two crows, and two poisoned crows kill forty men.'

The prince had now forfeited his life, and was ordered to be hanged. When he came to the place of execution he asked permission to give his slave Louis a message to take to his parents. Permission was granted, and he said, 'We caught a deer with one copper and one silver horn. Show the horns.' Louis showed the two first sarongs and the two sacks full of money. 'Again we caught a deer with one silver horn and one golden horn. Show the horns.' Louis showed the other two sarongs and bags full of money. Then the four women who had left these fled away, for their husbands were present and they were greatly ashamed. 'Further,' the prince went on, 'we caught a deer with one golden horn and one diamond horn. Show the horns, Louis.' 'Never mind,' cried the princess. 'I see now that you are destined to be my husband.'

So the prince came down triumphantly from the place of execution, and became the husband of the rich and beautiful princess.

Here the story unfortunately ends. We do not know if the princess gave up her bad habit of asking riddles, but at any rate we may presume that they lived happily ever afterwards.

Closely related to the conundrums are the proverbs. Their meaning is at first sight so obscure that it seems very probable that they were conundrums that, by constant repetition, have come to be regarded as proverbs. Thus: 'Atedu mēpe si koōko,' 'The egg breaks open the chicken,' seems at first sight mere nonsense, for our common experience of eggs and chickens is that it is the chicken which breaks open the egg. When used as a

proverbial saying to express any marked reversal of natural phenomena its meaning is clear.

Similarly when children rebel against the authority of their parents the native says, 'Tampanisi tumongko uwak,' 'The tampanisi (a kind of dove) defies the uwak (the great hornbill).'

But besides proverbs there are numerous maxims in common use amongst the people, some of them distinguished by remarkably fine and noble sentiments. Here are some examples :—

'Do not enrich yourself with the sweat of others.'

'If one could cut off flowing water, then could one break the bonds of brotherhood.'

'One must suffer heat and rain to receive joy' (23).

CHAPTER XIII

HISTORY OF AND USEFUL PLANTS IN MINAHASSA

Early history of European settlements in Minahassa—Account of the Dutch settlement—The Sagoweer palm—Coco-nut pearls—The Betel-nut palm—The *Corypha* palm—Woods—Kapok—The *Musa mindanensis*—Edible fruits—Rice—Legend of the rice—Art of the Alfürs.

In many of the legends of Celebes we find, as I have already mentioned, numerous traces of contact with European ideas. It is consequently necessary before bringing my description of the Minahassa races to a close just to run through as briefly as possible the scanty history we have of European conquest in this region.

Before the advent of the Portuguese the place now known as Manado was called Wenang, and the island Manado tuwa was called Bobantohé (22). The natives of the country now called Minahassa were under the dominion of the cruel and warlike kings of Bolang Mongongdu. The inhabitants of Bobantohé had been successful in resisting all attempts at subjugation, and were a free and independent people numbering some 300 warriors and about 700 non-combatants. For many generations these brave people, who said they were descended from the baboons which swarmed in the forests of the island, maintained their independence, but at last they found themselves in dire distress, owing partly to want of water, partly to internal dissensions, and partly to the loss of their crops by the voracious apes, and were obliged to migrate to Wenang and

surrender to the queen of Bolang, who reigned in Minahassa as the deputy of her husband (79).

It is not yet known for certain when the Portuguese first discovered the 'Pulah Salebih,' or 'Many Islands,' but, as mentioned above, in the year 1563 Mascarenhas sent a priest from Ternate, named P. Diogo Magalhaens, to preach Christianity to the people of Manado. He says that the Manadeese were a brave and warlike people and a terror in the neighbourhood; but his remarks probably apply, not to the Manado people, but to the Bantiks, who formed at the time a large and powerful tribe.

From Manado Magalhaens went to Siau, and for nearly a century afterwards the pioneers of civilisation and Christianity devoted their best energies to the chain of islands extending from Mindanao to Tagulandang, partly because they are on the direct route from the Philippines to the Moluccas or Spice Islands, and partly because the natives offered less combined resistance to their encroachments.

The Portuguese were succeeded in these waters by the Spaniards, and there seems to be no doubt that for a time at least part of the eastern peninsula was under the yoke of Castile.

The Dutchmen appeared upon the scene for the first time in 1655. They established themselves in a stone fortress they built at Manado. They soon drove out the Spaniards, and by the help of the famous Amsterdam Sultan of Ternate they, in the year 1677, defeated and routed the king of Bolang Mongondou.

From that time the power of the Dutchmen and the extent of their dominion gradually increased. They could soon reckon upon over 4,000 fighting men from Manado, Klabat, Tomohon and Kakas, and numerous kingdoms of the Tomini Bay and north coast came under the dominion nominally of the Sultan of Ternate, but actually of the Dutch.

Soon after the Dutchmen had established themselves in Celebes they commenced to spread amongst the natives the doctrines of the Reformed Church. For a long time Christianity seems to have made but little progress, and it was not until Dominie Kam arrived in 1817 and was followed by Lenting, Lammers, and Muller, that any very great impression was made upon those natives who had not previously accepted the Romanism of the Spaniards and Portuguese. Nine or ten years later came Hollendoorn, who set to work to learn the languages and preach the gospel in the dialects that were in actual familiar use amongst the natives, instead of using the conventional form of Malay. Hollendoorn may fairly be considered the first of that race of distinguished missionaries of which Riedel, Wilken, Schwartz, and Graafland were such brilliant examples. It may truly be said that they have achieved greater success in their mission than any missionaries at any time in any part of the world.

In Minahassa alone there are at the present time about 114,000 Christians out of a population of 135,000.

There have been one or two attempts to re-establish Roman Catholicism in Minahassa. We have in the writings of Wiersma (87A) very bitter comments on the doings of the Catholics.

During my visit to Celebes a Roman Catholic priest arrived, and terrible were the scandals that arose as to his objects and peregrinations. It certainly seems a pity that the *odium theologicum* should be allowed to intrude itself upon such an obviously good piece of work, and, although I am inclined to believe that Roman Catholicism would have been a more suitable form of Christianity for the natives than the reformed religion, it would be the greatest mistake in the world to allow the present system to be disturbed until the Celebeans are better

able to understand and appreciate the religion which suits them best.

Since the commencement of the colonisation of Minahassa the sway of the Dutch Government has been distinguished by a remarkable share of peace and prosperity. There have been one or two affairs with the Bantiks, that brave and independent race of people living near Manado; and in 1809 the Dutchmen were obliged to carry a flotilla of boats to Lake Tondano and suppress the revolt of the

Tondanese. About thirteen years ago, too, there was trouble with some natives from the district Bwool, who came in some twenty large praus one morning early, and before the military could disperse them slaughtered in cold blood a number of peaceful citizens in the market-place, attempted to burn the Residency, and actually tried to storm the fort itself. History does not give us details of the numbers of these poor misguided wretches who fell before the fire of the soldiers' rifles, nor of the number who escaped to tell their friends the story of their bold but disastrous attack upon the stronghold of the 'Orang blanda.'

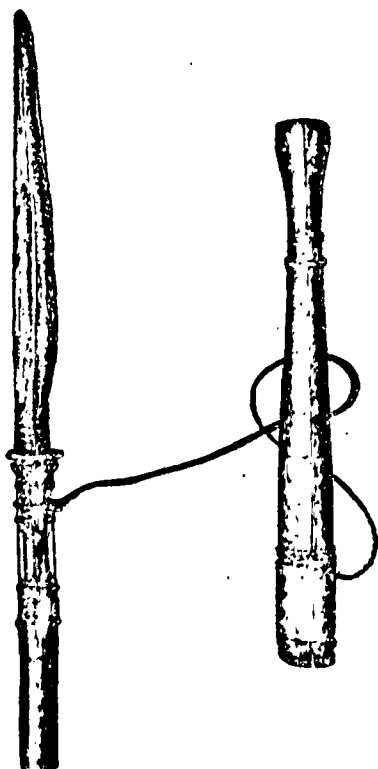


FIG. 33.—Spear used by the natives of Bwool.

Through the kindness of Mr. Harmsen, of Manado, I

was able to obtain one of the spears these people left behind them when they were driven off. The blade is of iron, the handle is of a heavy black wood about three feet in length. Around the neck of the spear there is a band of brass ornamented with a conventional floral design (fig. 33).

With these exceptions the rule of the Dutch in Minahassa has been a peaceful one, and the progress of the colony towards a condition of civilisation has been remarkable, thanks to the humanising efforts of the missionaries, the abolition of slavery by Resident Roos in 1819, the spread of an elementary education, and the wise and just government of the officials.

Minahassa has at various times been visited by many eminent naturalists and travellers. Van Rosenberg, Wallace, Reinwardt, Bleeker, Meyer, Platin, and others have sojourned in the peninsula for the purpose of investigating the natural history. Resident Musschenbroek made considerable additions to our knowledge of the fauna, and Controleur Riedel¹ did much valuable scientific work at Tondano.

A great deal of useful work was done by the naturalists on board the French man-of-war '*L'Âstrolabe*,' which visited Manado in the year 1827.

The British surveying vessel, the '*Samarang*,' under the command of Captain Sir E. Belcher, spent some days in North Celebes in the year 1844, and there is a valuable contribution to our knowledge of the fauna of this and other regions visited by the vessel in the volume on the zoology of the voyage edited by the distinguished naturalist Adams.

Notwithstanding the labours of all these naturalists, a great deal still remains to be done both in the botany and zoology of the district before we can form any accurate idea of the value of the treasures it contains. Some groups of the animal kingdom have not yet been looked at, and

¹ Afterwards Resident of Amboyna.

there can be no doubt that many valuable trees and flowering plants at present unknown to scientific men lie hidden away in the deep recesses of the forests.

Perhaps one of the most important lessons a naturalist learns when he lives for a few months with wild men in their native forests is the extraordinary value of the vegetable productions to them. The numerous little devices they have for making traps, baskets, cages, string or rope, projectiles of various kinds, out of leaves, bark, sticks, and the like, often struck me as extremely ingenious. In my expeditions in the forest I was frequently at a loss to know how to proceed for the want of some trifling article such as a piece of string, a pin, a little box or basket to carry something home in, or a trap to catch some strange creature with ; and I was amazed sometimes at the ready resource shown by my boys in helping me out of such difficulties with materials ready to hand in the forest.

With the progress of civilisation and the specialisation of manufacture we have grown to be so dependent upon articles which can be bought in shops that we have lost much of our independence in small matters. If a native of North Celebes, on the other hand, can buy or borrow a knife, he will be his own tailor, hatter, house-builder, boat-builder, and purveyor ; and he will manufacture all the string, rope, nails, pins, baskets, weapons of offence and defence, that he requires from the natural productions of his fields and the forests.

In these respects there are some plants which are undoubtedly of much more value than others. These are carefully preserved in the neighbourhood of the villages, and are regarded in some cases with especial reverence as the gift or discovery of their popular deities or heroes.

Of the bamboo it is hardly necessary for me to speak, for the importance of this grass has been already referred

to by nearly every traveller in the East Indies; and many of its uses must be familiar to everyone. It has with great justice been said that 'the bamboo is one of the most wonderful and most beautiful productions of the tropics, and one of Nature's most valuable gifts to uncivilised man' (83).

Next to the bamboo the most useful plant in Celebes is the sagoweer palm (*Arenga sacchariferum*). It extends all over the archipelago, from Sumatra in the west to Cochin China and the Philippines in the east. In Minahassa it is very common in the valleys and forests. Its sap provides the famous sagoweer wine, the drink of the gods in the heavenly village Kasendukan—a clear, sweet, and pleasant beverage when fresh, but bitter and intoxicating when it has been allowed to ferment. The sap is procured in the following way:—When the palm is four or five years old, spicate inflorescences appear among the young leaves. A little while afterwards a soft pad of vegetable tissue filled with sap is formed in the neighbourhood of the older inflorescences. This pad is called the *majang*. It is probably a young bud, which if allowed to develop further would form another inflorescence. When the blossoms fall from the tree, it is known that the *majang* is ready to be operated upon, and the native who finds the tree leans a bamboo, with the internodal *septa* knocked out, against it as a sign of ownership. The *majang* is first struck several times with a flat wooden club, and forcibly manipulated with the hand, so as to give the sap free passage in the pulpy mass. The tree is then left for three or four days to allow the sap to accumulate. A piece of the *majang* is next cut off, and if the native sees that it is ready, the sap is allowed to drip into a long bamboo suspended to it. This part of the work is called *makehet*.

The original discovery of this process of wine-making

is surrounded with a cloak of reverential myth. It is very generally attributed to the god Kiriwaerong, who presides over the 'seho' tree, as it is called in the native language.

In some places in Minahassa, and more generally in Java, a coarse black sugar or treacle is made from the sap of this palm.

But besides wine and sugar the arenga palm provides many other useful products. The dense plexus of hairy fibres given off by the leaf-stalks is useful as a tow for making ropes, strings, and brooms. This is called the *gumutu* or *würsan* in the Tondano dialect (56). The fibres are black, coarse, and rather brittle, and cannot in consequence be used with the same confidence as the more valuable manilla hemp fibres, but nevertheless they make very good thick ropes, especially valuable on board ship as hawsers, on account of their power of resisting the deleterious effects of constant soaking in sea-water.

The wood of the seho tree is hard and strong, and is frequently used by the natives for the floors of their houses. The half-ripe fruits when peeled and then baked form a not unpleasant article of food. The young buds can also be eaten as a vegetable.

When the trees have ceased to provide a sufficiently copious supply of sap they are cut down, and the pith chopped out and used as an inferior kind of sago. It is not considered to be a first-rate form of food, and is rarely used when there is a good supply of rice or Indian corn.

The true sago palm is not so commonly found in Minahassa as it is in Amboyna and some of the other islands of the Moluccas. Except in the Tonsawang district (22), it is not very highly valued for its pith; but its leaves are everywhere considered to make the very best 'attap' roofs. They are prepared in the same way as those of the arenga described in a previous chapter.

The coco-nut palms are very extensively grown in Minahassa, as in other islands of the tropics, and in many places form the most valuable possessions of the native families. The white fleshy part of the nut is largely used in the preparation of curries for the table and for other flavouring purposes, but the amount thus used is but a small proportion of the copra annually produced. The young leaves of the coco-nut palm are employed for purposes of decoration in times of festivity. To give the leaves a more bushy appearance the pinnules are sometimes cut half-way through at their bases and then partially split, as seen in figs. 19 and 20.

It is commonly reported that small pearls or stones of carbonate of lime are occasionally found in the fleshy substance of the coco-nut. When found they are highly valued by the natives as a charm against disease and evil spirits. The common Malay name for them is *Mustica calappa*. In the southern parts of Celebes several different kinds of charm-stones are kept by the natives. The Buginese word for them is *ulawu* (45). Thus there is the ulawu of the bambo, probably *tabasheer*, the ulawu of the belawa-wood (*Gluta benghas*), of the tamarind tree, the ulawu of the snake, the ulawu of the centipede, and many others. All of these are stones occasionally found in the trees or animals from which they derive their name, and are treasured by the natives as giving them the power to hold a spell over another person, to gain riches for themselves and for other purposes (91).

I have to thank the Resident of Manado for two excellent specimens of coco-nut pearls; one is pear-shaped, and may now be seen in the museum at Kew Gardens, and the other is spherical. Half of this one was submitted to chemical analysis and the other half remains in my possession. They are of a uniform milky-white colour, hard, and

capable of taking a polish like pure white marble. Chemically they were found by Dr. Kimmins to consist of pure calcium carbonate without any traces of other salts or vegetable products (36). The larger spherical specimen is half an inch in diameter, the other pear-shaped one rather smaller.

It has been supposed by some naturalists that these pearls, first described by Rumphius (66), are not really the product of coco-nuts, but are perhaps the concretions formed in the shells of tridacnas or other large bivalves. I have had the opportunity of comparing my specimens with some true tridacna pearls. The difference between them both in appearance and texture is considerable, and I feel confident that they cannot be the product of the same animal. There is, however, but little reason for us to disbelieve in their coco-nut origin, for Dr. Riedel, writing to *Nature* (65), says, 'I have a collection of fourteen coco-nut pearls (one of them I myself found in 1866 at Holontalo, N. Celebes, in the endosperm of the seed of the coco-nut).'

The pinang, betel-nut, or areca palm, one of the handsomest of the many handsome palms of the East Indies, with its smooth ringed stem and terminal crown of large green leaves, is also highly valued by the Alfûrs of Minahassa. It provides them with one of the principal ingredients of the bolus or quid which many of them are in the habit of chewing. So important has the practice of betel-chewing become to the Malays that in many regions no business, no religious or other ceremony, no love-making, can be carried on until the betel has been chewed in silence for some minutes. If the traveller in the wild parts of Malayia wishes to gain the confidence of and become really friendly with the native rajahs he comes in contact with, he should learn to chew the betel at the *bitjaras*, or conferences, without expressing disgust or pleasure. He may find it a very

unpleasant task, especially when a bolus is handed round a large assembly of native chiefs before it reaches him; but the accomplishment will often prove of great use.

In places where all the ingredients can be easily procured the bolus is composed of sirih leaves; the leaves of some species of the genus *Chavica* belonging to the order Piperaceæ, the pinang-nut, gambir, obtained from the *Uncaria gambir*, belonging to the order Rubiaceæ, chalk, usually obtained by burning coral, and some tobacco.

To make a bolus in the most approved fashion the Malay first takes a sirih leaf and spreads upon it some powdered chalk; he then places on it a small piece of gambir and a piece of betel-nut. He next folds the sirih leaf twice over the other ingredients and places it in his mouth, and when it has become sodden and partially masticated he adds a small bolus of tobacco (23A).

The *Corypha umbraculifera* is another palm which provides the Alfūr with many useful products. It is a tall handsome tree, the terminal crown composed of large fan-shaped leaves supported by long thick leaf-stalks. Some of the leaves are over six feet long in the mid-rib.

The leaves of the *Corypha* are very extensively used for making baskets, cigar-cases, trays, mats, hats, and other woven articles. When dry they are of a light yellow colour. They are soaked in water to make them pliable, and then boiled with colouring matter according to fancy. A very beautiful yellow enamelled appearance may be produced by a subsequent process of boiling, the exact details of which I was unable to learn.

In weaving together the different coloured strips various patterns are formed, but they are mostly angular and uninteresting. In the Langowan district, where mat-making has become a speciality, a few curious conventional designs of birds (fig. 34) and human figures are woven

into the patterns, but they are very crude and have but little artistic merit. The leaves of the *Corypha* are also

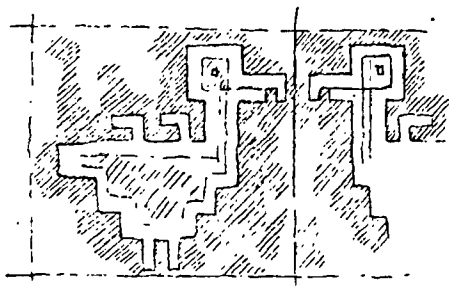


FIG. 34.—Bird-pattern on a Langowan mat.

sometimes used for making attap roofs.

The stem of this palm provides a hard and useful wood, and the pith is sometimes used as sago. The native drums—*tifa*—are almost invariably made from hollowed-

out portions of its stem. The young leaves are sometimes eaten as a vegetable, and a native remedy against dysentery is prepared from the roots.

For making baskets, water-bowls, and umbrellas the leaves of the woka or lontar palm (*Livistonia rotundifolia*) are largely used.

The cultivation of the wild banana (*Musa mindanensis*) for Manilla hemp was at one time very considerable in Minahassa. In the year 1855 there were, according to Bleeker, over a hundred thousand trees in cultivation; but of recent years the industry has considerably diminished, so that it is now of little moment. The only place in Minahassa where I saw string being made from this material was in the Bantik village on the northern bank of the Manado river.

The plants grow well in Minahassa, and produce threads of good length and quality, but unless the capital is forthcoming for the purchase of necessary appliances, the industry must fail in the competition with the large factories in the Philippine Islands.

The forests of Celebes provide many kinds of hard and valuable woods, a splendid collection of which has been placed in the museum at Haarlem. The most valuable of these

is the *kayu-hitam*, or black ebony of the *Diospyros ebenum* tree. *Djati* is the name given to various kinds of wood from trees of the order Verbenaceæ. The true teak (*Tectona grandis*) occurs in the neighbourhood of Manado, but it is not found in very great abundance in the mountainous country of the interior. The valuable iron-wood tree (*Eusideroxylon zwageri*) grows in many places on the coasts and extends some distance up the mountain slopes.

The cotton tree or *kapok* (*Eriodendron anfractuosum*) provides the natives with an inferior kind of wool, and the *Brousonettia* provides them with a bast from which they make—or rather used to make—their jackets (*tjidakos*), and a coarse kind of paper.

Many kinds of luscious tropical fruits are sold in the market-places of Minahassa, some of the numerous varieties of bananas and mangoes, pineapples, durians, mangostens, rhumbutans, catapangs, oranges and lemons, and others, but it is difficult to say which of these are really natives of the country, and which have been brought by man from other regions.

Spanish pepper, the native *tjabeh besar* (*Capsicum frutescens*), originally imported from America, now grows wild and in abundance in waste places. As a flavouring for his daily meal of rice it has almost become an article of necessity to the Malay.

Agar-agar, a light-blue jelly-like substance obtained from the *Sphæroccus lichenoides*, is largely used as a cooling drink.

The staple article of food in Minahassa, as in most parts of Malayia, is rice. This useful cereal is cultivated in dry fields (*kebon kring*), and in wet fields (*kebon petjeh*). On the dry grounds the rice is sown at the beginning of the west monsoon in December or January. The harvest is on the coast in April, and in the mountains in May or June.

The legend of the introduction of rice into Minahassa is as follows (22):—

In olden times men had no rice to eat. They were satisfied with the fruit of a certain plant called *klijat*, which was found in the forests. This fruit was very much like the banana. They roasted it and ate it as there was no rice, and with it they drank sagoweer.

Now there lived at one time a very old man, who walked one day until he came to the centre of the earth. There he found a stone, which he took along with him with some difficulty. Then he saw a deep pit, and a leaf of a tree called *puti weren*. (The *wereng-kusaj* of the Alfürs is the *Ficus minahassae*) (17). He also saw a ladder which was only a long rattan. When the old man got to the bottom of the pit he found there a race of men who were quite different to those above, for their noses were flat on their faces, instead of being straight and well-formed. Then the old man went for a walk, and he saw for the first time *padi*—unthreshed rice—which was lying in the sun to dry, so he took some grains of it and hid them in the waist-band of his *tjidako* and climbed up to earth again. When he looked behind, however, he saw a number of men with flat noses coming after him, so he cut the rattan and they all fell down again into the pit, but he could not see whether they were killed or not. Then he shut up the pit, and went away to sow the padi. Thus was rice first introduced into Minahassa, and now it has spread all over the country.

There are other legends in some districts which relate that the rice was first stolen from the heavenly village Kasendukan.

Indian corn is also grown in many districts of Minahassa, and forms an important article of food. On the coast it is planted in August, in the mountain districts, rather earlier.

I have referred briefly to the traces of a primitive art found in some places in Minahassa; but, like all the Malays, the inhabitants of North Celebes are not artistic in spirit. If we compare the Malays throughout the archipelago with their neighbours, the Papuans of the eastern or Dutch portion of New Guinea, we cannot fail to be impressed with the wide difference that exists between the two races in this respect. The Malay uses spears, shields, swords, canoes, and other weapons and implements which are often entirely without ornament, and the coloured designs on his clothes, his ceremonial shields, &c., are of the simplest geometrical patterns. The Papuan, on the other hand, covers everything he possesses with strange figures of men and animals, and fills up all the interstices between them with conventional designs of great regularity and beauty. The wooden idols, the 'Korowaars' of the Papuans, and the gigantic human figures carved on the piles of some of their temples, although to a certain extent conventionalised, show artistic powers of a remarkably high order. The fact that many of their patterns can be traced through a series of well-marked stages back to designs of human and animal figures is a point of great interest, as it shows that their artistic talent must have been exercised for many generations by a very considerable number of the people (37).

Among the wild Malays we but rarely find any attempt to draw or carve the human figure or the figures of animals. Those we do find are very rough and childish, and show no signs of becoming conventionalised.

There can be no doubt that the Malays are quite capable of learning the art of other races. The ruins of magnificent Buddhist temples and many beautiful designs on cloths of various kinds found in Java and Sumatra speak only too plainly of the readiness with which they

learnt the art of the races of the Asiatic continent. I was quite astonished, moreover, at the skill displayed by my own servants in Celebes in copying some of the rough sketches I made in my notebooks.

There is no evidence that in Minahassa there was at any time a true written language; but some years ago two remarkable specimens of what seem to be picture-message writings were brought to light. One of these is a piece of wood with certain figures carved on both sides, the cavities being filled up with chalk. There are some human figures, apparently in the act of fighting, some crosses, circles, and horizontal strokes, and also some figures which may be meant for banana trees. Judging from the appearance of these carvings, it is quite possible that this piece of wood is a message-stick, similar to the message-sticks of the Australians, and that it conveyed news of a war that was progressing, with directions as to the way succour might be sent.

The other example is a piece of coarse paper with the figures drawn in charcoal on both sides: The designs on this are rather more ambitious, and in many of the human figures there is a good deal of action; but there is wanting, in all the sketches, that touch and feeling which makes the Papuan art so much superior to that of the Malays. There is throughout an absence of all those graceful regular curves and other conventionalisms which are so well marked in many of the ordinary carvings and fretwork of the Papuans (2).

CHAPTER XIV

MANADO

Every-day life in Manado—Chinese New Year's Day—The King's birthday
—A grand ball—An oath—The story of Makalew—Last visit to Talisse
—Farewell to Celebes.

It would not, I am afraid, be of any great interest to the reader if I gave the details of my life in Minahassa after I left Talisse. Much of the time I could have employed in interesting work I was obliged to devote to the necessities of a convalescence after my severe illness; and much of it was spent in the still more monotonous work of drying, labelling, skinning, and pickling the specimens I was able to add to my collection. I cannot pass on, however, without expressing a word of heartfelt gratitude for the kindness and hospitality shown me by the Dutch residents of Manado. Weak and depressed by a long and tedious illness, a perfect stranger at first in a foreign land, I derived as much comfort from the friendly care and consideration of those with whom I came in daily contact as if they were my own countrymen or friends of long standing. I was made an honorary member of the little club by the sea-shore, and I could, whenever I felt so disposed, join in a game of billiards or cards or glance through the leading journals of the European capitals.

It might be said with some truth that, to one accustomed to life in large towns, Manado was dull. In a few weeks I seemed to know all the principal people of the

colony, and in the absence of daily newspapers and letters conversation on the topics of the day was soon exhausted. But Manado was not without its occasional excitements, and the varied beauties of sea and sky and land which bountiful Nature provides in this favoured region afford unending themes for contemplation and enjoyment. Day after day I would wander down to the sea-coast, as the sun was setting, to watch the glorious effects of red and gold upon the sea and the giant beams of burning light which formed a great celestial fan behind Manado tuwa peak; or in the evening, when the moon rose and cast a streak of rippling silver over the inky waters, I would join a little group of club-men from the 'Soc' upon the pier, and enjoy for a while the refreshing breezes of the land wind.

One day in February I shall not forget. There was great excitement in our little colony. It was Chinese New Year's Day, and it was announced that the Tapi Kong would walk that evening. All day long business in Manado was suspended. Everybody 'who was anybody' paid visits of congratulation to the leading Chinamen. Champagne and tea with little biscuits from 'Reading' were on the tables of the Chinese and their friends, and everything was *en fête*. Now in writing about this religious festival of the Chinese in Manado, I am painfully aware that I am writing on a subject about which I know nothing. I knew nothing about the religions of China at the time, and I know very little more now; but the religions of the Chinese in China and the religions of the Chinese in Manado are probably very different. The Chinamen in the Dutch colonies are, it must be understood, purely traders, and as the Government will not allow Chinawomen to enter the country, there is little more of the 'Celestial' about many of them than the pigtail. It

is natural then that as a class they should have forgotten the details of their religion, and I found to my surprise that not one Chinaman in ten could give a consistent story of his religious beliefs.

At one end of the Chinese Kampong stands the temple, a handsome little building of wood, sumptuously decorated inside with fine silks, quaint and curious wood-carving, and painting and gilt ornamental work in a characteristic Chinese style. It contains the shrines of the three deities, of whom the Tapi Kong, occupying the central place, is in every respect the most important. Of the other two, one is a goddess whose name I have forgotten, and the other is called Li-Hong. Before each shrine there is a table bearing the food and drinks of the gods, little tiny saucers containing rice and chilis, pork and durian, and three tiny cups containing tea.

The Tapi Kong having signified to the chief priest that, owing to the prevalence of sickness amongst the Chinamen and the commercial depression, he would graciously consent to walk abroad in the evening of the Chinese New Year's Day, elaborate preparations were made to celebrate the occasion in a befitting manner.

Just after sunset the preparations were completed, and then Mr. De Vries and I made our way to the temple through the noisy crowd of Chinamen who filled the streets of the Kampong, and by hiding away at the side of the temple when the ceremony commenced we were able to see all that went on.

When the allegorical designs, the snakes, lanterns, and other things to be carried in the procession were all ready to start, the priest advanced to the central shrine, and moving his two extended hands first to the right, then to the left, and lastly to his forehead, reverently removed the little wooden image of the Tapi Kong from the shrine to a

gorgeous little 'sedan chair' temple, to be carried in the procession by some of the leading Chinamen of Manado. I was unable to get a very good view of the Tapi Kong, but my impression is that he is a wooden figure of a Chinaman about one foot in height, in a sitting attitude, gorgeously dressed in coloured silks.

When the Tapi Kong had been safely housed and carried off by his bearers, the other two deities were similarly removed, and then the procession started. In order to get a good view of it we ran round to another part of the village, and waited in the house of a friendly Chinaman to see the fun. It was accompanied by a great crowd of men bearing torches and firing off squibs, crackers, and guns, or beating drums and cymbals, and making as much noise and confusion as possible.

First of all came some cars containing coarse and clumsy artificial green foliage and flowers and some three or four gorgeously dressed Chinese children, sitting upon invisible seats in the leaves and flowers as in a pantomime. Then came a tremendous dragon, which must have been fifty or sixty feet long, with a gaping mouth, armed with fearful teeth and great red eyes shooting flames, enough to give a child the nightmare for weeks. If it had not been so obviously a gigantic Chinese lantern, borne upon the shoulders of the faithful, it might have reminded one perhaps of the Latin Grammar quotation :

Monstrum horrendum informe ingens,

although it certainly had no *lumen ademptum*.

After this came a man borne on a platform, naked to the waist, with his pigtail tied up round his head, who was supposed to be slashing his back with a naked sword. Long streaks of red paint represented the gashes he did not make in his religious fervour.

At last came the Tapi Kong and his companions, and finally more allegorical set pieces, flags, umbrellas, and every conceivable thing that could add splendour, dignity, and noise to the proceedings.

As the long procession slowly marched through the streets, the Chinese and many others who took an interest in the proceedings illuminated their houses with lanterns and coloured fires, and added to the confusion of the occasion by letting off fireworks and guns. It was a strange weird orgy; the smell of gunpowder, the clouds of dust, and the din and noise of fireworks and guns and drums and bells were overpowering; but nevertheless there was order in the chaos, good-humour and fun prevailed, and when the lamps had burnt out and the Tapi Kong was once more safely at home in his little shrine in the Chinese temple, Manado assumed once more its mantle of peace and quietness.

It is really an astonishing example of the success of the Dutch system of government that a procession such as the one I have just described, ostensibly of a religious character, could take place amongst a mixed population of Mohammedans, Chinese, Christians, and heathens without a single case of riot or disorder. Where in the civilised world, it might well be asked, could a small portion of the community parade in the streets their own peculiar religious observances without incurring the active interference of those holding different opinions?

The day after the Chinese New Year another gala was held, but this was in honour of King William's birthday. One hundred and one shots were fired as a salute from guns on the fort, the Schuttery had a special church parade, and the Europeans called to congratulate the Resident as the representative in Manado of the great king. In the evening a grand ball was given by the Schutters in a large tent erected in a compound near the church.

The Schuttery or militia of Minahassa is composed of the natives whose ancestors volunteered in bygone days for military service in Java and other regions of the Dutch dominions. Their military service as Schutters frees them from the *heerendienst*.

The officers are chosen from the Europeans in residence in Manado.

I must confess that I was not particularly impressed with their drill or discipline, but nevertheless, armed as most of them are with modern rifles, they form a body of men capable of rendering effective service against poorly armed and half-naked savages.

The ball was attended by about a hundred of the non-commissioned officers and their wives and daughters, and most of the European residents put in an appearance for a few hours. At one end of the tent was a raised *daïs* with chairs for the principal guests, and against the wall at this end of the ballroom was a full-length representation of the King of Holland.

The dances were mostly the round and square dances of Holland, the orders for the latter being given in the French language by one of the masters of the ceremonies. I can assure the reader that French is not an easy language to understand when it is spoken by a Malay sergeant of Schuttery in North Celebes. The women were dressed in the native fashion, a simple coloured sarong round the waist and a little spotlessly clean white jacket or *kabaia*; their beautiful straight black hair was gracefully done up on their heads, fastened with silver filigree pins, and decorated with white orange and lemon blossoms; upon their naked feet they wore slippers ornamented with coloured beads and embroidery. It would, I fancy, astonish our English ladies could they pay a visit to one of these Manado parties, and see the graceful way in which Malay girls dance

the round dances under what would be called in England distressing circumstances. To dance well upon the turf is by no means an easy thing to do, but to dance upon the turf in slippers which cover only the toes would seem an impossibility, and yet I can give my word for it that some of the Malay women valse as elegantly and lightly as any girl in an English ballroom.

A still more surprising fact is that the ballroom is not the place for pleasant conversations and flirtations. The love-sick swain must find other opportunities than the dance affords to whisper his sentiments into the ear of his charmer. During the intervals the women sit in a row upon benches ranged along the walls of the tent, and the men stand about in crowds at either end smoking. The intervals are pretty long, and when the next dance is announced, the men, placing their unfinished cigars in a place of security so that they may find them again at the next pause, make a bow to the girls they wish to have as partners, and take up their positions for the dance. The orders are then shouted out in French by the M.C., the band strikes up, and the dance begins. Everything is performed with the greatest precision and decorum, and scarcely a word passes between the partners from the beginning to the end.

The ball lasts from six o'clock in the evening until six o'clock the next morning, and then, as the rising sun begins to make the lamps look pale, the party is adjourned to the beach, where three large canoes are in readiness to take the guests for a cruise in the bay in the cool breezes of the early morning. But even now the decorum does not break down; the band goes in one canoe, the gentlemen in the next, and the ladies in the last, and then, wafted by the gentle zephyrs of the early morn, illuminated by the splendours of the tropical sunrise, and lulled by the music

of the rippling waves, the revellers return to their homes, and snatch an hour's rest before the business of the day begins.

One day the Resident invited me to be present at the formal oath-taking of a native of the Lotta district. The case to be considered by the magistrate was one in which there was a dispute as to the ownership of a piece of land, and the reputed owner was to swear in the old Alfür manner that this land belonged to him. The parties who were to take part in this oath assembled on the grass plot in front of the Government building, and when the Resident and other officials appeared the ceremony began.

Now it must be understood that in these parts of the world the taking of an oath is not a simple formality, performed upon the spur of the moment without hesitation as it is in civilised communities, but is an extremely solemn mystical ceremony, transacted not only in the presence of earthly witnesses but before an audience of the heavenly hosts, the gods who dwell above, the gods who dwell below, and all the devils and evil genii. The false swearer, moreover, may be subject to all the horrible tormenting forms of death which can be conceived by the deities of a barbarous race, as well as to the ordinary legal punishments should he be found out.

When the ceremony began, a space was cleared and a piece of white cloth deposited on the ground, two swords crossed were placed upon it, and a loaded musket beside it. The witness, supported by two friends, took his stand opposite the cloth, and two priests, dressed in long embroidered cloaks and wearing caps with drooping white feathers in them, attended to deliver the invocations. The opening address or invocation delivered by the chief priest was a very lengthy and vigorous discourse, delivered in a local dialect, and many of the words he spoke have, I was

informed, fallen into disuse, and were probably quite unintelligible to his audience. I am indebted to the Hoofd-jaksa of Manado for a copy of part of this invocation, and to Mr. Graafland, of Amboyna, and Mr. Riedel, of Utrecht, for help in translating it into English.

The priest began with the usual formula (*see* p. 251):

‘ O Wailan, O Empung Rengarengan, we have assembled together to take an oath, and we ask you, if the witness lies, to take him with the walian (priest) to the house with seven plains on the west side, the borders of which are very populous, where dwells the wailan Walintukan, the wailan who is looking to the moon, and the younger empungs, the noisy, lively empungs who make a noise like that of falling stones and the murmur of heavy showers of rain—to the empungs who are in company with Lokontamburian, Rarurmantang, Worangtua, Worangwatah, Rarangtumundo, Gumelenggeleng, Marenkeyo, Marenketalang, Rarangpon-gajow, all of whom are fond of swallowing the heart and liver.

‘ I invoke now the walian Mananakul, who likes to catch men in a snare, and the empungs who delight in teasing men, such as Mameleng, Manūnūra, Mamisan, Mamisow, Mamirah, Mangengeles, Manondang, and Mananatar. I call upon you, if the witness refuses to speak the truth, to let him explode like the discharge of this gun, to vanish like the smoke, drip away like the water, fade and become yellow like this white linen.

‘ I call upon the gods who eat men to seize and swallow up the false witness. I call upon the gods who dwell in the great waterfalls, such as Lumanka, Rumambūs, Lumeklek, to seize him.

‘ I call upon the wailans living on the Rumengan mountain to let the perjurer be eaten up by mosquitoes, by worms, and by snakes, to flog him, and to hang him in the moun-

tain gorges, to swallow him up as a bird swallows the fish ; but, if the witness tells the truth, let him be rewarded with a long life and a profusion of blessings. I call upon you also, O wailan Muntuuntu, the chief of all the gods who dwell in the heavens above and the depths of the earth below, to consider both the greatest and the smallest of those who stand before you, to look upon the gun and the swords when the witness is stepping over them, to look also upon the white linen that is laid before the witness.

‘ I invoke you also, Manembo and Mamoto, worst of all the gods, that if the witness lies Mamoto may repress him, that the wailan Rumaha may drink his blood, and all the wailans who dwell on yellow grounds may deliver him to be swallowed up by the wailans Makatepehminahak, Makauweuran, Makapitiktampel, who long to swallow up bad people. And the wailan, charged with the duty of cutting short a man’s life, may he also cut short the life of the false witness.

‘ I who invoke you now, I am the drawer of the sword that will not hurt me ; ¹ my ancestors were also the drawers (of the sword) before perjurers. My forefathers Rumambi Sinangsang and Rumambi Ungkenawan in olden times witnessed the oaths of men on the left side and on the right side ; my forefather Kaenton, who liked to make a hubbub, and who shook the earth, my forefathers Makiohlor . . . ’ (here follows a list of thirteen ancestors), ‘ they were all drawers of the sword, as were also my forefathers Matindas . . . ’ (here follows another list of twenty-four ancestors).

‘ I invoke also the wailans Langkai and Tauliwatu, who were dressed in red cloth, and the wailan Walansendouw, the brother of Pikpik and Pujuh, both standing on the mountain ranges holding each other’s hands, looking for

¹ This is probably an Alfür expression for the priest whose business it is to attend the swearing in of witnesses.

false witnesses. If there is one here, let him be taken within nine days from now and be used as food for the wailan. One! two! three! four! five! six! seven! eight! nine!’

After this long address the priests stepped over the crossed swords three times, followed by the witness and his two friends.

This was to me the most interesting part of the ceremony, for it was the only part of it I could understand. The priests and the two assisting friends stepped across the swords with dignity and ease, but the poor witness showed by every movement that he was passing through a terrible ordeal.

The first time he went with a certain amount of confidence, though he stepped high and carefully, and was evidently very much relieved when he was safely over. In like manner the second time, but the third time it required all his courage to bring him to the scratch. He chattered volubly and defiantly, he danced about from one foot to the other, and then at last with a terrific rush he cleared the swords at a bound. When he was safely over for the third time he raised a yell of triumph, shook his fists in the air, and laughed and shouted with delight.

After this the gun was discharged in the air, and one of the priests said, ‘The wailan Muntuuntu has heard the shot and has looked upon the witness.’

The piece of white linen was then taken by the priests as payment for their services, and the ceremony concluded.

This ‘ordeal-oath,’ as it may be called, is of great interest to us, in the consideration of the development of our own modern oaths and ordeals. Oaths remain, it is true, in general use in the form of mere rudimentary, or, to use a more explicit word, vestigial formalities. Ordeals, on the other hand, survive only in remote country districts,

and even there they are rapidly dying out. 'The ordeals and the oaths are not only allied in their fundamental principles, but they continually run into one another. Oaths are made to act as ordeals, and ordeals are brought in to act as tests to oaths' (76).

There can be little doubt that in the old days true ordeals were in common use in Minahassa.

Thus, there were those of placing the hand in boiling water, of taking fire into the mouth, of taking poison, of washing the face in water which contained finely chopped Spanish pepper.

The following amusing and vigorous legend may be taken as an example of another form of ordeal, namely, that by diving:—

In olden times when there was a doubtful case the people had recourse to ordeals, which always spoke the truth. No one who wished to fly from death or punishment could escape these, for by them the gods showed who was guilty, and the innocent man was protected from tricks and suspicion.

Makalew was a mighty hunter who spent most of his time, both by day and by night, hunting in the forest.

At home he had a loving wife, who passed her life alone stamping the rice and weaving koffo. She seldom saw her husband, and when she did he was usually surly and taciturn. Makalew admired her beauty, but the demon of jealousy had hardened his heart, and he sought for some pretext to bring an accusation against his true and devoted wife. At last he thought he had discovered the partner of her infidelity. 'It can be no other than my slave,' he said, 'who has stolen my wife's heart by his extreme docility, by cunning, and by trickery. Why is he so diligent in performing all that she bids him, and why is she so considerate for the lot of a mere slave?'

The demon of jealousy tormented him now more than ever, and he fled away into the forest to free himself from its oppression. But even there he obtained no rest, and with the thought of the slave ever before him he felt that his heart would burst with vengeance. 'What a scandal it is,' he thought, 'that my wife should be in love with my own slave!' No, he could not punish him for that; he must seek for some other cause to give him his deserts. At last a plan occurred to him by which he could bring the matter to a crisis. 'Thief and slave are synonymous terms; I will hide my betel-nut box here'—a valuable piece of work mounted in silver.

Returning home he shouted, 'Wehe mei u lelemään!' ('Here, bring me my pinang box, slave!') 'Sulah wéla'— 'Sapristi, wife, bring me my pinang box.' They sought for the box high and low, but of course in vain. Then said Makalew, 'The slave has stolen it; he must be punished.' 'No, don't say that,' pleaded his wife; 'the slave is innocent. Perhaps the box is hidden away somewhere, and you have forgotten where it was put.' 'Ah,' said the hunter, 'you would try to screen him. I thought as much, but nevertheless he shall be punished as he deserves.' 'Fi!' said his wife, 'punish him without cause? That is certainly not the will of the gods. First prove that he is guilty in the approved Tombulu fashion.' 'Good,' said the hunter, 'matilalem' (the ordeal by dipping) 'shall decide between us three—the husband, the wife, and the slave.'

Departing then together, they sought a place in the depths of the forest where the gods should decide between them.

'I am not guilty,' said the slave, 'but the gods will decide justly between us. I will willingly undergo the matilalem with you, and the result of it will prove my honour.'

In the depths of the forest there was a piece of clear water, and the silence and solemnity of the surroundings were sufficient proof that the gods were present to judge the case.

‘Now to the water,’ said the hunter. ‘I will count nine, and then you must immediately plunge into the water, and whichever one of us comes to the surface first is in the wrong. ‘Nine!’ shouted Makalew, and the slave plunged into the water. The hunter, however, only put his spear in, and it seemed certain that he must win, for the ordeal was not a fair one. But the gods are ever ready to shelter the innocent here below. Lo! a pig suddenly appeared and darted into the wood. The hunter’s love for the chase could not endure the sight, so seizing his spear from the water he started into the wood in pursuit. When the slave came out of the water and saw that Makalew had disappeared, he claimed that matilalem had decided justly, and that he was proved to be innocent. Makalew would not, however, consent to this, but demanded a second trial of the ordeal. This time Makalew only put his feet into the water, and again it seemed that he must win. But the gods once more came to help the slave, for a crab caught hold of Makalew’s toe, and caused him such intense pain that he rushed out of the brook in agony. ‘Now,’ said the slave, ‘it must be evident to you that I am no thief in your house, for matilalem has twice decided in my favour.’ ‘Yes,’ said Makalew, ‘I am satisfied. You are safe from punishment. Now fetch me a leaf of the lolonga to bind round this wound on my toe’ (23).

On my return from Mr. Rijkschroeff’s coffee plantation in the mountains I was advised, on account of continued ill-health, to prepare to leave for Europe.

One more visit to Talisse was necessary, however, before

I left, to pack what remained of the collections I had made upon the island, my instruments, reagents, books, and other things.

With some difficulty I hired a canoe to take me to Talisse, and after a long and tiresome journey, fighting with contrary winds and currents, we came in sight once more of the little wooden pier at Koa. To my surprise and delight I found the 'Flying Fish' at anchor there, and was enabled to renew my acquaintance with my old friends on board of her. By their help I completed my packing in half the time I should otherwise have taken, and enjoyed meanwhile the pleasure of their society.

I found that my boy Marcus who had been left in charge of my house had faithfully discharged his duties to the best of his ability, but nevertheless white ants, spiders and rats had played havoc with many of the plants, birds, and other collections. I think I saved about one-fourth of my Lepidoptera, one-tenth of my plants; but I was able to bring away all the birds I had collected, although many of the skins were in a very damaged condition. Some of the corals I had left under the house to dry were broken and destroyed, and numbers of the mollusc shells I had left for the ants to clean were missing. My boots and clothes were covered with mould, many of my books were bored and nibbled by insects and mice, my instruments were in a terribly rusty condition, and several of my spirit bottles had run dry. Nevertheless I was able in a few days to save a good deal, and with the kind help I received from my friends of the 'Flying Fish' my cases were soon nailed up and ready to be shipped to Manado. One of the most unpleasant duties I had to perform was an attempt to collect together the bones of my old friend the babirusa. During my absence the poor beast had died, and Cursham, knowing that I was anxious if possible to have its skeleton,

had buried it in the sandy soil in front of his house. It was a very disagreeable job, and by no means easy to release the bones from the rotten and putrescent flesh, and although I sifted with the greatest care the sand I dug up from the grave, I found that many of the smaller bones of the tail and wrist were missing, owing perhaps to the depredations of crabs and worms.

Three days of packing and my task was done. I saw all my cases safely on board a Sangirese *sopi* bound for Manado, and on the evening of June 10 I said farewell for the last time both to the 'Flying Fish' and Talisse island.

It was with feelings of considerable remorse that I left Talisse, the work I had commenced being in an unfinished and imperfect condition. The little island, typical in every respect of the fertile, hilly, coral-girt islands of this volcanic region of the tropical world; had afforded me many pleasant rambles, abundance of material for observation and research, and many interesting studies of Malay character and habit. It would be unfair indeed if, from what I have said above, my little island home should gain a character for unhealthiness that it does not deserve. It would be ridiculous to assert that an island in the tropics with extensive mangrove swamps and coral reefs can be considered at any time or in any region very salubrious; but the miasmas of such places, under ordinary circumstances and with a little experience, may be successfully encountered by the European for many years, as has been conclusively proved by the lives of the missionaries who labour there.

The close of the year 1885 was, however, an exceptionally unhealthy time, owing, it was said, to the long delay of the rains, and many persons sickened and died in Celebes then who had up to that time enjoyed good health. It is not only possible, but I believe even probable, that if in the future another English naturalist should take up his resi-

dence in Talisse, he would escape the unhappy experiences I passed through during the last month of my stay there, and I can say without hesitation that if it should be my good fortune at any future time to revisit the Malay archipelago as a naturalist, I should ask once more the Moluksche Handels Vennootschap to permit me to reside in their little island Talisse.

The time was now fast approaching when I was to leave Celebes for home again, and for some days I was busy in collecting together the things I intended to take with me, and also those I would get rid of in a *vendutie*, or auction sale, in Manado. The *vendutie* system of the Dutch in the East Indian colonies is managed on an exceedingly sound and useful plan. In places where there are military and civil officers who may be changed from one part of the archipelago to another with very little notice, it is of great importance that there should be a system of sale by auction which does not involve risks or delays of payment. For the convenience therefore of its public servants, and it should be added for its own pecuniary benefit, the Government becomes the auctioneer.

A Government official appoints the time for the sale, and a friend of the vendor acts as 'Cheap Jack' to sell the goods to the best advantage. When the sale is concluded the Government is the debtor to the vendor for the amount the sale has realised, and the purchasers are debtors to the Government. The Government pays the vendor the amount in six months, and the purchasers pay the Government in three months. By this arrangement any one leaving the colony can realise on his effects at once, for the Government bond is always negotiable; and the Government gains three months' interest on the total amount the sale has realised in addition to certain commissions charged to the purchasers.

The venduties in Manado were always looked forward to with interest by the inhabitants. The 'friend' who officiated was expected to provide the company with jokes and playful exaggerations of the value of the goods to be sold; the people laughed and talked over the *pijtjes* and cigars, and frequently amused themselves by running a trifling article up to a fancy price.

When the vendutie was over and the mail steamer 'Japara,' which was to take me back to Batavia, was in sight, I paid my final visits to my friends in Manado.

Sorry as I was to leave Manado and all the kind friends I had made there, I was filled with excitement in anticipation of the many wonderful and beautiful places I was to see in the month's cruise round the Moluccas to Batavia. I may perhaps be allowed to say that my anticipations were fully realised. The wild forest of Gilolo, the fire-mountains of Ternate and Motir, the glorious harbour of Amboyna, the milky seas of Banda, Timor, Bali, one of the last remaining homes of Buddhism in the archipelago, and my old friend Makassar, were all beautiful and interesting. I could almost fill another volume with my notes and letters from these enchanting spots; but my impressions there, I fear, were only those of an inexperienced globe-trotter, and are hardly worth recording.

I was pleased to find among the passengers Mr. Graafland and his family, who were leaving Celebes for Amboyna. Dominie Graafland is perhaps better known in Europe for the valuable works he has published on the ethnology of the Alfurs of Minahassa than any of the band of noble and intelligent missionaries who have worked in that favoured land. Having laboured in the country for some six-and-thirty years, he is a master of some of the native dialects. His works are characterised

by a clear appreciation of the scientific value of the facts he records and a deep insight into the character and feeling of the natives.

The 'Japara' left Manado at eleven o'clock on the morning of July 10, 1886, and by midday we were off the prim cone of Manado tuwa, trying with our *kijkers* to discover the herds of baboons which it is currently reported swarm in the forests of the island. Later in the day we passed the wreck of the German barque 'Mathilde,' which had floated on to the reef in a calm a few days before. And then, as we slowly steamed towards Taruna, the coasts and forests of Celebes gradually sank from view, and when the sun was setting in the sea that evening, the well-known peaks of Celebes, the Klabat, the Lokon, and the Two Sisters gradually faded away into the purple mist of the horizon.



FIG. 35.—Tommy Kwack, a Manado dog,
my friend and companion in many
of the adventures recorded
in this volume.

APPENDIX A



Length of forearm of *HARPYIA CEPHALOTES* in centimetres.

Manado, 7·6, 6·5, 6·3 (skel.).

Amboyna, 6·8, 6·2.

Ternate, 5·8.

Timor Laut, 6·5.

Cape York, 5·6.

Admiralty Is., 5·6.

Length of forearm of *CEPHALOTES PERONII* in centimetres.

Manado, 10·4 (average measurement).

Timor, 11·8, 10·9, 10·3.

Misool, 11·2, 10·6.

Mefoor, 11·5.

Rau, 12·0, 11·6, 11·1.

Ceram, 13·4.

Amboyna, 12·2, 12·9, 12·8, 13·9, 13·2, 10·5, 11·5.

Morotai, 12·7, 12·2.

Waigiou, 13·7, 14·1.

Batjan, 12·6, 12·2.

Buru, 13·2.

Banda, 12·6, 12·2.

Andai, 15·1.

Solomons, 10·2.

Ugi, 10·5, 11·0.

APPENDIX B

CLASSIFICATION OF THE ANIMALS

MENTIONED IN THIS VOLUME

MANMIMALIA.

- PRIMATES : *Cynopithecus nigrescens* (a baboon), 20, 49, 82.
 CHEIROPTERA (bats) : *Pteropus Wallacei*, 84 ; *Cynonycteris minor*, 84 ; *Cephalotes Peronii*, 85 ; *Harpyia cephalotes*, 84 ; *Phyllorhina bicolor*, 85.
 RODENTIA : *Mus xanthurus* (a rat), 229 ; *Sciurus murinus* (a squirrel), 84.
 UNGULATA : *Sus babirusa* (a pig), 18 ; *Cervus moluccensis*, 69 ; *C. hippelephas* (deer), 189 ; *Anoa depressicornis* (the sapiutan), 82.
 MARSUPIALIA : *Cuscus celebensis*, 83.

AVES.

- FALCONIDÆ (the true falcons, hawks, buzzards, and eagles) : *Haliastur leucogaster*, 35 ; *Spilornis rufipectus*, 89 ; *Erythrospiza trinotata*, 87 ; *Poliornis indicus*, 89.
 THE OSPREY : *Pandion leucocephalus*, 88, 158.
 PSITTACI (parrots) : *Tanygnathus Mülleri*, 59, 86, 155 ; *Tanygnathus megalorhynchus*, 158. *Eos indica* (lory), 155.
 CUCULIDÆ (cuckoos) : *Cuculus canorus*, 21, 143 ; *Phœnicophaes calorhynchus*, 255 ; *Eudynamis melanorhyncha*, 255.
 ALCEDINIDÆ (kingfishers) : *Sauropatis chloris*, 90. *Halcyon coromanda*, 90 ; *Alcedo bengalensis*, 90.

- BUCEROTIDÆ (hornbills): *Buceros exaratus*, 20; *Cranorrhinus cassidix*, 255.
- CORACIADÆ (rollers): *Eurystomus orientalis*, 90.
- CYPSELIDÆ (swifts): *Collocalia esculenta*, 91; *C. fusca*, 91; *Macropteryx Wallacei*, 91.
- CORVIDÆ (crows): *Corvus enca*, 91.
- ORIOOLIDÆ (orioles): *Oriolus celebensis*, 92; *O. formosus*, 191.
- DICRUROIDÆ (drongos): *Chibia leucops*, 91.
- CAMPOPHAGIDÆ (cuckoo-shrikes): *Graucalus leucopygius*, 91.
- NECTARINIIDÆ (nectar birds): *Anthothreptes celebensis*, 92.
- FRINGILLIDÆ (finches): Rice birds, 225.
- STURNIDÆ (starlings): *Calornis neglecta*, 88; *C. sanghirensis*, 92, 191.
- COLUMBIDÆ (pigeons and doves): *Calaenas nicobarica*, 183; *Myristicivora luctuosa*, 93; *Carpophaga paulina*, 41, 93; *Ptilopus melanocephalus*, 93; *Turtur tigrina*, 94.
- MEGAPODIDÆ (brush turkeys): *Megapodius Gilberti*, 94; *M. sanghirensis*, 95; *Megacephalon maleo* (the maleo), 95.
- SCOLOPACIDÆ (snipe): *Numenius phæopus* (whimbrel), 96; *Tringoides hypoleucus* (sand piper), 21.
- ARDEIDÆ (herons): *Demigretta sacra* (an egret), 96; *Bubulcus coromandus*, 219.

REPTILES.

- CROCODYLIA: *Crocodylus biporcatus*, 96.
- LACERTILIA (lizards): *Platydyctylus monorchis* (gecko), 96
Varanus bivittatus (monitor lizard), 34.
- OPHIDIA (snakes): *Pytho reticulatus*, 97; *Dendrophis picta*, 98; *Tragops prasinus* *Hydrophis*, 98.

AMPHIBIA.

- FROG: *Rana macrodon*, 98.

PISCES.

- ELASMOBRANCHII (Sharks, Rays, and Dog-fishes): *Scyllium*, 117; *Chiloscyllium*, 117; *Carcharias*, 117; *Aetobatis* (sting ray), 115.

Teleostei (bony fishes).

SEA PERCHES : *Serranidæ*, 112 ; *Mesoprion*, 112.

CORAL-FISHES : *Chaetodon*, *C. ephippium*, 112.

SURGEONS : *Naseus*, *Acanthurus*, 113.

GOBIES : *Sicydium*, 206 (note) ; *Periophthalmus*, 30.

OPHIOCEPHALIDÆ : *Ophiocephalus striatus*, 221.

CLIMBING PERCH : *Anabas scandens*, 221.

WRASSES : *Julis*, 206 (note).

FLYING FISH : *Exocætus*, 199.

HERRINGS : *Clupea atricauda*, 137.

EELS : *Anguilla Elphinstonei*, 221 ; *Conger anagoides*, 35.

INCERTA SEDIS : *Leptocephalus*, 206 (note) ; *Lithrinus*, 206 (note).

PIPE-FISHES : *Syngnathina*, 137.

SEA-HORSES : *Hippocampus*, 114.

FILE-FISHES : *Balistes aculeatus*, 112 ; *B. lineatus*, 114.

COFFER-FISHES : *Ostracion arcus*, 114.

MOLLUSKA.

Cephalopoda

OCTOPUSES, 136 ; *Octopus lunulatus*, 136.

CUTTLEFISHES, 61, 116.

Gasteropoda

CYPRIO, 135 ; *Cypræa tigrina* (cowry), 135 ; *Pyræzus palustris*, 141 ; *Helix*, 158 ; *Chiton incisus*, 182.

Lamellibranchiata

BIVALVES, 61, 135 : pearls in tridacnas, 332.

ARTHROPODA.

Crustacea

CRABS : *Grapsus varius*, 29 ; *Sesarma*, 105 ; *Calappa*, 35, 140 ; *Gelasimus bellator*, 141.

PRAWNS : *Palæmon ornatus*, 105 ; *Atya Wyckii*, 222 ; *A. sulcatipes*, 222 ; *A. bisulcata*, 223 ; *Stenopus hispidus*, 35.

PAGURIDÆ (hermit crabs), 39.

STOMATOPODA : *Squilla*, 60, 136.

CIRRIPEDIA : Acorn shells (*balanidæ*), 29; *Barnacles*, 127;
Pollicipes, 52.

Arachnida

SPIDERS : *Heteropoda sanatoria*, 102; *Epeira*, 41, 104.

SCORPIONS, absence of, 104: *chelifers*, 101.

Myriapoda

CENTIPEDES : *Scolopendra gigantea*, 104.

MILLEPEDES : *Siphonophora*, 105.

Hexapoda—Orthoptera

TERMITIDÆ (white ants), 64, 102.

DRAGON-FLIES, 105, 224.

Neuroptera

MYRMELEON (Ant lions), 101.

Hemiptera

CICADARIA : *Flata marginata* (Wax insect), 101.

Diptera

FLIES, 46.

CULICIDÆ (Mosquitoes and Gnats), 64, 142, 224.

Lepidoptera (butterflies)

PAPILIONIDÆ : *Papilio Blumei*, *P. daedalus*, 99; *P. polytes*, *P. pammon*, 100.

PIERIDÆ : *Terias talissa*, *Tachyris phestus*, 100.

LYCAENIDÆ : *Liphyra brassolis*, 168.

MOTHS, 41.

Coleoptera (beetles)

COCKCHAFERS : *Parastia*, 100.

STAG BEETLES : *Odontolabis celebensis*, 100.

LONGICORNS : *Batocera celebiana*, 101.

Hymenoptera

ANTS, 140, 142.

Bryozoa or Polyzoa, 126.

Brachiopoda

LINGULA, 139, 182.

Echinodermata

CRINOIDEA (feather stars): *Antedon*, 109; *Pentacrinus*, 109.ASTEROIDEA (star fishes): *Pentaceros*, 139; *Ophidiaster*, 139;
Culcita, 131.

OPHIUROIDEA (brittle stars), 108, 136.

ECHINOIDEA (sea-urchins), 136.

HOLOTHUROIDEA (sea slugs and cucumbers): *Synapta*, 132;
Holothuria (trepang), 195.

COELENTERATA.

Hydrozoa

HYDROIDEA, 35: *Hydra*, 52.HYDROCORALLINÆ: *Millepora plicata*, 128; *M. alcicornis*, 131;
Distichopora, 52, 126.

Anthozoa zoantharia

Actiniaria (sea anemones)CORALLIMORPHIDÆ: *Thelaceros rhizophoræ*, 143.*Madreporaria perforata*

MADREPORINÆ (madrepores), 15, 24, 108, 123.

TURBINARIAS, 124.

FUNGIIAS, 124.

Madreporaria imperforata

POCILLOPORAS, 108, 124.

SERIATOPORAS, 108, 124; 131; *S. tenuicornis*, 108.ASTRAEIDÆ (star corals): *Astraea*, 124; *Macandrina* (brain coral), 124; *Mussa*, 124; *Galacea*, 124.

Anthozoa Alcyonaria

STOLONIFERA : *Tubipora musica* (organ pipe coral), 124 ; *Syringopora*, 134 ; *Halysites*, 134 ; *Clavularia viridis*, 125, 128, 130.

ALCYONIDÆ : *Alcyonium digitatum*, 51 ; *Sarcophytum*, 24, 35, 49, 133 ; *Heliopora coerulea* (blue coral), 124, 134 ; *Helio-lites*, 134 ; *Plasmopora*, 134 ; *Propora*, 134 ; *Thecia*, 134
Isis, 127 ; *Corallium rubrum*, 125.

GORGONIDÆ (flexible corals), 125 : *Gorgonia*, 108.

Porifera (sponges), 24, 132.

PROTOZOA.

FORAMINIFERA : *Calcarina*, 29 ; *Orbitolites*, 29.

APPENDIX C

CLASSIFICATION OF THE PLANTS

PHANEROGAMIA.

- VIOLACEÆ (pansies), 226.
 CAPPARIDACEÆ (the caper order) : *Cratæva magna*, 196.
 MALVACEÆ (the mallow order) : *Hibiscus*, 69, 168.
 BYTTNERIACEÆ : *Theobroma cacao* (cocoa), 210.
 STERCULIACEÆ : *Eriodendron anfractuosum*, 335 ; *Durio zibethinus* (dorian), 206.
 CAMELLIACEÆ (the camellia order) : *Thea chinensis* (tea), 210.
 GUTTIFERÆ : *Garcinia* (mangostens), 206.
 SAPINDACEÆ (soap worts) : *Nephelium lappaceum*, 206.
 AURANTIACEÆ (the orange order) contains the various genera and species of orange and lemon trees.
 ANACARDIACEÆ (the sumach order) : *Mangifera* (mangoes), 206 ; *Gluta benghas*, 331.
 LEGUMINOSÆ : *Erythrina lithosperma*, 228 ; Beans, 226 ; *Phaseolus*, 195 ; *Tamarindus indica* (tamarind tree), 5 ; *Acacia cæsia*, 69 ; *Indigofera tinctoria*, 179.
 ROSACEÆ (roses), 207, 226.
 MYRTACEÆ (the myrtle order) : *Barringtonia speciosa*, 74.
 RHIZOPHORACEÆ (mangroves) : *Rhizophora* and *Bruguiera*.
 COMBRETACEÆ : *Terminalia catappa* (the Katapang), 74.
 PAPAYACEÆ (the papaya order) : *Carica papaya*, 195.
 CUCURBITACEÆ (the cucumber order) ; *Cucumis melo* ? 168 (watermelons).

- RUBIACEÆ (the madder order): *Mussaenda frondosa*, 183; *Coffea arabica* (coffee), 210; *Uncaria lanosa*, 19; *U. gambir*, 333; *Psychotria*, 196.
- EBENACEÆ (the ebony order): *Diospyros ebenum*, 74, 210, 335.
- CONVOLVULACEÆ (the bindweed order), 168; *Convolvulus*, 168; *Batatas edulis*, 195.
- SOLANACEÆ (nightshades): *Capsicum frutescens* (Spanish pepper or chillies), 335; *Nicotiana* (tobacco), 210; Potatoes, 226.
- VERBENACEÆ (the vervain order): *Tectona grandis*, 335.
- ACANTHACEÆ: *Rhinacanthus communis*, 196.
- NYCTAGINACEÆ (the marvel-of-Peru order): *Bougainvillea*, 226.
- LAURACEÆ (the bay order): *Eusideroxylon zwageri*, 67, 335.
- MYRISTICACEÆ (the nutmeg order): *Myristica*, 168.
- THYMELACEÆ (the lace-bark order): *Hernandia*, 292.
- EUPHORBIACEÆ (the spurge order): *Carumbium populifolium*, 236; *Ricinus communis* (castor oil plant), 226; *Poinsettia*, 226; Crotons, 207.
- ARTOCARPACEÆ: *Ficus nitida*, 33; *Ficus minahassæ*, 336; *Urostigma benjamineum*, 160; *Artocarpus*, 168; *Broussonettia*, 335.
- CUPULIFEREÆ (the oak order): *Quercus moluccensis*, 236.
- CASUARINACEÆ: *Casuarina*, 69.
- PIPERACEÆ (the pepper order): *Chavica betle*, 333.
- PALMACEÆ (palms): *Areca* (betel nut), 273, 332; *Arenga sacchariferum*, 19, 329; *Livistonia rotundifolia*, 19, 296, 334; *Metroxylon elatum*, 217; *Corypha umbraculifera*, 333; *Cocos nucifera* (coco-nut), 331; *Calamus* (rattan), 18.
- PANDANACEÆ (screw pines): *Pandanus*, 33.
- AROIDEÆ (the aroids), 33.
- LILIACEÆ (lilies): *Yucca*, 69; *Aloe*, 69; *Asparagus*, 226.
- DIOSCORIACEÆ (yams), 195.
- ORCHIDACEÆ (orchids): *Grammatophyllum*, 71; *Vanilla*, 210.
- ZINGIBERACEÆ: *Curcuma longa*, 179.
- MUSACEÆ (bananas), 69: *Musa mindanensis*, 179, 334.
- BROMELIACEÆ (the pineapple order): *Ananassa*, 69, 206.
- NALADACEÆ (the pondweed order): *Zostera marina*, 138.

GRAMINACEÆ (grasses): *Imperata arundinacea*, 46, 176; *Chrysopogon*, 176; *Phragmitas*, 176; *Bambusa*, 94; *Oryza sativa* (rice); *Zea mays* (maize).

CYPERACEÆ (sedges), 40.

CRYPTOGAMIA.

FILICES (ferns): *Blechnum orientale*, 46.

ALGÆ: Corallines, 138; *Sphærococcus*, 335.

FUNGI: *Pachyma tuber-regium*, 196.

BIBLIOGRAPHY

The following abbreviations are used:—

A.M.H. Annals and Magazine of Natural History. A.M.G. Annali del Museo Civico di Storia Naturale di Genova (Genoa). B.T.L.v. Bijdragen tot de Taal, Land en Volkenkunde van Nederlandsch Indie. M.Z.G. Mededeelingen van wege het Nederlandsche Zendinggenootschap (Rotterdam). P.R.S. Proceedings of the Royal Society (London). P.R.S.E. Proceedings of the Royal Society of Edinburgh. P.Z.S. Proceedings of the Zoological Society of London. Q.J.M.S. Quarterly Journal of Microscopical Science (London). R.B.A. Reports of the British Association for the Advancement of Science. T.T.L.v. Tijdschrift van Indische Taal, Land en Volkenkunde. T.L.S. Transactions of the Linnean Society (London). T.N.I. Tijdschrift van Nederlandsch Indie. T.R.S. Philosophical Transactions of the Royal Society (London). T.Z.S. Transactions of the Zoological Society (London).

1. ADAMS, A., in Sir E. Belcher's Narrative of the Voyage of H.M.S. 'Samarang,' 1843-46, vol. ii. p. 373.
2. Anonymous, Oud Alfoersch Teekenschrift, M.Z.G. jg. vi. 1862, p. 407.
Astrolabe. *Vide* 78.
Bange, J. J. H. Levensbeeld van Johann Friedrik Riedel, v. 58.
3. BELCHER, Sir E. Narrative of the Voyage of H.M.S. 'Samarang,' with Natural History Notes by Arthur Adams. 2 vols. London, 1848.
4. BELT, T. A Naturalist in Nicaragua. 8vo. London, 1874.
5. BLASIUS, W. Die Vögel von Gross Sangir, 'Ornis,' 1888, Heft iv.
6. BLASIUS, W. Beiträge zur Kenntniss der Vogelfauna von Celebes, 'Zeitschrift für die gesammte Ornithologie,' Birds of N. Celebes, in iii. Jg. 1886, p. 81.
7. BLEEKER, P. Reis door de Minahassa en den Molukschen Archipel. 2 vols. Batavia, 1856.
An account of the manufacture of the koffo occurs in vol. i. p. 48. A list of fishes found in Celebes occurs at end of vol. ii.
8. BLEEKER, P. For a well-illustrated and detailed account of some of the East Indies fishes v. 'Atlas Ichthyologiques des Indes Orientales Néerlandaises,' 8 vols. folio, Amsterdam, 1862-78.
This work contains a list of the more important of the numerous contributions of this author to the ichthyology of Netherland India.

9. CAPELLEN, Governor-General VAN DE VELDE VAN. Beschrijving van de Sangi eilanden; 1856, m.z.g. jg. 1, 1857.
10. CHIJ, J. A. VAN DER. Catalogus der Ethnologische verzameling van het Bataviaasch Genootschap van Kunsten en Wetenschappen. M. Nijhoff, 's Hage, 1885.
- 10A. CRAWFORD, J. Descriptive Dictionary of the Indian Islands. Bradbury and Evans, London, 1856.
11. DARWIN, C. Origin of Species. Murray, London, 1859.
12. DARWIN, C. The Structure and Distribution of Coral Reefs. Smith, Elder, and Co. 2nd ed. 1889.
13. DOREN, J. B. J. VAN. Fragmenten uit de Reizen in den Indischen Archipel. Amsterdam, 1854.
This work contains accounts of Lake Tondano, the Tonsea Lama falls, and the Alfurus of Minahassa.
14. DOREN, J. B. J. VAN. Herinneringen en Schetsen van Nederland's Oost Indiën. Amsterdam, 1858.
This volume contains a long account of 'De Sangirsche eilanden,' with a list of the native names of various woods, fishes, &c.
15. DYER, W. THISELTON. Cocoa-nut Pearls, 'Nature,' June 16, 1887.
16. ECK, R. VAN. Schetsen uit het volksleven in Nederland Oost Indië, xiii. De Alfuren in de Minahassa van Manado, 'Indische Gids,' vol. viii. 1882.
17. FILET, G. J. Plantkundig woordenboek voor Nederlandsch Indië. 2nd edition. De Bussy, Amsterdam, 1888.
18. FOWLER, G. H. The Anatomy of the Madreporaria, q.j.m.s. 1888, vol. xxviii. p. 426.
19. FRAZER, J. G. On certain Burial Customs as illustrative of the Primitive Theory of the Soul, 'Journal of the Anthropological Institute,' August 1885.
21. GOLDMAN, W. C. F. Beschrijving van het eiland Banka (ten N. van Celebes), met Kaart, T.T.L.V. x. 4° s. 1, 1861, pp. 144, 135.
22. GRAAFLAND, N. De Minahassa. Wyt en Zoonen, Rotterdam, 1867.
23. GRAAFLAND, N. De Geestesarbeid in de Minahassa gedurende de heidensche periode, m.z.g. jg. 25, 1881.
- 23A. GRABOWSKY, F. Das Betelkauen bei den malaiischen Völkern, 'Internationales Archiv für Ethnographie,' 1888, Bd. i. p. 188.
24. GUILLEMARD, F. H. Report on the Collection of Birds obtained during the Cruise of the Yacht 'Marchesa,' part iv. P.Z.S. 1885, p. 552.
25. GUILLEMARD, F. H. The Cruise of the 'Marchesa.' Murray, London, 1886.
26. GÜNTHER, A. C. L. Fische der Südsee, 'Journal des Museum Godeffroy,' Heft iii. Hamburg, 1873.
This volume contains some beautiful coloured illustrations of reef fishes.

27. GUNTHER, A. C. L. An Introduction to the Study of Fishes. A. and C. Black, Edinburgh, 1880.
28. GUPPY, H. B. The Solomon Islands and their Natives. Swan Sonnenschein, 1887.
29. HADDON, A. C. Caudal Respiration of *Periophthalmus*, 'Nature,' Jan. 17, 1889.
30. HADDON, A. C. Notes from the Torres Straits, 'Nature,' Feb. 7, 1889.
31. HEUDE, P. M. The 'Tamarao' of the Philippine Islands, 'Nature,' vol. xxxix. p. 128, Dec. 6, 1888.
32. HICKSON, S. J. The Ciliated Groove (Siphonoglyphe) in the Stomodæum of the Alcyonarians, T.R.S., part iii. 1883, p. 693.
33. HICKSON, S. J. The Structure and Relations of Tubipora, Q.J.M.S. 1883, vol. xxiii.
34. HICKSON, S. J. Preliminary Note on Certain Zoological Observations made on Talisse Island, P.R.S. No. 243, 1886.
35. HICKSON, S. J. Notes on the Sengirese, 'Journal of the Anthropological Institute,' vol. xvi. No. 2, 1886, p. 136.
36. HICKSON, S. J. Cocoa-nut Pearls, 'Nature,' June 16, 1887.
37. HICKSON, S. J. On Certain Degenerations of Design in Papuan Art, R.B.A. 1887, p. 907.
38. HICKSON, S. J. On a New Species of the Genus *Atya* (*A. Wyckii*), A.M.H. Nov. 1888, s. 6, vol. ii. p. 357.
39. HICKSON, S. J. Omzwingingen in Noord Celebes, 'Tijdschrift van het Nederland Aardrijkskundig Genootschap,' 1886.
- 39A. HOLLANDER, Dr. J. G. DE. Handleiding bij de beoefening der Land en Volkenkunde van Nederlandsch Oost Indie (vierde, omgewerkte uitgave). Breda, 1882.
40. LEUTHNER, O. Monograph of the Odontolabini, T.Z.S. 1885, xi. p. 385.
41. LOUWERIER, J. Minahassische vertelseltjes, M.Z.G. jg. 20, 1876, p. 51.
42. MACARÉ, RETHAAN. Uitbarsting van eenen vuurspuwenden berg Aboe op de Sangir eiland. Extract uijt het Taboekan's dag-register onder 10-16 Dec. des jaars 1711. 'Hist. Gen. Kron.' xv. 1859, quoted by Valentijn. *Vide* No. 79.
43. MACLENNAN, J. F. Studies in Ancient History. Macmillan. 2nd edition, 1886.
44. MAGELLAN. First Voyage round the World, Haykluyt's edition, by Lord Stanley of Alderley, 1874.
45. MATTHES, B. F. Makassaarsch-Hollandsch woordenboek. Muller, Amsterdam, 1859.
46. MEYER, A. Field Notes on the Birds of Celebes. Ibis. 1879.

47. MIQUEL, F. A. W. Flora van Nederlandsch Indie. Van der Post, Amsterdam, 1855.

47A. MITCHELL, P. C. On *Thelaceros rhizophoræ*, a New Actinian from Celebes.

This paper will shortly be published in one of the scientific periodicals.

48. MORSE, E. S. Ancient and Modern Methods of Arrow Release. Essex Institute Bulletins, 1885.

49. MOSELEY, H. N. Notes by a Naturalist on the 'Challenger.' London, 1879.

50. MOSELEY, H. N. On the Presence of Eyes in the Shells of certain Chitonidæ, and on the Structure of these Organs, Q.J.M.S., 1885, vol. xxv. p. 37.

51. MOSELEY, H. N. Report on the Scientific Results of the Voyage of H.M.S. 'Challenger,' 1873-76, 'Zoology,' vol. ii.

52. MURRAY, JOHN. On the Structure and Origin of Coral Reefs and Islands, P.R.S.E. (1880), vol. x. p. 505.

53. NICHOLSON, H. A. On the Structure of the Skeleton of *Tubipora musica*, and on the Relation of the Genus *Tubipora* to *Syringopora*, P.R.S.E. 1880-81.

54. PADTBRUGGE, R. Journaal van Padtbrugge's reis naar Noord Celebes en de Noordereilanden, B.T.L.V. 3° volgrees, deel ii. 1867, p. 262.

For extract of Padtbrugge's account of the *orang wadjoes* or *badjoes*, see Keizer's edition of Valentijn (79), p. 205. The date of Padtbrugge's journey was 1677.

55. PLEYTE, C. M. De praehistorische steenen, wapenen en werktuigen uit den oostindischen archipel, B.T.L.V. 5° volgrees, deel ii. 1887, p. 586.

Quoy et Gaimard. *Vide* 78.

56. REINWARDT, G. C. Reize naar het oostelijk gedeelte van den Indischen Archipel (1821), 'Werken van het Koninklijk Instituut voor Taal, Land en Volkenkunde,' ii. afdeeling. Muller, Amsterdam, 1858.

57. RHLJN, L. J. VAN. Reis door den Indischen Archipel. Wyt en Zonen, Rotterdam, 1851.

This work contains an account of the progress of Christian missions in Minahassa.

58. RIEDEL, J. F. Levensbeeld van Johann Friedrik Riedel, by J. J. H. Bange.

Mulder, Veendam, 1881. J. F. Riedel arrived in Celebes in the year 1831.

59. RIEDEL, J. G. F. De Minahasa in 1825, T.T.L.V. xvii. 1872, p. 486.

61. RIEDEL, J. G. F. Proeve van Alfoersche Poesie. Alfoersche tekst

- met Latijnsch karakter, en Nederduitsche vertaling. T.T.L.v. vi., ns. iii. 1857, p. 258.
62. RIEDEL, J. G. F. De Bedafliegging bij de Toe-oem-boeloe in de Minahasa, T.T.L.v. 1864, xiv. p. 369.
63. RIEDEL, J. G. F. De Volksoverleveringen betreffende de voormalige gedaante van Noord Celebes en den Oorsprong zijner bewoners, T.N.I. 1871, vol. i. p. 288. Quoted by Pleyte (55).
64. RIEDEL, J. G. F. De Sluik- en Kroesharige Rassen tusschen Selebes en Papua. Nijhoff, 's Gravenhage, 1886.
65. RIEDEL, J. G. F. Cocoa-nut Pearls, 'Nature,' September 15, 1887.
66. RUMPHIUS, G. E. Amboinische Raritäten-Kammer. Folio, Wien, 1766.
67. SALVADORI, T. Uccelli di Sanghir, A.M.G. vol. ix. p. 60, 1876-7.
68. 'SAMARANG.' The Zoology of the Voyage of H.M.S. Samarang' during the Years 1843-6, edited by A. Adams. 4to: London, 1848-50.
- 68A. SCHIPPERS, M. H. Jets over den Stam der Bantiks, M.Z.G. xxx. 1886, p. 94.
69. SCHLEGEL, H. On an Undescribed Species of Black-legged Megapode, 'Notes from the Leyden Museum,' ii. March 1880.
Schwartz, J. A. *Vide* No. 90.
70. SCLATER, P. L. The Tamaron (*Anoa mindorensis*) of the Philippine Islands, 'Nature,' vol. xxxviii. p. 363, August 16, 1888.
71. SPENSER ST. JOHN. Life in the Forests of the Far East. Second edition, 2 vols. 8vo. London, 1863.
Stanley, Lord, of Alderley. *Vide* 44.
72. TENDELOO. De toestand der vrouw in de Minahassa, M.Z.G. 1873, jg. xvii. p. 21.
73. THOMSON, J. Archives Entomologiques, vol. i. pl. xx. p. 453. Paris, 1857.
74. TIELE, P. A. De Europeërs in den Maleischen Archipel, B.T.L.v. 4^e volgreesk, deel i. 1878, p. 321 *et seq.*
75. TWIST, A. J. DUYMAER VAN. Aanteekeningen betreffende eene reis door de Molukken. Nijhoff, Amsterdam, 1856.
Dumayer van Twist was a governor-general of the Netherlands India. The volume is mainly official and statistical.
76. TYLOR, E. B. Ordeals and Oaths. Lecture at the Royal Institution, April 7, 1876.
77. TYLOR, E. B. On a Method of Investigating the Development of Institutions, applied to Laws of Marriage and Descent, 'Journal of the Anthropological Institute,' February 1889.
78. URVILLE, M. J. DUMONT D'. Voyage de Découvertes de 'L'Astrolabe,' exécuté par ordre du Roi pendant les années 1826-29. Text

- 8 vols. 8vo. Atlas 3 vols. folio. Paris, 1830-35. Zoologie, par MM. Quoy et Gaimard.
79. VALENTIJN, FRANÇOIS. Oud en nieuw Oost Indien, uitgegeven door Mr. S. Keizer. Second edition. Amsterdam, 1862.
80. WALDEN, Viscount ARTHUR. A List of the Birds known to inhabit the Island of Celebes, t.z.s. 1872, vol. viii. part ii.
81. WALLACE, A. R. On the Phenomena of Variation and Geographical Distribution, as illustrated by the Papilionidæ of the Malayan Region, t.z.s. xxv. 1865.
82. WALLACE, A. R. List of Birds from the Sula Islands (East of Celebes), with Descriptions of New Species, p.z.s. 1862, p. 333.
83. WALLACE, A. R. The Malay Archipelago. 8vo. Macmillan, 1883.
84. WESTWOOD, J. O. List of Diurnal Lepidoptera collected in N. Celebes by Dr. Hickson, 'Transactions of the Entomological Society of London,' 1888, part iii. (October).
85. WIEDERSHEIM, R. On the Torpid State of Protopterus, R.B.A. 1887, p. 739.
86. WIERSMA, J. N. Mededeelingen omtrent de Alfoersche taa van Noord-Oost Celebes, B.T.L.V., 3^o volgrees, deel iv. pp. 205, 400 (1870); deel v. pp. 70, 195 (1870-71).
87. WIERSMA, J. N. Geschiedenissen van Ratahan en Passan, B.T.L.V. 3^o volgrees, deel vi. 1872, p. 204.
- 87A. WIERSMA, J. N. Ervaringen gedurende mijne twaalfjarig zendingsleven. Rotterdam, 1876.
88. WILKEN, N. P. De Godsdienst en godsdienstplegtigheden van de Alfoeren in de Minahassa, T.N.I. 1849, deel ii. p. 387.
89. WILKEN, N. P. Bijdragen tot de kennis van de zeden en gewoonten der Alfoeren en de Minahassa, M.Z.G. 1863, jg. vii. pp. 117, 289, 371.
90. WILKEN, N. P., en J. A. SCHWARTZ. Allerlei over het land en volk van Bolaang-Mongondou, M.Z.G. 1867, jg. xi. p. 284.
91. WILKEN, G. A. Het animisme bij de volken van den Indischen Archipel, 2 vols. 1st vol., De Bussy, Amsterdam, 1884; 2nd vol., Brill, Leiden, 1885. Reprinted from 'De Indische Gids,' jaarg. 1884, deel i. p. 925, and deel ii. p. 19, and jaarg. 1885, deel i. pp. 13 and 191.
92. WILKEN, G. A. Het shamanisme bij de volken van den Indischen Archipel, B.T.L.V. 5^o volgrees, deel ii. 1887, p. 427.
93. WILKEN, G. A. De Simsonsage, 'De Gids,' jaarg. 1888, deel ii. p. 303.
94. WILKEN, G. A. Plechtigheden en Gebruiken bij Verlovingen en Huwelijken bij de Volken van den Indischen Archipel. Nijhoff, 's Hage, 1886-89. Reprinted from B.T.L.V., 5^o volgrees, deel i. 1886, p. 140, and deel iv. 1889, p. 380.

95. WILKEN, G. A. De verbreiding van het matriarchaat op Sumatra, B.T.L.V. 5° volgrees, deel iii. 1888, p. 163.
96. WILKEN, G. A. Over de Verwantschap en het huwelijks en erfrecht bij de volken van het maleische ras. De Bussy, Amsterdam, 1883. Reprinted from 'De Indische Gids,' jaarg. 1883, deel i. p. 656.
97. WILKEN, G. A. Het afplatten van het voorhoofd bij de Alfoeren van de Minahassa, T.T.L.V., deel xxi. 1874, p. 374.
98. WILKEN, G. A. Het land bezit in de Minahassa, m.z.g. deel xvii. 1873, p. 107.
99. WILKEN, G. A. Jets over naamgeving en eigennamen bij de Alfoeren van de Minahassa, T.T.L.V. deel xxii. 1874, p. 363.
100. WILKEN, G. A. De besnijdenis bij de volken van den Indischen Archipel, B.T.L.V. 4° volgrees, deel x. 1885, p. 165.
101. WILKEN, G. A. Ueber das Haaropfer und einige andere Trauergebräuche bei den Völkern Indonesien's, 'Revue Coloniale Internationale,' 1886, tome ii. p. 225, and 1887, tome i. p. 345.
102. WILKEN, G. A. Jets over Schedelvereering bij de volken van den Indischen Archipel, B.T.L.V. 5° volgrees, deel iv. 1889, p. 89.
103. WILKEN, G. A. Jets over de mutilatie der Tand en bij de volken van den Indischen Archipel, B.T.L.V. 5° volgrees, deel iii. 1888, p. 472.
104. WÜBBEN, F. A. EBBINGE. Die Nanusa-Inseln, 'Petermann's Mittheilungen,' 1888, part v. p. 136.
 Te verwachten uitbarsting van den werkenden vulkaan van het kleine eiland Roeang, 'Natuurkundig Tijdschrift voor Nederlandsch Indië,' xii. 3° s. ii. 1856-57, p. 503.
 Uitbarsting van den Vulkaan Awoë op Groot Sangir gedurende Maart 1856, 'Java Courant,' April 23, May 17, 1856.
 Repertorium op de Koloniale Litteratuur in mengelwerken en Tijdschriften van 1595 tot 1865 uitgegeven, by J. C. Hooykaas. Amsterdam, 1877-80.

INDEX

The numbers in brackets refer to the numbers of the Bibliography. (Z) refers to Zoological classification, Appendix B. (B) refers to Botanical classification, Appendix C. (Mal.) after a word signifies that it is Malay; (Dutch) Dutch; (Alf.) one of the Alfür dialects of N. Celebes; (Sang.) Sangirese; (Bdg.) Böginese; (Bat.) Batak language.

ABNORMALITY

- ABNORMALITY** of a woman's breasts
at Béó, 171
Acacia casia (B), 69
Acanthurus (Z), 113
Acorn shells (Z), 29
Ada, 166
Adam, 166, 246
Adams' description of *Gelasimus*
crabs (1), 141, 327
Adjiganti, a goblin, 263
Adoption of children in Minahassa,
282
Adultery, punishment for, 197
Aetobatis (Z), 115
Agar-agar jelly, 335
Agricultural priests, 233, 255
Ajer-madidi (lit. bubbling water)
(Map I. p. 12), 218, 265
Alaoruru, the principal deity of the
Nanusa islanders, 166
Alcedo bengalensis (Z), 90
Alcyonaria (Z), 15, 60, 108, 124,
132; anatomy of, 126
Alcyonium digitatum (Z), 51
Alfür, Alfour, Alfuru, or Alfur, a
general term applied to the
natives of the interior in the
Malay archipelago. For etymo-
logy, see Crawford (10 A)
Allang-Allang (Mal.), *Imperata*
arundinacea (B), a grass, 68,
176
Aloes? (B), 69
Altar, in Nanusa, see Ebbinge
Wübben (104), 165; in Mina-
hassa, 214, 251
Ampuang, a deity, 188

ART

- Amsterdam, king or sultan of Ter-
nate, 193, 324
Amuck, Amook, 6
Amurang, (Map I. p. 12), 8; con-
troleur of, 12
Anabas scandens (Z), 221
Anchorage at Manado, 9; at
Biarro, 48
Andamanese, the inhabitants of the
Andaman Islands, Bay of Bengal,
300
Anemone in the swamps, 143
Anquilla Elphinstonei (Z), 221
Animism, 247
Anoa depressicornis (Z), the sapi-
utan, or wild cow, 82
Ansalina, 166
Antedon (Z), 109; *A. rosaceus*, 109
Antedonin, 109
Anthothreptes celebensis (Z), 92
Ant-lions (Z), 101
Ants in the swamps, 140, 142
Ape and the turtle story, 306, 307;
Apes and crocodiles, 312
Aphrodite, 51
Arab brig visits Talisse, 79
Arabs in Manado, 206; Omar, 227
Areca palm (B), 332
Arenga sacchariferum (B), 19,
329; wood, 67
Aris, a district of Manado (Map I.
p. 12), 206
Aroids (B), 33; enormous size of
leaves of, 33
Aros, cape in Talisse (Map I. p. 12),
25; visit to, 48
Art in Minahassa, art of the wild

ARTOCARPUS

- Malays compared with that of the Papuans, 337
Artocarpus (B), 168
Asparagus (B), 226
 Assa, a kind of reed ? 241, 253
Astraea (Z), 25, 41, 49, 53, 108
Astrœidæ, 124
 L'Astrolabe visits Celebes, 327
 Atjeans, the natives of Atjeh, in North Sumatra, 270
 Attap (Mal.), roofing made of palm-leaves or grass, 68; manufacture of, 68
Atya Wyckii (Z), 222; *A. sulcatipes*, 222; *A. bisulcata*, 223
 Augite-andesite series of rocks, 29
 Autozooids of Sarcophytum, 133
 Avenue of tamarind trees at Makassar, 5
 Avi-fauna of the Sangir Islands, 190; of Talisse, 85
 Avoidance of parents-in-law, 279
 Awu volcano, Sangir (Map II. p. 156), 173
 BABAR archipelago, 8° S. 130° E., 288
 Babirusa (Z), hunting for, 18; captive, 69, 81; collecting the bones of, 353
 Baboons (*Cynopithecus nigrescens*) (Z), 20, 49, 82, 144; on Manado tuwa, 323
 Bakker, Mr., President of the Landraad, 218
 Bali, an island east of Java, 356
 Balian or Walian, from balik or walik (Mal.), to turn or return. Hence balian, he who turns the spirit, a priest (92), 215, 254
Balistes (Z), *B. aculeatus*, 112; *B. lineatus*, 114
 Ball in honour of the King's birthday, 344
 Bamboo (B), 328
 Bamboo-wood, 94
Bananas (B), 69, 206
 Banda, a group of islands south of Ceram, 356
 Bangsa (Sang.), a nobleman, 193
 Banka Strait (Map I. p. 12), 11, 27; island, 75
 Bantik, a district of Manado (Map I. p. 12), 206
 Bantiks, a tribe of Alfûrs of Minahassa, 213, 326. *See* Schippers (68 A)

BLOTTO

- Barometric pressure in Talisse, 63
Barringtonia speciosa (B), 74
 Bataks, a race of men living in Sumatra, 243, 259, 285, 288
 Batatas, *B. edulis* (B), 195
 Bathing after a funeral, 298
Batocera celebiana (Z), 101
 Bats (Z), 49, 84, 144
 Batu or Watu (Mal.) = a rock, stone
 Batu Angus (Mal.) = fire-rock, 60; hill in N. Celebes (Map I. p. 12), 82
 Batu Kapal = ship-rock (Map I. p. 12, sketch map, p. 34), 33
 Bays, Bohoi, 29; Boni, 3; butterfly, 34; Manado, 8, 211; Tomini, 3; Tomori, 3; Wallace, 36
 Beans (B), 226
 Beena marriage (MacLennan), when the husband follows his wife and lives in her house and village, 286, 288
 Beetles (Z), 100
 Belawa wood from the *Gluta bcnghas* (B), 331
 Belian wood (*Ensideroxyylon Zwageri* B), 67, 335
 Belt (4), observations on scavenger spiders in Nicaragua, 104
 Bentenan, on the coast of Afd. Belang (Map I. p. 12), 293
 Béo, a village in Karkelang (Map I. p. 156), 169
 Betel-chewing in Sangir, 203
 Betel-nut = pinang (B), 273, 297, 332
 Biarro island (*see* Map II. p. 156), 48
 Bidadarie, 166
 Birds' nests in the tropics, 156
 Birds on the road to Langowan, 225; holy, 255
 Birth customs in Minahassa, 291
 Birthday of King Willam, 343
 Bitjara (Mal.) = a conference, 332
 Bivalves (Z), 62, 135
 Blackening the face in Minahassa, 298
Blcchnum orientale (B), a fern, 46
 Bleeker, works on Malay fishes (8, 9), 116, 117
 Blood of *Scolopendra*, 105
 Blood-drinking, 216
 Blotto or Balotto, the canoes on Lake Tondano, 217

BLUE

- Blue blood of *Scolopendra*, 105
 Blue coral (Z), 124, 134
 Boba, a disease, its remedies, 196
 Bobantohé, the original name of Manado tuwa, 323
 Bobato (Sang.), a chief, 193
 Bohoi promontory (Map I. p. 12), 23; shore platform and mangrove swamp at, 23; fauna of coral reef at, 24; bay, 29
 Boils in Talisse, 66
 Bolang Mongondou, a kingdom W. of Minahassa, marriage laws, 287; stories, 262, 313, 318; kings of, 323
 Boni, bay of, 3
 Bonthian, a mountain in S. Celebes, 1, 4
 Botany of Celebes little known, 237
 Bōtō (Alf.), literally means to cut off in haste, as in the chase, hence that which is cut off in haste, the lock of hair of an enemy used for extracting 'berani' or courage, 216
 Botto, knot of hair of the women of Sangir, 204
 Bottom of Talisse Sea, 110
Bougainvillea (B), 226
 Bows and arrows, 202
 Brain corals (Z), 49, 124, 130
 Breakfast in Talisse, 61
 Bridges in Minahassa, 236
 Brigs that visited Talisse, 79
 Brittle-stars (Z), 108, 136, 181
 Broers, Controleur of Tondano, 211, 217
Brousonettia (B), 335
 Bryozoa (Z), 126
Bubulcus coromandus (Z), 219
Buceros exaratus (Z), 20
 Budak pemblian (Mal.), bought slaves; Budak pusaka, inherited slaves, 194
 Buffalo story, 263
 Buginese, a race of mariners living chiefly in South Celebes, 4, 259
 Bunakin island (Map I. p. 12) 211
 Burial customs in Sangir Islands, 198; in Minahassa, 296
 Burong (Mal.) = a bird. B. kakatua, 87; B. koheba, 89; B. skip abuabu, 89; B. kiss-kiss, 90; B. rajah udan, 90; B. kokotaka or Tjetje, 91; B.

CELEBES

- pavas, 91; B. woka-woka, 91; B. maspas or kuku inewahat, 91; B. gunting, 92; B. sié, 92; B. kuning, 92; B. chuwi, 92; kum-kum, 93; B. wakian, 93; B. kükü, 94; B. maleo, 94; B. mamunga, 95; B. kerombek, 96; B. sueko, 96; B. mas, 183
 Butterflies (Z), 41; in Talisse, 99
 Butterfly Bay (sketch map, p. 34), 34
 Bwool, a town and district on the north coast of the North peninsula of Celebes, long. 122° E., 326
 CABIU ISLANDS, Cabiulusu (Map II. p. 156), 187
Calanias nicobarica (Z), 183
Calappa crabs, (Z), 35, 140
Calcarina (Z), 29, 139
 Calcium carbonate = Carbonate of lime, 121
 Calling back the soul of a patient, 295
Calornis neglecta (Z), 92; *C. sanghirensis*, 92 foot-note, 191
 Canoes, londi, 21; fetich or 'sakit,' 163
 Capitain laut (Mal.), literally sea-captain, the native officials next in rank to the djugugu, 159
 Captain Maclear, 11
 Carbonate of lime, 121; in solution in sea-water, 148
 Carbonic acid in solution in sea water, 148
Carcharias (Z), 117
 Carcinologist, a zoologist who has made a special study of the Crustacea, 222
Carica papaya (B), 195
Carpophaga paulina, (Z), a pigeon, 41, 93
Carumbium populifolium (B), 236
 Castor oil plants (B), 226
Casuarina (B), 69
 Catching the soul of a patient, 295
 Catholic priests, influence of Spanish, 166; attempts to re-establish Catholicism in Minahassa, 325; influence of, on legends, 245, 269
 Caves in Talisse, 49
 Celebes, pronounced Selibes, etymology doubtful; sula (Mal.) =

CENTIPEDES

- island and *besi* (Mal.) = iron has been suggested, *vide* also Crawford (10A); size and shape of Celebes, 3
- Centipedes (Z), 104
- Cephalopods (Z), 116
- Cephalotes Peronii* (Z), 85
- Ceremony of seeking for a mouse, 271, 276
- Cervus moluccensis* (Z), 69; *C. hippelaphas*, 189
- Chatodons (Z), 112; *C. ehippium*, 112
- Chavica* (B) leaves, 'sirih,' 833
- Chelifers (Z), under the wings of *Batocera*, 101
- Chibia leucops* (Z), 91, 191, 225
- Chiloscyllium* (Z), 117
- Chinese at Lirung, 155; at Taruna, 174; at Manado, 206
- Chinese festival in Manado, 340
- Chiton incisus*, 182
- Chlorophyl (Z), 150
- Christians in Minahassa, number of, 325
- Chrysopogon* (B), 176
- Church at Taruna, 176; Manado, 206; Tondano, 214; Langowan, 226
- Circumcision in Nanusa, 167; in Minahassa, 294
- Claus, a German brig visits Talisse, 79
- Clavularia viridis* (Z), 125, 128, 130
- Climbing perch (Z), 221
- Cloth-sellers, 207
- Clubs used in Sangir, 203
- Clupea atricauda* (Z), 137, 199
- Cockchafers (Z), 100
- Cocoa (B), 210
- Coco-nut fetich, 175
- Coco-nut palms, 168, 174, 331; pearls, 331
- Coco-nut plantations in Talisse, 72
- Cocos nucifera* (B), the coco-nut palm, 331
- Coelenterata (Z)
- Coffee (B), 210; planting, 228; disease, 229
- Cognate relationship (Latin *Cognatio*), relationship by birth whether male or female, as distinguished from agnate relationship (Latin *Agnatio*), or consanguinity on the male side only, 284
- Collocalia esculenta* (Z), 49, 91, 143; *fusca* (Z), 49, 91

CRATÆVA

- Colour of the Crinoids, 109; of reef fishes, 111, 115; of cuttle-fishes, 116; of corals, 149
- Colours used for staining kofko, 179
- Conger anagoides* (Z), an eel, 35
- Controleur (Dutch), an official governing a district under a Resident, 12; of Sangir, 174; Broers of Tondano, 211, 217; Riedel, 327
- Conundrum in Celebes, 318
- Convolvulus (B), 168
- Coolies in Talisse, 65
- Copal, 210
- Copra, the fleshy part of the coco-nut, 175, 210
- Coral reefs. First sight of Talisse coral reefs, 15; brilliant colours of the reefs, 15; at Bohoi, 24; conditions favouring growth of, 25; no coral reefs at T. aros, 24, 49; practical importance of the investigations of, 26; natural selection on the, 35; absence of reefs exposed to N.N.E., 76; coral talus, 108; fauna of Talisse, 111; stench of, 131; Silurian and Devonian coral reefs, 134; Mollusca of, 135; at Manganitu, 181
- Coral, blue, 124; organ pipe, 124; precious, 125; brain, 124; star, 124; flexible, 125
- Corallimorphidae (Z), 143
- Corallines (B), 138
- Corallium rubrum* (Z), 125
- Corallum, the hard parts of a coral, 123
- Corals, polypes, 118; skeleton or shell of, 118; species of, 119; food of, 146; colours of, 148
- Cornea, disease of the, 66
- Corvus enca* (Z), 91
- Corypha umbraculifera* (B), 333
- Cosmogony, the science of the origin of the universe, 240
- Cosmology, the science of the universe, 243
- Cotton tree (*Eriodendron*), 335
- Courtship in Minahassa, 272
- Cow-fish = *Ostracion arcus* (Z), 114
- Cowry (Z), 135
- Crabs (Z), 29, 60; hermit crabs, 39
- Cranorrhinus cassidix* (Z), 255
- Cratæva magna* (B), 196

CRINOIDS

- Crinoids (Z), 109
Crocodylus biporcatus (Z), 96;
 stories about crocodiles, 304, 312
 Crow (Z), 91, 225
 Crustacea (Z)
 Cuckoo, *Cuculus canorus* (Z), 21,
 143
Culcita (Z), 131
Curcuma longa (B), 179
 Cursham, Mr., opzichter, M.H.V.,
 64, 70
Cuscus celebensis (Z), marsupial
 sloth, 83
 Cuttle-fishes (Z), 116; eggs of, 51
Cynonycteris minor (Z), 84
Cynopithecus nigrescens (Z), 20, 82
 Cyperaceæ (B), 40
Cypræa tigrina (Z), 135
Cyprio (Z), 135

DACTYLOPORES of Hydrocorallinæ,
126

Dancing in Manado, 344

Datu (Mal.) = grandparent, hence
 prince, 191

Daun or Dawon (Mal.) = a leaf,
 hence frequently used to signify
 a tree or plant; *D. barimuda*
 (*Cratæva magna*) (B), 196; *D.*
burong (*Rhinacanthus commu-*
nis) (B), 196

Deega marriage (MacLennan), when
 the woman follows the man,
 277

Demigretta sacra (Z), 96

Dendrophis picta (Z), 98

Devil in Nanusa, 166

Devonian coral reefs, 134

Diarrhœa in Talisse, 66

Dinner in Talisse, 61

Diospyros ebenum (B), ebony tree,
 74, 335

Direkt bestuur (Dutch) = direct
 control, 12

Diseases in Talisse, 66; in Sangir,
 196; in Minahassa, 294

Distichopora (Z), 52, 126

Divorce in the Sangir and Talaut
 islands, 197; in Minahassa, 281

Djaga (Mtl.) = a sentry, policeman
 or guard, 6, 180

Djati (Mal.), teak, 335

Djiko Calimata, a bay in Banka I.
 (Map I. p. 12), 76

Djiko Sago, a bay in Banka I.
 (Map I. p. 12), 75

ERYTHROSPIZA

Djugugu, a native official, next in
 rank to the President rajah, 169

Doctor Jawa, a native Malay
 educated in medicine in Java,
 295

Dog-fishes (Z), 117

Dominie Wielandt. The Dominie
 of Manado is the head of the
 missionaries working in the do-
 minions under the control of
 the Resident of Manado, 153, 176

Dongola, a small village on the N.
 coast of Celebes, 8

Doren, van, writings of, 196

Dorian or Durian (B), 206

Doründung (Sang.) = koffo, 179

Dowry of a rajah's daughter, 197;
 in Minahassa, 270, 275

Dredging in Talisse sea, 106

Driving away the ghost, 299

Drums, 233; made from the *Cory-*
pha umbraculifera, 334

Dua sudara (Mal.) = two sisters,
 mountains in N. Celebes (Map
 I. p. 12), 82

Dutchmen in Manado, 324

Dyaks, a race of people in Borneo;
 286

EAGLE, great sea eagle (Z), *Haliastur*
leucogaster, 88

Ebony = kayu hitam (Mal.), wood
 of the *Diospyros ebenum* (B),
 74, 210, 335

Echinoderms (Z)

Edible nests of *Collocalia*, 50

Eel (Z), 221

Eens gekocht blijft gekocht (Dutch)
 = Once bought always bought.
 The name of a farce performed
 in Makassar, 6

Egrets (Z), 96

Elevation of the land at Karaton
 and Lirung, 165

Empung, literally 'a grandfather,'
 hence an ancestral hero, a god,
 a spirit, 250; E. rengarengan =
 protecting spirits, 251

Endogamy or 'marrying in,' the
 law which compels a man or
 woman to marry inside his own
 clan or totem, 277

Epeira spiders (Z), 41, 104

Eriodendron anfractuosum (B),
 kapok, 335

Eruptions, Ruang, 45; Awu, 173

Erythrospiza trinotata (Z), 88

ETIQUETTE

- Etiquette of visiting in the Dutch East Indies, 9
Eudynamis (Z), 191; *E. melanorhyncha*, 255
Eurystomus orientalis (Z), a roller, 90, 144
Eusideroxylon Zwageri (B), 67, 335
 Eve, 166
 Exogamy or 'marrying out' (J. F. Maclellan, 'Primitive Marriage'), the law that compels a man or woman to marry outside his own clan or 'totem,' 167, 197, 285
 Exports from Minahassa, 210
 Ewa, 166, 246
 Eyck, van, captain of the Dutch steamer 'Ternate,' since deceased, 154
 Eyes of Chiton, 182
 FABLES in Minahassa, 304
 Face-blackening in Minahassa, 298
 Falconidæ (Z), 88
 Faras katu (Mal.), strips or lathes of attap, 68
 Fauna, land fauna of Talisse, Chap. V.; marine fauna of Talisse, Chap. VI.; of coral reef, 111; of the lagoon, 136; of the swamp, 140; of the Sangir Islands, 189; of Lake Tondano, 221
 Feather-stars (Z), 109; green, 110, 132
 Fetiches, 247; canoes, 163; coconut, 175
 Fevers in Talisse, 66
Ficus nitida (B), 33; *F. Minahassæ*, 336
 Filaments in the sand of the lagoon, 139
 Fire-making at Béo, 172
 Fishermen calling at Talisse, 77
 Fishes of the reefs, 60; of the lagoons, 137; in the market, 206; of Lake Tondano, 221
 Fishing in Sangir, 199
 Fishing stakes, 29
Flata marginata (Z), 101
 Flexible corals (Z), 125
 Flies (Z), 42, 142
 Flying-fish Bay, 34
 'Flying Fish,' H.M.S., 16, 353
 Flying-fish (Z), methods of capture

GOUVERNMENT

- in Sangir and Solomon Islands, 199
 Foam of the sea, 51
 Food of corals, 146; of the Sangirese, 195
 Foraminifera (Z), 139
 Foraminiferous sand, 29
 Forest, character of the forest near Likupang, 19; variation of the character of the forests, 19; multiplicity of species in, 237
 Fort Orange in Makassar, 5
 Fosso, poso, a feast, 215, 256
 Fruits in the Manado market, 206; in Minahassa, 335
Fungia (Z), 35, 41, 124
 Galacea (Z), 53, 135; anatomy of, 120
 Gambir, from the *Uncaria Gambir* (B), 333
 Games, top, 207
 Ganga, an island in Banka Strait (Map I. p. 12), 76
 Gardens, Mr. Steller's, in Sangir, 183; at Langowan, 226
 Garnaal (Dutch) = a shrimp, a prawn, 224
 Gastropores of Hydrocorallinæ, 126
 Gecko (Z), 96
 Gedeh, a volcano in the Preanger, Java, 235
Gelasimus (Z), *G. bellator*, 141
 Genealogy of Albert Waworuntu and Roland Ngantung, 243
 'Generaal Pell,' s.s., 1
 General cavity of a coral, 121
 General subsidence theory, 151
 Genii, 251
 Geteh-geteh, *Anabas scandens* (Z), 221
 Giants, 260
 Glaga (Mal.) = *Phragmites* (B), 176
Gluta benghas (B), 331
 Goblins, 263
 God-cage, 163; ladders, 215
 Gods, the names of some of the principal ones in Minahassa, 250
 Gongs, 234
Gorgonia (Z), 108
Gorgonidæ (Z), 125
 Gorontalo, a settlement in the bay of Tomini, 4, 12
 Gouvernment's stoomschip (Dutch) = Government steamer, 152

GKAAFLAND

- Graafland's researches (22, 23), 273
 Gradients of the shore at Talisse,
 Manado, Mananinta, 107
Grammatophyllum (B), an orchid,
 71
Grapsus varius (Z), 29
 Grasses (B), allang-allang (Mal.),
Imperata arundinacea, kussu-
 kussu (Mal.), *Chrysopogon*, Glaga
 (Mal.), *Phragmites*, 176
Graeculus leucopygius (Z) = mas-
 pas, 91
 Gravel beds near Langowan, 226
 Graves in Minahassa, 297
 Green Crinoid, 109, 132
 Gumutu (Mal.), the network of
 fibres formed by the leaf-stalks
 of the Arenga palm, 68, 202,
 330
 Gunther, Mr., missionary at Man-
 garung, 167
 Guppy, on a method of catching
 Flying-fish in the Solomon
 Islands, 200

- HADDON, researches on Periophthal-
 mus, 30; ethnology of Torres
 Straits, 239
 Hair, courage in the, 216
 Hair stories, 314
Halcyon coromanda (Z), 90
Halictus leucogaster (Z), a fish-
 eagle, 35, 88
 Halo round the moon, 299
Halysites (Z), 134
 Harmonie, the Societeit or club at
 Makassar, 5
 Harmsen, Mr., of Manado, 326
Harpyia cephalotes (Z), 84
 Harta (Mal.) = dowry, 275
 Hats of the sentries at Taruna,
 176
 Heads, human, at the fossos, 216;
 at funerals, 298; hunters, 275
 Heavenly villages, 248
 Heerendienst (Dutch), 208
Heliolites (Z), 134
Heliopora cerulea (Z), 124, 134
 Hermit crabs (Z), 39
Hernandia (B), 292
 Herons (Z) of Lake Tondano, 219;
 story, 313
 Herrings (Z), 76, 137, 199
Heteropoda sanatoria (Z), 102
Hibiscus (B), 69, 168, 179
Hippocampus (Z), 114

KAITSJIL

- History of Sangir, 192; of Siau
 193; of Minahassa, 323
 H.M.S. 'Flying Fish,' 16, 353;
 Cruise in, Chap. II. and III.
 H.M.S. 'Samarang,' fight with
 pirates at Ternate, 75
 Holothurians (Z), 132
 Holy islands near Sangir, 187
 Holy stones, 251
 Horti (Sang.) = *Musa mindanesis*
 (B), 179
 Hot-water springs at Langowan,
 226
 House in Talisse, 67
 House of the rajah of Manganitu,
 179
 Houses at Karaton, 162; of the
 Tondanese, 214
 Hukum (chief) besar (big) (Mal.) =
 chief of a district, 212
 Hunting for babirusas, 18
 Hydrocorallinae (Z), 126
 Hydroids (Z), 35
Hydrophis (Z), 98

- ICHTHYOSIS in Talisse, 66
 Ikan chicchak (Mal.) = *Perioph-
 thalmus*, 31; Isapi (Mal.) = *Os-
 tracion* (Z), 114
Imperata arundinacea (B), a grass,
 46, 176
 Imperforata (Z), 124
 Importance of the investigation of
 coral reefs, 26
 Indian corn in Minahassa, 336
Indigofera tinctoria (B), 179
 Inheritance laws in Minahassa, 279
 Insect pests in Talisse, 63, 102,
 353; in the swamps, 140
 Irokor si okki (Alf.), the bringing
 down of the child, 292
 Iron-wood, *Eusideroxylon* (B), 335
 Isis (Z), 127

- 'JAPARA,' S.S., 357
 Jkhr (short for Jonkheer, a Dutch
 title of nobility) van der Wyck,
 Resident of Manado, 222
 Julis (Z), 206

- KABATA (Mal.) = a loose jacket, 270
 Kain (Mal.) = cloth, 207
 Kaitsjil Ali, admiral of the Sultan
 of Ternate, 193

KAKAS

- Kakas (Map I. p. 12), 219, 224, 234
 Kakaskassan, a village and district near Tomohon, 252
 Kala moyang (Mal.), a small myriapod, 105
 Kamudi (Mal.) = a steersman, hence captain of a small boat, 14, 219
 Kandahar, a village in Sangir (Map II. p. 156), 174
 Kapok (*Eriodendron*), 335
 Karaton, in the Nanusa archipelago (Map II. p. 156), 159
 Karkelang, Talaut Islands (Map II. p. 156), 159
 Kasendukan, a heavenly village, 250
 Kaskade himpank, a disease, 196
 Katapang (Mal.) = *Terminalia catappa* (B), 74
 Kati (Mal.) = 9,984 grains, 197
 Kawana (Sang.) = free men, 193
 Kawulusan, story of, 310
 Kayu hitam (Mal.) = black wood = ebony, *Diospyros ebenum* (B), 74, 335
 Kebos (*Ophiocephalus striatus*) (Z), 221
 Kelelonde, mountain in North Celebes (Map I. p. 12), 82, 211; arrival at, 227; etymology, 230
 Kelling, a missionary, 38
 Kema (Map I. p. 12), Controleur of, 12
 Kemiri, an oily nut, 292
 Kenilo (Map I. p. 12), 252
 Kesar Islands, west of the Babar archipelago, 8° 30'S., 127° 20'E., 289
 Kijkers (Dutch) = field glasses, 357
 Kilat (Mal.) = lightning
 Kimmins, analysis of coconut pearl, 332
 Kinabohutan island (Map I. p. 12), 76; coral reefs opposite, 25; derivation of the name, 74
 King Amsterdam, 193, 324
 King William III.'s birthday, 343
 Kingfishers (Z), 90, 143; red kingfisher (*Halcyon coromanda*), 59, 90
 Kiolor and the sakits legend, 252
 Kiriwaerong, the deity of the Arenga palm, 330
 Klabat or Klobat, a mountain in Minahassa (Map I. p. 12), 6,694 feet, 8, 82, 249, 357

LEMON

- Klabat bawah, a district of Manado (Map I. p. 12), 206
 Kleine garnalen (Dutch) = small prawns, 224
 Koa (Map I. p. 12), arrival at, 15, 107, 353
 Koffo, 161, 179; manufacture of, 179
 Koheba, a bird of prey, 89
 Kolintang (Alf.) = a gong, 234
 Korowaars, wooden idols of the Papuans, *see* Guillemard (25), 337
 Kowle (Sang.), *Carica papaya* (B), 195
 Koyang (Sang.) = a sailing-vessel, 199
 Kusi (Mal.) = *Cuscus celebensis* (Z), 70
 Kusi, bald patch on head of children of Sangir, 204
 Kussu-kussu (Mal.) = *Chrysopogon*, (B), 176

- LADDERS for the gods, 215
 Lagoon, fauna of the, 136
 Lake Tondano, 218
 Lake-dwellings of the Tondanese, 214
 Lakki-lakki (Mal.) = husband, man, male, 22, 87
 Lamentations, 296
 Land tenure in Minahassa, 231
 Landraad (Dutch), a provincial court of justice, 218
 Lang (Sang.) = slaves, 193
 Langowan (Alf.), poisoned (there is a story that at one time the ripe fruits of a certain poisonous tree fell into a well, and many persons were thereby poisoned) (Map I. p. 12), 225
 Language of the Sangirese, 204
 Large, houses in Nanusa, 162; formerly so in Minahassa, 214, 277; in Borneo, 286
 Larvæ of dragon-flies and gnats, 105; mosquitoes, 142; in Tondano Lake, 224
 Lava of the Ruang, 41
 Law of exogamy, *see* Exogamy
 Legend of Mahampi, 166; of the flood in Sangir, 191, *see* Stories
 Leguminous herbs, 40
 Lembej, an empung, the distributor of riches, 257
 Lemon trees, 69

LENTE

- Lente's eerstelingen (Dutch) =
First fruits of spring, the name
of a farce performed in Makassar,
6
Lepa-lepa (Sang.) = small coast-
ing canoe, 199
Leptocephalus (Z), 206
Life in Manado, 339
Lightning stones, 239
Li-Hong, one of the Chinese gods,
341
Lii (Alf.) = holy or tabūd, 247,
299
Likupang (Map I. p. 12), 18, 111;
river and sand-banks, 111
Limbé Island (Map I. p. 12), 32
Lime, carbonate of, 121
Lingula (Z), 139, 182
Liphyra brassolis (Z), 168
Lirung, a village in Salibabu (Map
II. p. 156), 155, 167
Lithrinus (Z), 206
Livistona rotundifolia (B), 18,
296, 334
Lizard (Z), 34, 96
Lokon, mountain (Map I. p. 12),
211, 249, 252
Londi, a double-outrigged canoe, 21
Longicorn beetles (Z), 101
Lontar palm (*Livistonia*), 334
Loods (Dutch) = pilot, 40
Loom for weaving koffo 179
Lory, *Eos indica* (Z), 155
Lotta (Alf.) = muddy (see Map I. p.
12), 211
'Louise,' a Danish brig, visits
Talissee, 79
Love songs in Minahassa, 301
Lumelútut (I cannot give the
exact position of this rock), 308
Lumimuüt, legend of, 241, 248
Lunch in Talissee, 61
Luzon, the north island of the
Philippines, 300
- MAAROM NEGORI (I cannot give the
exact position of this), 309
Maclear, Captain of H.M.S. 'Flying
Fish,' 11, 16
Macropteryx Wallacci (Z), 91, 143
Madreporis (Z), 15, 24, 108, 127;
anatomy of, 123
Maendrina (Z), 124
Maeng-kom, a Celebean Baron
Munchausen, 308
Magalhaens, P. Diogo, 193, 324

MANGARANG

- Magellan, 192
Mahangetang, a holy island near
Siauw (Map II. p. 156), 188
Mahapasoösoh, bathing after a
funeral, 298
Mahatatambulelen, a singing dance
in the evening at the time of the
rice harvest (89), 244
Mahawu, a mountain in Minahassa
sometimes called Mount Rumen-
gan, 250
Mahawuwuringan, face blackening,
298
Mahomedan influence in Nanusa,
166
Maize in Minahassa, 336
Majang (Mal.), the soft pad of the
arenga palm from which the
sagowee is obtained, 329
Makalew story, 350
Makassar, 4, 356; the market, 5
Makawalang, one of the gods of the
under world, 250
Makehet (Alf.) = the process of ob-
taining wine from the sagoweer
palm, 293, 329
Maki-oki, maki-uran, maki-anak,
the custom of adopting children,
282
Malay art, 337
Maleo = *Megacephalon maleo* (Z),
a brush turkey, 41, 95
Mamanua and the heavenly
nymphs, 315
Mammals (Z), of Talissee, 81; of
Sangir, 189
Manado or Menado, formerly We-
nang, 9, 12, 206; the bay, 8, 209;
the anchorage, 9; the residency,
12; controleur, 12; as a port,
209; original name, 323; history
of, 323
Manado tuwa, i.e., old Manado, an
extinct volcano island, near
Manado, 8, 211; origin of, 249;
original name, 323
Mananinta (Map I. p. 12), 107
Mandako, a holy island near Siauw,
188
Mandej, a god of agriculture, 250
Mandūr = a foreman, 16, 65
Manempeh, the fosso for the calling
back of the soul, 295
Manganitu in Sangir (Map II. p.
156), 177
Mangarang in Kabrukan (Map II.
p. 156), 167

MANGOES

- Mangoes (B), 206
 Mangrove swamp; at Bohoi Point, 23; in Talisse, 71, 140; conditions for animal life in, 145
 Mangrove tree (B), 140
 Manilla hemp, 334
 Mantehage, an island near Manado (Map I. p. 12), 158
 Manuel, 32
 Mapalu, 230
 Marcus, 32
 Marga (Bat.) = a clan, 286
 Marine fauna of Talisse shores, Chap. VI., 106
 Market at Makassar, 5; at Manado, 206
 Marriage laws in Nanusa, 167; in Sangir Islands, 197; in Minahassa, 268; between persons of different ranks, 278
 Marsupial sloth, 83
 Mascarenhas, Pedro, Bishop of Ternate (1563), 193, 324
 Massape, a holy island near Siauw, 188
 Mat-making at Tondano, 333
 Matilalem, the ordeal by dipping, 350
 Matindas, story of, 309
 Matriarchal system. The mother the head of the family, the husband lives in the wife's village, and, in some cases, house, descent traced through female line, 197
 Maxims, 322
 Medicine in Talisse, native medicines, 66
Megacephalon maleo (Z), 41, 95
Megapodius Gilberti (Z), 94; *M. sanghirensis*, 95
 Melon (B), 168
 Menangkabawer Malays of the W. coasts of Sumatra, 270
 Mengampit or Mahampi, an island in the Nanusa archipelago (Map II. p. 156), 166; legend of, 166
 Mengnupu, an island in the Nanusa archipelago (Map II. p. 156), 166
 Mesenterial filaments of corals, 122
 Mesenteries of corals, 121
Mesoprion (Z), 112, 206
Metroxylon elatum (B), 217
 Migration of the Malays, 269
Millepora plicata (Z), 128; *M. alicornis*, 131; food of, 147

MUMU

- Millepores (Z), 126
 Minahassa, 3, 4; natives of, 12; journey through, Chapter IX.; etymology of the word, 205
 'Minahassa,' schooner, 79
 Missionaries, influence of the, 38, 167, 178; history of the, 325
 Missionaries: Kelling, 38
 Gunther, 167; Richter, 169; Steller, 177; Wilken and Schwartz, 204; Graafland, 356; Portuguese, 193, 324
 Mode of keeping time in Mangani, 180
 Mollusca (Z) of the Panchuran, 105; of the reefs, 135; of saha, 158
 M. H. V., Moluksche Handels Vennootschap (Molucca Trading Company), Offices in the Kromme Binnenkant, Amsterdam, 11, 56
 Mongondu, W. of Minahassa, *see* Bolang Mongondu
 Mongondus, the inhabitants of Bolang Mongondu, 243
 Monitor lizard (Z), 34
 Moon, sun, and stars, origin of, 244
 Moseley, researches on Hydrocorallinae, 52 (51); on the relations of Syringopora, 130; on eyes of Chiton, (50), 182
 Mosquitoes (Z), 64, 142; larvae of, 142
 Moths (Z), 41
 Motiara, loads = pilot, 40
 Motir, an island south of Ternate, 356
 Mountains: Awu (about 5,000 ft.?), 173; Bonthain (10,850 Amst. feet), 1, 4; Batu Angus, (3,846 feet), 82; Gedeh (10,587 Amst. feet), 235; Klabat (6,694 feet), 8, 82; Lokon (1,592.4 metres), 211; Kelelonde (1,827.1 metres), 82, 211; Manado tuwa (2,737 feet), 8, 211; Mahawu or Rumengan (? feet), 250; Ruang (2,330 feet), 41; Saputan (? feet), 82; Siauw volcano, (5,924 feet), 155, 185; Two Sisters (4,300 feet), 357
 Mouth of corals, 121
 Mourning customs in Minahassa, 296
 Mumu, official sticks made from

MURRAY

- the gumutp of the Arenga palm, 296
 Murray's views on origin of barrier reefs, &c. (52), 151
Musa mindanensis (B), 179, 334
 Mushroom, *Pachyma tuber-regium* (B), 196
 Music, Sangirese, 78
Mussa (Z), 124
Mussaenda frondosa (B), 183
 Musschenbroek, van, formerly Resident of Manado, 183, 225, 327
 Mustica (Mal.) = a charm; *M. calappa*, a coco-nut pearl, 331
Mus xanthurus (Z), 229
 Myriapoda (Z), 105
Myristica (B), the nutmeg tree, 168
Myristicivora luctuosa (Z), 93
 Mythology of the Minahassers, Chap. X.
 Na afloop bal (Dutch) = At the conclusion, a ball, 6
 Nangka (Mal.) trees = *Artocarpus* (B), 168
 Nanusa Islands (Map II., p. 156), 159; evidence of recent elevation of, 165; marriage laws, 167, 287
Naseus (Z), 113
 Native medicines, 66
 Natives of Minahassa, 12
 Naturalists and travellers in Minahassa, 327
 Nectar birds (Z), 92, 155
 Negori v. negari (Mal.) = a small district or a suburb
 Negori baru, a district of Manado (Map I. p. 12), 206
 Nematocysts, the stinging cells of Cœlenterata, 146
Nephelium lappaceum (B), 206
 Nests (edible) of Collocalia, 50; birds' nests in the tropics, 156
 Niasers, inhabitants of Nias island W. of Sumatra, lat. 1°N., 243
 Nicobar pigeon, 183
 Nisos, king of Megara, story, 315
 Nocturnal visits in courtship, 272
Numenius phaeopus, (Z), 96
 Nutmegs (B), 210

OAK (B), 236

Oath-taking in Manado, 346

PARANG

- Observation spot, Tindela island, 39
Octopus (Z), 136
Odontolabis celebensis (Z), 100
 Omar, an Arab, 227, 230
 Olo-Ngadjus, a race of men living in South-East Borneo, 259, 300
Ophidiaster (Z), 139
Ophiocephalus striatus (Z), 221
 Ophiurids (Z), 108
 Opzichter (Dutch), overseer or superintendent, 16, 56
 Orang (Mal.) = a man, *O. petenong*, a priest, 188
 Orang blanda (Mal.), Dutchmen: 'blanda' is a Malay corruption of the word Hollanda, 326
 Orange, fort in Makassar, 5
 Oranges (B), 206
Orbitolites (Z), 29, 139
 Orchids, best place for, 71
 Ordeals in Minahassa, 350
Oriolus celebensis (Z), 92: *O. formosus*, 191
 Organ pipe coral (Z), 124
 Osprey (*Pandion leucocephalus*) (Z), 87, 158
Ostracion arcus (Z), 114
 Ourata, an island in the Nanusa Archipelago (Map II. p. 156), 166
 PAAL (Dutch), literally a pole, hence the distance between two poles, nearly one English mile, 211
Pachyma tuber-regium (B), 196
 Paku (Sang.), fringe of hair worn by men of Sangir, 204
 Pala (Mal.) trees = *Myristica* (B), 168
Palæmon ornatus (Z), 105, 221
 Palenti trees, 179
 Panchuran (Mal.) = a water-spout, 59, 105
Pandion leucocephalus (Z), 87, 158
 Pansies (B), 226
 Papaya, *Carica papaya* (B), 195
Papilio Blumei (Z), 99; *P. dædalus*, 99; *P. polytes*, 100; *P. pammon*, 100
 Paposanan, an altar, 251
 Papuan art, 337
 Papung (Sang.), a nobleman, p. tuwas, p. beka, p. timbang, 193
Parastia (Z), 100
 Parang (Mal.), a short sword or dagger, 266

PAREPEJ

- Parepej, 260.
 Pari-Pari, a small village on the S.W. coast of Celebes, 8
 Parrots (Z), 59, 86, 155
 Pasanbangko (I cannot give the exact position of this), 310
 Pasangrahan, panugrahan (pinugrahan), anugrah., a rest-house or small hotel subsidised by the government, 11
 Paso (Map I. p. 12), 234
 Passan in the Afd. Belang (Map I. p. 12), 293
 Passiac (Map II. p. 156), 43, 44
 Pata-besi, a giant of Ternate, 263
 Paths in Talisse, 69
 Patriarchy, the man the head of the household, the wife lives in the village of her husband; descent traced through the male line, 285
 Pelagic life, 58
 'Pell, General,' s.s., 1
Pentacrinus (Z), 109
Pentaceros (Z), 139
Pentacrinin, 109
 Perch, climbing, 221
Periplthalmus (Z), Frontispiece; habits, 30; food, 30; mode of capture, 32; in Talisse, 143
 Perplexing the ghost, 299
 Pesendeen (Alf.), sham infant marriage, 270
 Petenong, a priest, 188
 Petta, a village in Sangir (Map II. p. 156), 155
Phanicochaes calorhynchus (Z), 255
Phaseolus (B), 195
 Phosphorescence of the sea in Talisse, Banda, and Scotland, 65; of Myriapoda, 105
Phyllorhina bicolor, var. *fulvus* (Z), 85
 Physiography of the Sangir Islands, 188
Pieridæ (Z), 99
 Pigeons in the Likupang forest, 20; on the Ruang, 41; in Talisse, 92; in the swamps, 144; at Langowan, 225
 Pijjtjes, a word used by Dutchmen in the Indies for gin and bitters, derived from *pahit* (Mal.) = bitter, 5, 10
 Pile dwellings of the Tondanese, 214

PULU

- Pilih' (Sang.) = holy or tabūd, 194, 247
 Pinang (Mal.), a betel-nut (B), 332; use in courtship, 273
 Pineapples (B), 69, 206
 Pinoutoan, the name of the god who dwells in the Lokon mountain, 250
 Pipe-fishes (Z), 137
 Pirates in the Banka Straits, 74
 Pisang (Mal.), a banana. P. utan = *Musa mindanensis* (B), 179
 Pits of the ant-lions, 101
Plasmopora (Z), 134
Platydictylus monorchis (Z), 96
 Plein (Dutch), a public field, a square, 5
Pocillopora (Z), 108, 124
Poinsettia (B), 226
 Polder (Dutch), a piece of land reclaimed from a marsh or lake, 221
Poliornis indicus (Z), 89
Pollicipes (Z) (figure on p. 51), 52
 Polygamy, 167; in Babar archip., 288
 Polypes, structure of, 118; difference between Alcyonarian and Zoantharian, 126
 Polyzoa (Z), 126
 Port of Manado, 209
 Posan (Alf.), forbidden, 279
 Post prau to Talisse, 77
 Potatoes (B), 226
 Poton (Alf.) = holy or tabūd,
 Prau or Prahu (Mal.) = a boat or canoe; race with a native canoe, 21
 Prawns, freshwater, 105, 221; coral reef, 35, 137
 Prayers, 251
 President rajah, a native official next in rank to the rajah, 169
 Priests in Sangir, 196; in Minahassa, 254
 Produce of Minahassa, 210
 Products of the Sangir Islands, 195
Propora (Z), 134
 Property, inheritance and possession of, in Sangir, 198; in Minahassa, 232, 278
 Protozoa (Z)
 Proverbs in Celebes, 321
Psychotria (B), 196
Pteropus Wallacei (Z), 84
Ptilopus melanocephalus (Z), 93
 Pulu Pate, a mythical island in the Nanusa Archipelago, 166

PULUTAN

- Pulutan in Kabruang (Map II. p. 156), 159
 Punishments for crime in Sangir, 198
 Pusaka, the common property of a family, 232, 278
Pyrazus palustris (Z), 141
Pytho reticulatus (Z), 97

Quercus moluccensis (B), 236

RACE with a Londi, 21

- Rajah of Manado, 50; rajah udan (Mal.) = king of the forest, 59; rajah of Pulutan, 159; of Karaton, 162; of Kandahar, 174; of Manganitu, 177; of Siau, 186
 Rambutans = fruits of *Nephelium* (B), 206

Rana macrodont (Z), 98

Rat (Z), 229

Rataan in the Afd. Belang (Map I. p. 12), 293

Rattan, or Rottan (B), 18 = Calamus, sp., 210

Reception of the Resident at Manganitu, 184; at Tomohon, 212

Reef work, 60

Reef fishes, 60, 111

Reinwardt, botanist, &c., 237

Religion in Sangir Islands little known, 196; in Minahassa, chap. X.

Remboken (Map I. p. 12), 234, 260

Remedies for disease in Sangir, 196

Reptiles of Talisse, 96

Resident of Manado, Jkhr. van der Wyck, 9, 152

Resident Roos abolishes slavery in Minahassa, 1819, 327

Rhinacanthus communis (B), 196

Rice, cultivation of, 335; legend of the, 336

Rice birds (Z), 225

Richter, missionary at Béo, 169

Riddles in Celebes, 320

Riedel, Controleur of Tondano, 327

Rig of a Londi, 21

Rijkschroeff, Mr., formerly opzichter in Talisse, 69, 211, 227

Rijsttaffel (Dutch), the midday meal of rice, curry, &c., of the Indies, 224

Rimbah and Koingotan story, 304

SAPUTAN

Roads in Minahassa, 208

Roller, *Eurystomus orientalis* (Z), 90

Rooper, Lieut., R.N., 33

Rooper Point, 34

Ropes made of gumutu, 330; of Manilla hemp, 334

Rorehi, a large Moluccan sailing boat, 75

Roses (B), 226

Roti island, S.W. of Timor, 243

Ruang volcano (Map II. p. 156), 37; attempted walk round, 40; ascent of, 41; eruptions of, 45

Rumengan or Mahawu, a mountain in Minahassa (Map I. p. 12), 250

Rumengan, the name of the god who dwells in the mountain of that name, 250

Running amuck, 6

SAGO prepared from the pith of the Arenga, 330; true sago palm, 330; from the Corypha, 334

Sago chopper, 195

Sago-sago (Alf.) = the sword of the priests, 216, 296

Sagoeer wine, prepared from the sap of the Arenga (B) palm, 207; method of preparation, 329

Saha Islands (Map II. p. 156), 156

Sahada manjura (Sang.) = old and trustworthy slaves, 194

Sakit (Mal.), a sickness or disease, hence a devil, 163, 252

Salibabu, one of the Talaut Islands (Map II. p. 156), 155

'Samarang,' H.M.S., 75, 327

Sambiki (B) = a melon, 168

Samson and Delilah, 314

Sanatotoan (Alf.), those who have sucked the same milk, 284

Sand of the shore near Likupang, 20; foraminiferous, 29; of Flying-fish Bay, 35; banks at Likupang, 111

Sandpipers v. *Tringoides hypoleucus* (Z), 20, 21, 95, 165

Sangir (Map II. p. 156), 16

Sangir Islands, visit to, Chapter VII., marriage laws, 197, 288

Sangirese, 56; music, 78

Sapi utan = wild cow (*Anoa depressicornis*, Z), 82

Saputan, mountain in N. Celebes (see Map I. p. 12), 82, 230

SAPUTAN

- Saputan, the god who dwells in the mountain, 250
Sarcophytum (Z), 24, 35, 49, 132; structure of, 133
 Sarong (Mal.), a cloth wound round the waist, 270, 295
Sauropatis chloris (Z), 90
 Scenery of the road to Tondano, 211; at Tompusu, 234
 Schooner 'Minahassa,' 79
 Schutterij, the Dutch militia, 344
 Scissor-tailed birds = *Chibia leucops* (Z), 91, 225
Sciurus murinus (Z), 84
Scolopendra (Z), 104; blood of, 105
 Scorpions (Z), 104
 Screw-pines = *Pandanus* (B), 33
 Scyllium (Z), 117
 Sea-urchins (Z), 136
 Sea-currents in Talisse Sea, 76; bottom in Talisse Sea, 110; horses, 114; anemone, 143
 Security of property in Talisse, 78
 Seho or Seha (*Arenca sacchariferum*, B), 253, 330
 Sentries at Taruna, 176
 Septa, 121
Seriatopora (Z), 108, 124, 131; *S. tenuicornis*, 108
 Seroyen, Governor, 193
 Serranidae (Z), 112
Sesarma (Z), 105
 Shaman, a medium, 259
 Sharks (Z), 117, 138
 Shell or skeleton of corals, 118
 Shields at Béó, 172; at Taruna, 176
 Ship-building in Sangir, 199
 Shore plains, at Bohoi Point, 23; formation of, 24, 145
 Shore sand near Likupang, 20; shore gradients, 107
 Shunning the parents in law, 279
 Siafu (a *Phascolus*?) (B), 195
 Siauw island (Map II. p. 156), 155, 185, 193
 Sickness at Béó, 169
Sicydium (Z), 206 note
 Siladen island (Map I. p. 12), 211
 Silurian coral reefs, 134
 Siphonoglyphe, 133
Siphonophora (Z), 105
 Siphonozooids of *Sarcophytum*, 133
 Sirih leaves (*Chavica*, B), 333
 Sisters, Two, mountains in Minahassa, 82, 357

STORIES

- Skeleton of corals, mode of formation, 118
 Skuchi api (Mal.), fire-boat; skuchi = a small ship or boat, 29
 Slaves and slavery in Sangir, 194
 Snakes (Z), 96
 Soc., short for 'Societeit' (Dutch) = club, 340
 Soft or fleshy part of corals, 121
 Sondei, perhaps a misprint for Sonder (Map I. p. 12), 256
 Song on Lake Tondano, 219
 Songs in Minahassa, 301
 Spada (Mal.) = Siap'ada = Siapa (who), ada (is), 10
Sphaerococcus lichenoides (B), 335
 Spears at Béó, 172; at Taruna, 176; in Sangir, 202; of the people of Bwool, 326
 Species of corals, 119
 Spencer St. John on love-making in Borneo, 274
 Spiders (Z), 102; scavenger spiders in Epeira webs, 104
Spilornis rufipectus (Z), 89
 Spines of Trigger-fishes, 113
 Sponges (Z), 24, 132
Squilla (Z), 28, 60, 136
 Squirrels (Z), 84
 Stag-beetles (Z), 100
 Star-corals (Z), 124
 Star-fishes (Z), 15, 35, 60, 139; armless, 131
 Starlings (Z), 92, 155
 Stars, origin of, legend, 244
 Steller, missionary at Manganitu, 177
 Stench of coral reefs, 131
Stenopus hispidus (Z) (prawns), 35
 Sting ray (Z), 115
 Stinging cells of Cœlenterata (Nematocysts), 146
 Stone implements, 239
 Stones, holy, 251
 Stories: of the flood, 191; Lumi-muit, 241; origin of the sun, moon, and stars, 244; Wailan wangko, 246; Warereh, 248; Tuleng, 250; Parepej, 260; the ape, the buffalo, and the wéris, 263; Utahagi, 265; Walasindouw, 265; Rimbah and Koingotan, 304; widow and her two sons, 305; apes, 306; apes and crocodiles, 312; Maeng Kom, 308; Matindas, 309; Kawalu-

STOMODEUM

- san, 310; hair, 315; ordeal by diving, 350
 Stomodeum = throat, of a coral, 121
 Stream Cape, T. aros (Map I. p. 12), 49
 Stone with inscription at Ulu, 185
 Subsidence theory, 151
 Suiten (position doubtful), 308
 Sulu Islands, S.W. of the Philippine group, 300
 Sulphur deposits, 230
 Sun, moon, and stars, origin of, legend, 244
 Sundanese, a race inhabiting the west of Java, 270
 Surface netting, 58
Sus babirusa (Z), 18, 69, 81
 Swifts (Z), 49, 91, 143
 Swords in Sangir, 202; of the priests in Minahassa, 216
Synapta (Z), 132
Syringopora (Z), 130, 134

- TABASHEER, concretions of flint occasionally formed in the internodes of the bamboo, 331
 Tabeh or Tabik (Mal.), a salutation, 214
Tachyris phæstus (Z), 100
 Tagulandang (Map II. p. 156), 37, 155, 186; rajah of, 37
 Talaut Islands (Map II. p. 156), visit to, Chapter VII.; evidence of recent elevation of, 151; marriage laws, 167, 287
 Taleran (Bentenansch) = head flattening, 293
 Talisse (Map I. p. 12), arrival at, 11; topography of, 55; etymology of the name, 74
 Talisse Sea, limits, depth, and bottom of, 17 (Map I. p. 12), bottom and depth, 110
 Talus of dead coral, 108
 Tamarind trees (B), avenue of, at Makassar, 5
 Tampak Got (Mal.) = God cage, 163
 Tana-wangko (Map I. p. 12), 213
 Tanah (Mal.) = land
 Tanjong (Mal.) = a cape; T. piso (a knife) (Map I. p. 12), 14; T. aros (stream), 25
Tanygnathus Mulleri (Z), 59, 86, 191; *T. megalorhynchus*, 158; *T. luconensis*, 191

TOMOHON

- Tapi Kong, Chinese idol in Manado, 207, 341
 Taruna, the capital of Sangir (Map II. p. 156), 174
 Tattooing in Nanusa, 167
 Tea (B), 210
Tectona grandis (teak), 335
 Teëteken (Alf.) = circumcision, 294
 Teknonymy in Minahassa, 281
 Temberan, the upper portion of the Tondano river, 218
 Temboan (Alf.) = an altar, 214
 Temperature of the sea, 58; of the air in Talisse, 62
 Temple of the Chinese in Manado, 207
 Tendeloo, researches, 283
 Tentacles of corals, 121; of an anemone (?), 139
Terminalia catappa (B), 74
 Termites, flying (Z), 64
 'Ternate,' steamer in the service of the colonial government, 152
Tirias talissa (Z), 100
 Thecæ or coral cups, 121
Thelia (Z), 134
Thelaceros rhizophoræ (Z), 143
 Tifa (Alf.) = a drum, 233, 334
 Time, mode of keeping, in Manginitu, 180
 Timorese, the inhabitants of Timor island, 9° S., 125 E°, 288
 Tindela (Map I. p. 12), 15, 39, 76
 Tindong, a funeral hat worn in Minahassa, 299
 Tjabeh besar (Mal.) = the large tjabeh (*Capsicum frutescens*), 335
 Tjelana (Mal.) = trousers, 207
 Tjidako (Mal.) = a jacket, 335
 Tobacco (B), 210
 Toko, a shop or store, 155
 Toli-toli, a small village on the N. coast of Celebes, 8
 Tolian, a district close to Tondano village, 277
 Tolimambot, a district close to Tondano village, 277
 Tomalun, the giant-killer of Tomohon, 260
 Tomb of a chief in Lirung, 156
 Tombs in Minahassa, 297
 Tombulus, 214, 239, 242, 252, 305
 Tomini Bay in Celebes, 3, 79
 Tomohon, Toumuhum (Alf.) = men of the river Mouhoum (Map I. p. 12), 212, 260

TOMPUSU

- Tompusu Pass, 235
 Tondano (Map I. p. 12), 212; etymology, 218; the lake, 218; fauna of the lake, 221
 Tondano, Controleur of, 12, 217
 Tondanese, 213, 217
 Tonsawang, a district in the Afdeeling Belang, 277
 Tonsea district lies N. of Kema (Map I. p. 12), 249
 Tonsea Lama, the famous waterfall near Tondano, 218
 Top playing, 207
 Totems, i.e. animal or vegetable crests or names, 305
 Toulembo, perhaps Tolimambot, 308
 Toulours, etymology, 213
Tragops prasinus (Z), 97
 Transverse section of a coral, 122
 Trepang = *Holothuria* (Z), 195
 Trigger-fishes (Z), 112
Tringoides hypoleucucus (Z), v. Sandpipers, 20, 95
 Tuan (Mal.) = sir, master; T. puti = white gentleman, 59
 Tuan bohki = the wife of the rajah, at Manganitu, 178
Tubipora (Z), 24, 41, 128; *T. musica*, 124; species of, 129
 Tuis, 241
 Tuleng, legend of, 250
 Tumuktok (Alf.) = the practice of cutting the body of an enemy into fine pieces, 216
Turbinaria (Z), 124
 Turtle, 195
 Turtle and ape story, 306, 307
Turtur tigrina (Z), 94
 Tusks of babirusa, 81
 Two Sisters, mountains in Minahassa, 82, 357
 Tylor's researches on marriage laws (77), 280
 ULAR (Mal.) = a snake or worm, U. patjola = *Pythoreticulatus*, 97
 Ulawu (Bug), a charm, 331
 Ulcers in Talisse, 66
 Ulu in Siauw (Map II. p. 156), 185
Uncaria (B), 19; *U. gambir*, 333
 Unpunctuality of the Malays, 14
 Uro (Sang.), a coco-nut fetish, 175
Urostigma microcarpa (B), 33 n.; *U. benjamincum*, 160
 Utahagi, story of, 265, 315

WIELANDT

- VANILLA (B), 210
Varanus bivittatus (Z), 34
 Vendutie (Dutch) = a sale by auction, 355
 Verbenaceæ (the vervain order), 336
 Vereeniging (Dutch), an association. V. Unitas at Makassar, 5
 Vigour of coral growth, at Bohoi, 24; in Talisse, 132
 Volcanic eruptions, 38, 45, 173
 Volcanoes: Ruang, 37, 45; Awu, 173; Siauw, 186; Saputan, 230
 Voyage from Makassar to Manado, 8
 Vries, Mr. de, 37, 341
 WADJORESE, 56
 Wailan Wangko, the deity of the Southern Minahassers, 246
 Walantakka tree (*Erythrina lithosperma*, B), 228
 Walian, vide Balian, 257: female, 292
 Wallace Bay (Map I. p. 12), 36
 Wanga wood (*Metroxylon elatum*, B), 217
 Warereh, legend of, 248
 Waringin (Mal.) tree = *Urostigma benjamincum* (B), 160, 163, 253
 Watu or Batu (Mal.) = a stone
 Watu-ing kilat (Mal.) = lightning stones, 239
 Watu merah (Mal.), red rock (Map I. p. 12), 308
 Wax insects (Z), 101
 Wedding in Minahassa, 276
 Weintré, commander, defeated the Tondanese 1809, 213
 Weledelen (Dutch), a courtesy title used in addressing private individuals, 9
 Weledelgestreng (Dutch), a courtesy title used in addressing Dutch officials, 9
 Wenang, the original name for Manado, 323
 Wetar Islands, W. of the Kesar Islands, 8° S., 126° E., 289
 Whelk, eggs of the, 51
 Whimbrels (Z), 96
 Whistling for the wind, 14
 White ants (termites, Z), 64, 102
 Widow and her two sons, story, 305
 Wielandt, Dominie of Manado, 176

WILKEN

- Wilken, A. G., researches, 242
 (line 23), 251, 268
 Wilken, G. N. (the elder), 242 (line
 30)
 Wilken and Schwartz (90), re-
 searches in Bolang Mongondu,
 204
 William III. of Holland, birthday
 celebration in Manado, 343
 Wind, whistling for the, 14
 Witches, 166
 Woka palm, *Livistona* (B), 296
 334
 Wooden spears and shields at Béo,
 172
 Woman, status of, in Minahassa,
 290

ZOSTERA

- Woods of Celebes, 334
 Würsan (Tond.), gumutu, 330
 Work on the reefs,
 Wyck, Jkhr. van der, Resident of
 Manado, 10, 222

- YAMS (B), 195
 Yuccas (B), 69

- ZOANTHARIA (Z), 118, 130; anatomy
 of, 120, 124
 Zoophytes, a general term applied
 to animals of plant-like growth
 and habit, 24
Zostera (B), 138

ALBEMARLE STREET,
July, 1889.

MR. MURRAY'S

List of New Publications.



Comedy of a Country House.

A NOVEL.

By JULIAN STURGIS,

Author of "John a Dreams," "John Maidment," &c.

2 Vols. Crown 8vo. 21s.

"Mr. Sturgis's new novel shows his refinement to the best advantage. . . . It is written with genuine satirical humour and will keep a smile of quiet pleasure constantly on its reader's lips. Mr. Sturgis's dialogue is always witty, and in this charming tale it has many happy epigrams."—*Scotsman*.

"Mr. Sturgis's story is bright and lively, and it holds the attention of the reader from cover to cover. . . . His dialogue is crisp and witty, and a shining vein of good-humoured satire runs through it."—*Observer*.



The Railways of England.

By W. M. ACWORTH.

Second Edition. With 56 Illustrations. 8vo. 14s.

CONTENTS :

NORTH WESTERN.	SOUTH WESTERN.
MIDLAND.	GREAT WESTERN.
GREAT NORTHERN.	GREAT EASTERN.
MANCHESTER, SHEFFIELD, &	BRIGHTON & SOUTH COAST.
LINCOLN.	CHATHAM & DOVER.
NORTH EASTERN.	SOUTH EASTERN.

"It is long since a more interesting book was written upon a purely practical and industrial subject. From end to end it is thoroughly readable, and appeals as strongly to the casual reader who seeks only amusement as to the more sedate person who needs it for reference."—*St. James's Gazette*.

"A volume which, for many, will have the glamour and fascination of a romance, while it will always be an authority on the topic it deals with."—*Globe*.

The Correspondence of the late John Lothrop Motley, D.C.L.

SOMETIME UNITED STATES MINISTER IN ENGLAND.

AUTHOR OF

"THE RISE OF THE DUTCH REPUBLIC," "HISTORY OF THE
UNITED NETHERLANDS," &c.

Edited by **GEORGE WILLIAM CURTIS.**

Second Edition. With Portrait. 2 Vols. 8vo. 30s.

"In the two handsome and beautifully printed volumes before us one of the greatest of America's historians has proved that the epistolary Muse of English literature dare not give her Transatlantic sister odds. There is a portrait of Mr. Motley in the first of these volumes, and the book accurately fulfils the promise of his captivating countenance. A better example of the trust that may be placed in the good looks which have been described as better than any other letters of introduction is not often met with. Our sole object in this notice is to make it clear to all whom it concerns that Mr. Motley's correspondence is a boon to book-lovers, and is as well worth purchasing as it is beyond all question well worth reading. In a word, this correspondence may be not untruly said to be a most valuable addition to a most pleasant department of literature, and as such it deserves all the success which we most confidently anticipate for it."—*Spectator*.

WORKS BY THE AUTHOR OF "HURRISH."

I.—"Plain Frances Mowbray," and Other Tales.

By the **HON. EMILY LAWLESS.**

Crown 8vo. 6s.

"We perceive the same masterly and original analysis of character, the same truth of description as in the very remarkable story of West of Ireland life by which the author is best known."—*Pall Mall Gazette*.

II.—Major Lawrence, F.L.S.

A NOVEL.

By the **HON. EMILY LAWLESS.**

Crown 8vo. 6s.

"It was not an easy task to write a novel like 'Major Lawrence, F.L.S.' . . . but in our judgment Miss Lawless has completely succeeded . . . altogether there have been few stories published this season which may be read with such sincere pleasure, or studied with more profit."—*Academy*.

"We part with 'Major Lawrence' with regret; it is a good book, a pure book, a book to stimulate and to help men and women whose lives are not all sunshine."—*Yorkshire Post*.

The Battle Abbey Roll.

WITH SOME ACCOUNT OF THE NORMAN LINEAGES.

By the **DUCHESS OF CLEVELAND.**

3 Vols. Small 4to. 48s.

"The work is the most exhaustive that has yet appeared upon its subject, and it will be valued as a work both for reading and for reference by all whose studies lead them to investigate the history and relationships of Norman families in England."—*Scotsman*.

"The volumes are full of interesting anecdotes,"—*Graphic*.



WORKS BY MRS. ROSS (née DUFF-GORDON).

I.—The Land of Manfred.

RAMBLES IN APULIA AND OTHER REMOTE PARTS OF
SOUTHERN ITALY,

WITH SPECIAL REFERENCE TO THEIR HISTORICAL ASSOCIATIONS.

By **JANET ROSS.**

With Map and Illustrations. Crown 8vo. 10s. 6d.

"Bright and entertaining is Mrs. Ross's story of her travels. . . . She has, as it were, caught the very spirit of the historical associations that lend a charm to the regions with which the memory of Manfred, Prince of Tarentum, King of Sicily, is allied. To a power of description far above the average she adds the happy gift of blending romance with everyday experiences, poetry with matter of fact prose. The result is a literary picture in which the most strongly contrasted colours are harmonized in the happiest manner."—*Morning Post*.

II.—Three Generations of English Women.

OR MEMOIRS OF MRS. JOHN TAYLOR—MRS. SARAH
AUSTIN—AND LADY DUFF GORDON.

By **JANET ROSS.**

With Portraits. 2 Vols. Crown 8vo. 24s.

"Two charming volumes brimful of fresh and delightful reading. . . . A more valuable collection of letters of eminent men has seldom been published."—*Pall Mall Gazette*.

"It is satisfactory to think that the memories of three women whose lives were so typical of English thought and manners are not to be left to oblivion . . . we can recall no feminine parallel to the remarkable sequence of grandmother, mother and daughter . . . the pages slip by the reader almost as easily as the pages of a novel."—*Guardian*.

THE VOYAGE OF THE BEAGLE.

**A Naturalist's Voyage Round
the World,**WITH NOTES ON THE NATURAL HISTORY AND GEOLOGY OF THE
COUNTRIES VISITED.By **CHARLES DARWIN, M.A., F.R.S.***Author's Popular Edition. With Portrait. Crown 8vo. 3s. 6d.*

"Mr. Darwin's work still maintains its unrivalled position. . . Every schoolboy and school-girl too, should possess this book if only to acquire one of the arts for 'interviewing' nature—the art of observation—almost the solitary accomplishment in which precocity is not offensive."—*Land and Water.*

ROBINSON'S GARDEN CYCLOPÆDIA.

I.—The English Flower Garden.

STYLE, POSITION, AND ARRANGEMENT,

WITH A DESCRIPTION OF ALL THE BEST PLANTS AND
DIRECTIONS FOR THEIR CULTURE.*Second Edition Revised. With many New Illustrations. Medium 8vo. 15s.***II.—The Vegetable Garden:**ILLUSTRATIONS, DESCRIPTIONS, AND CULTURE OF
THE GARDEN VEGETABLES CULTIVATED
IN EUROPE AND AMERICA.*With 750 Woodcuts. 8vo. 15s.*

"Innumerable treatises on the cultivation of vegetables have been written, but 'The Vegetable Garden' is the first work in any language in which are classified, described, and illustrated what are the most important of all plants to the human race. It is the production of men who in their work for many years past have had good opportunities of thoroughly studying the subject. It will enable us to realise the wonderful variety of light, pleasant, and excellent food now within our reach, and in making many a good vegetable more widely known."—*From the PREFACE.*

THE SPEECHES AND ADDRESSES OF
H.R.H. The Prince of Wales.
DURING TWENTY-FIVE YEARS—1863-1888.

Edited by **JAMES MACAULAY, M.A.**

With Portrait. 8vo. 12s.

— ♦ —
Buddhism,

ITS CONNEXION WITH BRAHMANISM AND HINDUISM,
AND ITS CONTRAST WITH CHRISTIANITY,

By **SIR MONIER WILLIAMS, K.C.I.E., D.C.L., &c.**

With 21 Illustrations. 8vo. 21s.

"Those who would study the subject fully, and it is well worth it, must go to the extremely able and carefully written book which Sir Monier Williams has produced. They will learn the relation of Buddhism to the earlier thoughts of India. They will have the details of the present faith and worship of Buddhists in different lands, with full accounts of the works, and beautifully engraved pictures of idols, temples and relics."—*The Rock*.

"An important and valuable work. . . thorough and exhaustive, and throws great light upon the teaching of Buddha."—*Standard*.

— ♦ —
**The Duke of Wellington's
Conversations**

WITH THE LATE

EARL STANHOPE. 1831-1851.

Fourth Edition. Crown 8vo. 7s. 6d.

"The literature and history of England already owe much to the house of Stanhope, and these '*Conversations*' will considerably increase the debt—an extremely interesting little volume. . . . All classes of readers may find their account in this book; chatter or scandal about the living there is not, but there is almost everything else. Those who gauge a book solely by the number of amusing stories it contains will find plenty to their taste, and yet more is there to the taste of those who are interested in improving their acquaintance with one of the greatest captains who has ever made war; one of the finest characters in human story; the bravest, truest, most unselfish, and most unswerving man who has ever served his country at any time in any capacity."—*World*.

"The volume is a museum of anecdote, history, and opinion, abounding so much in good things that it is difficult to select, and almost impossible to abridge."—*Spectator*.

"The whole volume is replete with reminiscences of the Great Duke of the most interesting description."—*Morning Post*.

Lives of Twelve Good Men.

- The Learned Divine.* MARTIN JOSEPH ROUTH.
The Restorer of the Old Paths. HUGH JAMES ROSE.
The Man of Saintly Life. CHARLES MARRIOTT.
The Great Provost. EDWARD HAWKINS.
The Remodeller of the Episcopate. SAMUEL WILBERFORCE.
The Humble Christian. RICHARD LYNCH COTTON.
The Faithful Steward. RICHARD GRESWELL.
The Pious Librarian. HENRY OCTAVIUS COXE.
The Christian Philosopher. HENRY LONGUEVILLE MANSEL.
The Singleminded Bishop. WILLIAM JACOBSON.
The Earnest Parish Priest. CHARLES PAGE EDEN.
The Good Layman. CHARLES LONGUET HIGGINS.

By JOHN W. BURGON, B.D., Late Dean of Chichester.

Fifth Edition. 2 Vols. Crown 8vo. 24s.

"Everything about Burgon, from his figure to his umbrella, suggested originality and independence of mind. Here we see displayed his tenderness of heart, his love of children, his strong sense of humour, his fund of anecdote, his independence of speech, his fervent piety, his loyalty to his friends and to his University. No student of religious life in this country during the XIXth Century can afford to neglect so rich a collection of anecdotes, and no Oxonian should pass by a work which is inspired by a passionate enthusiasm for much of what is best and noblest in the past or present life of Oxford."—*Athenæum*.

The Revision, Revised.

- I. THE NEW GREEK TEXT.
 II. THE NEW ENGLISH VERSION.
 III. WESTCOTT AND HORT'S TEXTUAL THEORY.

With a Reply to Bishop Ellicott's Defence of the Revisers, and a Vindication of the Traditional Reading of 1 Timothy iii. 16.

By J. W. BURGON, B.D.
 Late Dean of Chichester.

Second Edition. 8vo. 14s.

Corney Grain.

By HIMSELF.

Post 8vo. 1s.

Life of Sir Wm. Siemens, F.R.S.,

CIVIL ENGINEER.

By **WILLIAM POLE, F.R.S.,**

HON. SECRETARY OF THE INSTITUTE OF CIVIL ENGINEERS.

With Portrait and Illustrations. 8vo. 16s.

"Mr. Pole had a straightforward story to tell, and has told it in a way likely to interest and instruct a wide circle of readers. Sir William's biography shows him to have been a man of high talent, which under effective discipline and the teachings of experience, was successfully and profitably applied in devising and carrying out undertakings which form marked features in the history of the period with which this biography deals."—*Times*.

The Scientific Works of the late Sir William Siemens, F.R.S.

A COLLECTION OF PAPERS AND DISCOURSES.

Edited by **E. F. BAMBER, C.E.**

VOL. I.—HEAT AND METALLURGY.

„ II.—ELECTRICITY, &c.

„ III.—ADDRESSES AND LECTURES.

With Illustrative Plates and Index. 3 Vols. 8vo. 12s. each.

"For many years Sir W. Siemens has been a regular attendant at our meetings, and to few, indeed, have they been more indebted for success. Whatever the occasion, he had always new and interesting ideas, put forth in language which a child could understand. It is no exaggeration to say that the life of such a man was spent in the public service."—**LORD RAYLEIGH** at *British Association*, 1884.

Murray's Magazine.

HALF-YEARLY VOLUMES, bound in Cloth, Medium 8vo. 7s. 6d. each.

VOLUME I. JANUARY—JUNE, 1887.

VOLUME II. JULY—DECEMBER, 1887.

VOLUME III. JANUARY—JUNE, 1888.

VOLUME IV. JULY—DECEMBER, 1888.

VOLUME V. JANUARY—JUNE, 1889.

"*Murray's Magazine* seems to stand out head and shoulders above its competitors."—*Glasgow Herald*.

"Though only a year old, *Murray's* has fairly won its way to the very front rank among magazines."—*Nonconformist*.

"*Murray's Magazine* improves with every new month. More convenient in form and eighteenpence cheaper, it seems to contain all that we expect to get in the big monthlies."—*Land and Water*.

THE CAREER OF
Major George Broadfoot, C.B.,
 IN AFGHANISTAN AND THE PUNJAB.

COMPILED FROM HIS PAPERS AND THOSE OF
 LORDS ELLENBOROUGH AND HARDINGE.

By **MAJOR WM. BROADFOOT, R.E.**

With Portrait and Maps. 8vo. 15s.

"An officer of rare capacity—killed in the prime of life. How high was the estimate of George Broadfoot may be gathered not only from his deeds, but from the eulogies of friends who were competent judges. Colin Mackenzie inscribed on his grave these words, 'The foremost man in India,'—and, added Havelock, 'truly in intellect and resolution he was.' The same noble soldier, speaking of the siege of Jellalabad, called him 'greater than any or all that fought in defence of that old wall,' and spoke of his 'more than Roman self-devotion,' his tenderness of heart and 'uncompromising love of truth.' Sir Henry Lawrence said 'he had no equal on the frontier, and perhaps few in India;' while Lord Hardinge wrote,—'He united a greater variety of admirable qualities than any other officer I have met with in the Indian Army.' Herbert Edwardes, commenting on the Battle of Ferozshah, refers to him as 'foremost among the dead as he was ever foremost among the living.'—*Spectator*.

—♦—
**Three Counsels of the
 Divine Master.**

FOR THE CONDUCT OF THE SPIRITUAL LIFE.

I.—THE COMMENCEMENT. II.—THE VIRTUES. III.—THE CONFLICT.

By **E. MEYRICK GOULBURN, D.D.**

Late Dean of Norwich.

3 Vols. Crown 8vo. 16s.

"A most devout and helpful book."—*John Bull*.

—♦—
Principal Shairp and his Friends.

MEMOIRS OF JOHN CAMPBELL SHAIRP,

LATE PROFESSOR OF POETRY AT OXFORD.

By **WM. KNIGHT,**

Professor of Moral Philosophy in the University of St. Andrews.

With Portrait. 8vo. 15s.

"Nearly all those who have contributed reminiscences of Shairp are persons whose judgments are valuable, and who possess the literary faculty in no mean measure. From beginning to end, in the society of 'Shairp and His Friends,' the reader will find himself in an atmosphere of rich intellectual and spiritual life, regaled with food for the mind and pure wine for the soul. He will linger with pleasure and profit over the various stages in Shairp's life."—*Scotsman*.

The Invisible Powers of Nature.

SOME ELEMENTARY LESSONS IN PHYSICAL SCIENCE
FOR YOUNG BEGINNERS.

HEAT, LIGHT, SOUND, GRAVITATION, SOLIDS, FLUIDS,
ELECTRICITY, MAGNETISM, &c.

By **E. M. CAILLARD.**

Post 8vo. 6s.

"We would especially single out for praise the chapters devoted to the Wave Theory and Interference. The book is one which will bear good fruit in the hands of the young, and we congratulate the authoress on having produced a very readable little volume."—*Journal of Education.*

"We admire the lucidity and easy power with which the most recondite or complicated matters are treated, and the manner in which common matters are made illustrative."—*Non-conformist.*

"We have rarely met with a work of the kind in which so much information is so clearly and so accurately set forth."—*Gardeners' Chronicle.*

The Infallibility of the Church.

A COURSE OF LECTURES DELIVERED IN THE DIVINITY
SCHOOL OF THE UNIVERSITY OF DUBLIN.

By **GEORGE SALMON, D.D.,**

Provost of Trinity College, Dublin.

8vo. 12s.

"As regards style and manner the Provost is almost an ideal controversialist. In the first place he is never dull, verbose, obscure, discursive, irrelevant or tedious. Next he is scrupulously honourable towards opponents. Lastly he writes throughout with charity and courtesy."—*John Bull.*

"One of the ablest books we have yet fallen in with upon the Roman controversy. We can assure those who may be alarmed and repelled by its bulk that it is remarkably easy and even pleasant reading."—*Church Times.*

A Broken Stirrup-Leather.

By **CHARLES GRANVILLE,**

Author of "Sir Hector's Watch"

Fourth Edition. Crown 8vo. 2s. 6d.

"The characters are natural and life-like, and afford opportunity for a number of amusing or exciting incidents. In short, the book does not lose by comparison with the bright and taking style that characterised his previous book."—*Morning Post.*

"A finished work in its way. The heroes and heroines are all thorough gentlemen and gentlewomen—a somewhat rare perfection in these days—and are full of individual character told with pleasant humour."—*Guardian.*

English Fans and Fan Leaves.

COLLECTED AND DESCRIBED

By **LADY CHARLOTTE SCHREIBER.**

With 160 Plates. Handsomely Bound. Folio, £7 7s.

The greater number of the designs upon these fans relate to historical events of the end of the 18th and beginning of the 19th centuries.

* * *The Edition is Limited to 150 Copies.*

THE

Political and Private Correspondence of Daniel O'Connell,

1792—1847.

EDITED WITH NOTICES OF HIS LIFE AND TIMES.

By **WM. J. FITZPATRICK, F.S.A.**

With Portrait. 2 Vols. 8vo. 36s.

"Mr. Fitzpatrick, while presenting to us a collection of moderate extent, has not only woven them into a web of fair average continuity, but has, as a sculptor would, presented to us his hero 'in the round,' so that we may consider each of his qualities in each varied light, and judge of their combination into a whole, whether it is mean or noble, consistent or inconsistent, natural or forced. . . . Few indeed, as I think, of those who give a careful perusal to these pages, will withhold their assent from the double assertion that he (O'Connell) was a great man, and that he was a good man. Upon this issue the volume now before us will enable us to try him; and in trying him to try ourselves. For who can any longer doubt that some debt is still due to him; that he was, to say the least, both over-censured and under-valued?"—Mr. GLADSTONE, in *The Nineteenth Century*.

Old Deccan Days;

OR, HINDOO FAIRY LEGENDS CURRENT IN SOUTHERN INDIA.

By **MARY FRERE.**

With Introduction by the late Sir **BARTLE FRERE, Bart.**

Fourth Edition. With 50 Illustrations. Post 8vo. 5s.

ROUND THE WORLD IN A YACHT.

The Voyage of the Marchesa
TO
Kamschatka and New Guinea.
WITH NOTICES OF FORMOSA, LIU-KIU, AND THE
ISLANDS OF THE MALAY ARCHIPELAGO.

By **F. H. H. GUILLEMARD, F.L.S.**

Second and Cheaper Edition. Maps and Illustrations. Medium 8vo. 21s.

"Mr. Guillemard has done well in publishing a cheaper edition of that admirable book of travel *The Cruise of the Marchesa*, in which he showed to so much advantage both as a narrator of his various experiences on his different voyages, and as a keen observer of the natural history of the strange lands which he visited during the cruise. The present edition has the merit of being cheaper than the original, while the merit has not been attained by any substantive sacrifice of attractive matter."—*John Bull*.

WORKS BY MR. SYDNEY BUXTON, M.P.

Finance and Politics ; **A Handbook to Political Questions of the Day,**
AN HISTORICAL STUDY,
1783-1885.
By **SYDNEY BUXTON, M.P.**
2 Vols. 8vo. 26s.

"A couple of extremely interesting and readable volumes."—*Spectator*.

"Taken as a whole, the book presents us with an exhaustive and accurate political history of our own times."—*Guardian*.

"Likely to have a considerable influence upon political thought."—*Daily News*.

AND THE
ARGUMENTS ON EITHER SIDE.

WITH AN INTRODUCTION.

By **SYDNEY BUXTON, M.P.**

Seventh Edition, revised and enlarged.
8vo. 8s.

The Holy Places of Jerusalem.

By **J. HAYTER LEWIS, F.S.A.,**

Vice-President of the Royal Institute of British Architects, and Emeritus Professor of Architecture, University College, London.

With Illustrations. 8vo. 10s. 6d.

"By far the most important contribution to the discussion respecting the holy places of Jerusalem that has appeared since 1878, when Mr. Fergusson published his 'Temples of the Jews.' . . . A book which should be read and studied by every one who takes an interest in the sacred shrines of the Holy City."—*Athenæum*.

Early Adventures in Persia, Susiana, and Babylonia.

BEFORE THE DISCOVERY OF NINEVEH.

INCLUDING AN ASCENT OF THE KARUN AND A RESIDENCE
AMONG THE BAKHTIYARI AND OTHER WILD TRIBES.

By Sir HENRY LAYARD, G.C.B.

With Portrait and Illustrations. 2 Vols. 8vo. 24s.

"Whatever may be the claims of other publications, with very many readers these two volumes will be considered the most entertaining of the season's issues—they are full of the deepest interest from cover to cover."—*Field*.

"Il est impossible de lire cet ouvrage sans éprouver un sentiment de juste admiration envers Sir H. Layard."—*Revue Nouvelle*.

[UNIFORM WITH THE "SPEAKER'S COMMENTARY."]

The Apocrypha,

WITH A COMMENTARY, EXPLANATORY AND CRITICAL,
AND A REVISION OF THE TRANSLATION.

BY THE FOLLOWING CLERGY OF THE ANGLICAN CHURCH.

Introduction	GEORGE SALMON, Provost Trin. Coll., Dublin.
Esdras	J. H. LUPTON, Sur-master of St. Paul's School.
Tobit & Esther	J. M. FULLER, Professor of Ecclesiastical History, King's Coll., London.
Judith	C. J. BALI, Chaplain of Lincoln's Inn.
Song of Three Children	
Susanna	
Bel and Dragon	
Manasses	Archdeacon FARRAR.
Wisdom	
Ecclesiastical	
Baruch & Jeremy	
Maccabees	Canon GIFFORD.
	Canon RAWLINSON.

Edited by HENRY WACE, D.D.,

Preacher of Lincoln's Inn, Prebendary of St. Paul's, and Principal of King's College, London.

2 Vols. Medium 8vo. 50s.

"We feel that this Commentary on the Apocrypha marks a distinct advance in English theological scholarship. We can hardly imagine that thirty or even twenty years ago anything of the kind would have been attempted. We are sure that it would have been executed in a very different spirit."—*Record*.

"Dr. Wace and his able coadjutors have done their work in so thorough, scholarly, and workmanlike, luminous, and yet so readable a manner, that they have left little to be desired. It is far and away the best guide to the study of the Apocrypha yet issued from the English or American press."—*Nonconformist*.

A Readable English Dictionary.

ETYMOLOGICALLY ARRANGED.

WITH A COMPLETE ALPHABETICAL INDEX.

By **DAVID MILNE, M.A.**

Crown 8vo. 7s. 6d.

"The book will be found both interesting and useful to many who have not had a Classical Education. The general plan of the book appears to be good, the practical utility of etymological information being much increased when words derived from the same source are brought together for comparison. The definitions are usually well expressed."—*Athenæum*.

"The main purpose of this work is to provide for those who either do not get a Classical Education, or who are mere beginners in the study of Greek and Latin, an easy, interesting and instructive method of acquiring a thorough knowledge of the derivatives from these languages common in English."—*Preface*.

Dean Hook's Church Dictionary:

A PRACTICAL MANUAL OF REFERENCE FOR
CLERGYMEN AND LAYMEN.

14th Edition, thoroughly Revised.

By **WALTER HOOK, M.A.,** and **W. R. W. STEPHENS, M.A.**

One Volume. (790 pp.) 8vo. 21s.

"No book could have gone through so many editions, and have become so widely appreciated, without having well deserved its reputation . . . the revision has been conducted with the utmost care, while the judicious impartiality with which editors have treated matters on which opinion is still divided, deserves our warmest acknowledgment."—*Saturday Review*.

Geographical Etymology.

A DICTIONARY OF PLACE NAMES,

GIVING THEIR MEANING AND
DERIVATIONS.

By **C. BLACKIE.**

Third Edition. Crown 8vo. 7s.

Sermons to Children.

INCLUDING THE BEATITUDES—
AND THE FAITHFUL SERVANT.

By **A. P. STANLEY, D.D.,**
Late Dean of Westminster.

Fourth Thousand. Post 8vo. 3s. 6d.

The Dictionary of Christian Biography,

LITERATURE, SECTS, DOCTRINES, &c.

CONTAINING A COMPREHENSIVE ACCOUNT OF THE PERSONAL, THE LITERARY
THE DOGMATIC, AND THE ECCLESIASTICAL LIFE OF THE CHURCH DURING
THE FIRST EIGHT CENTURIES OF CHRISTIANITY.

Edited by WM. SMITH, D.C.L., and HENRY WACE, D.D.

4 Vols. Medium 8vo. £6 16s. 6d.

"The value of the work arises, in the first place, from the fact that the contributors to these volumes have diligently eschewed mere compilation; and, in fact, the articles include many really important monographs by highly competent scholars, frequently adding to a summary of what had been already known the results of new and original investigations. Essays of this class deserve the better welcome on account of their comparative infrequency in this country. . . . *In these volumes we welcome the most important addition that has been made for a century to the historical library of the English theological student.*"—*The Times*.

"This noble collection of biographies and treatises ought properly to be reviewed, as it has been compiled, by distribution amongst specialists. Many of its articles, if they were printed in larger type, would make volumes of considerable size, and supply the critic with plenty of hard work. . . . The Dictionary as it stands is a truly noble monument of the best contemporary English scholarship, in which the two absolutely necessary elements of the perfect historical temper—the conservative and the critical—too often opposed as contraries, are happily blended."—*Saturday Review*.

* * * *Subscribers are recommended to complete their Sets.*

NEW AND UNIFORM EDITIONS OF GROTE'S HISTORIES.

I.—History of Greece

FROM THE EARLIEST PERIOD TO THE TIME OF
ALEXANDER THE GREAT.

With Portrait, Map, and Plans. 10 Vols., Post 8vo, 50s.

* * * *This Edition is printed from the last Library Edition, which contained the Author's final revision. The volumes may be had separately.*

II.—Plato.

AND OTHER COMPANIONS OF SOKRATES.

NEW EDITION. WITH THE CONTENTS SO ARRANGED THAT EACH VOLUME IS
COMPOSED OF NEARLY RELATED SUBJECTS.

4 Vols. Crown 8vo. 20s.

The Land of the Midnight Sun;

Summer and Winter Journeys through Sweden, Norway, Lapland, and Northern Finland,

By **PAUL B. DU CHAILLU**,
Author of "Explorations in Equatorial Africa," &c.

Map and Illustrations. 2 Vols. 8vo. 36s.

"Mr. Du Chaillu's work is likely to become one of the most popular books of the season."
—*Times*.

"Full of interest from beginning to end."
—*Pall Mall Gazette*.

"No writer has made travel in desolate regions more attractive."—*Spectator*.

The Campaign of the Nile.

The Testimony of an Independent Eye-Witness of the Heroic efforts made for the Rescue and Relief of Gordon and Khartoum.

By **ALEXANDER MACDONALD**.

Maps and Plans. Crown 8vo. 12s.

"We have only been able to indicate a few of the many points of interest which Mr. Macdonald has presented in his excellent book. He is to be thanked for telling with candour and clearness, as well as with great literary skill, the story of our military glory and political dishonour."—*St. James's Gazette*.

UNIFORM EDITION OF

The Works of George Borrow.

5 Vols. Post 8vo, 2s. 6d. each.

"The career and works of George Borrow are well worthy of study; he may have been 'a vagabond' by taste and habit, but he was eminently a Christian and a gentleman, and many men have earned greater name and fame without half his claims to the gratitude of society."—*Saturday Review*.

- I. **The Bible in Spain;** or, the Journeys and Imprisonments of an Englishman in an attempt to circulate the Scripture in the Peninsula. With Portrait.
- II. **The Zincali:** an Account of the Gypsies of Spain; their Manners, Customs, Religion, and Language.
- III. **Lavengro:** The Scholar—the Gipsy—and the Priest.
- IV. **The Romany Rye:** a Sequel to Lavengro.
- V. **Wild Wales:** its People, Language, and Scenery.

Also, Post 8vo, 5s.

Romano Lavo-Lil: With Illustrations of English Gypsies, their Poetry and Habitations.

MOUNTSTUART ELPHINSTONE'S HISTORY OF INDIA.**I.—Hindu and Mahomedan Periods.**

Edited by **E. B. COWELL.**
5th Edition, with Map. 8vo. 18s.

II.—Rise of the British Power in the East.

By **SIR EDWARD COLEBROOKE.**
With Maps. 8vo. 16s.

International Law.

BEING THE WHEWELL LECTURES DELIVERED BEFORE THE
 UNIVERSITY OF CAMBRIDGE IN 1887.

By **SIR HENRY SUMNER MAINE, K.C.S.I.,**
 Late Master of Trinity Hall, Cambridge, and Member of the Indian Council.

8vo. 7s. 6d.

"These Lectures are marked by that lucidity of statement and felicity of illustration that are so characteristic of Sir Henry Maine's writings."—*Manchester Guardian.*

"They reveal his mind throughout; they are full of the touches of his master hand."
Times.

**Samuel Taylor
 Coleridge**

And the English Romantic School.

By Professor **ALOIS BRANDL,**
 Professor of English at the University of Prague.

With Portrait. Crown 8vo. 12s.

"Coleridge's life, character, and substantial work recounted, described, and estimated with uncommon geniality and fairness, and a most agreeable absence of ostentation of science and system."—*St. James's Gazette.*

**Society in France
 before the Revolution,
 1789,**

AND

The Causes which led to it.

By **ALEXIS DE TOCQUEVILLE.**

Translated

By **HENRY REEVE, D.C.L.**

Third Edition. 8vo. 12s.

**The Country Banker:
 His Clients, Cares, and Work.**

FROM FORTY YEARS' EXPERIENCE.

By **GEORGE RAE,**
 Author of "Bullion's Letters to a Bank Manager."

New Edition. Crown 8vo. 7s. 6d.

ETON COLLEGE SCHOOL BOOKS—NEW SERIES.

I.—Eton Latin Grammar. FOR THE HIGHER FORM.

By **F. H. RAWLINS, M.A.,** and **W. R. INGE, M.A.**

Crown 8vo. 6s.

"A good school-book, intelligently designed, well arranged, of moderate size, and excellently printed. The word lore, often so dry and shapeless, is here reduced to intelligible and interesting accounts of the history and analysis of inflexional forms, each in its proper place. The accidence is generally helpful, and a good stepping-stone to philological study."—*Journal of Education*.

II.—Eton Elementary Latin Grammar.

FOR USE IN THE LOWER FORMS.

By **A. C. AINGER, M.A.,** and **H. G. WINTLE, M.A.**

Crown 8vo. 3s. 6d.

III.—Eton Preparatory Grammar, ABRIDGED FROM

THE ABOVE WORK. *Crown 8vo.* 2s.

IV.—*Eton First Latin Exercise Book, ADAPTED

TO THE LATIN GRAMMAR. *Crown 8vo.* 2s. 6d.

"Excellent in every respect. It makes no pretence to a scientific method of treatment, but for the purpose for which it is intended we have no hesitation in pronouncing it almost ideally perfect."—*John Bull*.

V.—Eton Fourth Form Ovid:

SELECTIONS FROM OVID AND TIBULLUS.

With Notes by **H. G. WINTLE, M.A.**

Third Edition. Crown 8vo. 2s. 6d.

VI.—Eton Horace:

THE ODES, EPODES, AND CARMEN SÆCULARE.

With Notes. By **F. W. CORNISH, M.A.**

In Two Parts. With Maps. Crown 8vo. 6s.

As it is considered desirable that the notes should be used only in the preparation of the lesson, and not in the class, they are bound up separate from the text.

"The idea of publishing the notes separately seems to us a good one in the case of a text-book for schools. The notes can then be employed in preparing the lesson, while the text alone is brought into class. The Eton Horace is a thoroughly sensible and useful book. The notes are sufficiently full without sacrificing brevity, and, as far as we can see, they do not shirk difficult passages."—*Literary World*.

VII.—*Eton Exercises in Algebra.

By **E. P. ROUSE, M.A.,** and **A. COCKSHOTT, M.A.**

Crown 8vo. 3s.

VIII.—*Eton Exercises in Arithmetic.

By **Rev. T. DALTON, M.A.**

Crown 8vo. 3s.

* Keys may be purchased by authenticated teachers on written application to the Publisher.

**Kugler's Handbook of
Painting.**

THE ITALIAN SCHOOLS.

By **SIR A. HENRY LAYARD,**
G.C.B., D.C.L.,*Fifth Edition. Illustrations. 2 Vols.*
Crown 8vo. 30s.**Old English Plate:**ECCLESIASTICAL, DECORATIVE,
AND DOMESTIC; ITS MAKERS
AND MARKS.WITH IMPROVED TABLES OF THE DATE-
LETTERS.By **WILFRED J. CRIPPS, C.B.,**
M.A., F.S.A.*Third Edition. Illustrations. 8vo. 21s.***Life of Charles Darwin, F.R.S.**

WITH AN AUTOBIOGRAPHICAL CHAPTER.

By his Son, **FRANCIS DARWIN, F.R.S.***Seventh Thousand. With Portrait and Woodcuts. 3 Vols. 8vo. 36s.*

CHEAPER EDITIONS OF MR. DARWIN'S WORKS.**A Naturalist's Voyage Round the World.** 3s. 6d.**Origin of Species by means of Natural Selection.** 6s., or
Large Type Edition, 2 Vols. 12s.**Various Contrivances by which Orchids are Fertilised by
Insects.** 7s.**Variation of Animals and Plants under Domestication.**
2 Vols. 15s.**Insectivorous Plants.** 9s.**Descent of Man, and Selection in Relation to Sex.** 7s. 6d., or
Large Type Edition, 2 Vols. 15s.**Movements and Habits of Climbing Plants.** 6s.**Effects of Cross and Self-Fertilization in the Vegetable
Kingdom.** 9s.**Different Forms of Flowers on Plants of the same Species.**
7s. 6d.**Formation of Vegetable Mould through the Action of Worms.**
6s.**Life of Erasmus Darwin.** Portrait. 7s. 6d.

The Speaker's Commentary.

A Commentary on the Holy Bible.

EXPLANATORY AND CRITICAL, WITH A REVISION
OF THE TRANSLATION.

BY BISHOPS AND CLERGY OF THE ANGLICAN CHURCH.

Edited by F. C. COOK, M.A.

Late Canon of Exeter.

The Old Testament.

6 Vols. Medium 8vo.

£6 15s.

- I.—GENESIS—DEUTERONOMY. 30s.
- II.—JOSHUA—I. KINGS. 20s.
- III.—II. KINGS—ESTHER. 16s.
- IV.—JOB—SONG OF SOLOMON. 24s.
- V.—ISAIAH, JEREMIAH, LAMENTATIONS. 20s.
- VI.—EZEKIEL—MALACHI. 25s.

* * The following are sold separately:—BOOK OF PSALMS—ST. JOHN'S GOSPEL, 10s. 6d. each.—EPISTLE TO THE ROMANS, 7s. 6d.

"There can be no question that the Speaker's Commentary will supersede all older commentaries for English readers, so far as an external commentary is concerned."—*Guardian*.

The New Testament.

4 Vols. Medium 8vo.

£4 14s.

- I.—SS. MATTHEW, MARK, LUKE. 18s.
- II.—ST. JOHN, ACTS OF THE APOSTLES. 20s.
- III.—ROMANS—PHILEMON. 28s.
- IV.—HEBREWS—REVELATION. 28s.

"We regard these volumes as a specimen of English scholarship of which we need not be ashamed. The arrangement is admirable."—*Nonconformist*.

LIST OF WRITERS:

ARCHBISHOP OF YORK.

BISHOPS JACKSON, HAROLD BROWNE,
LORD ARTHUR HERVEY, BASIL
JONES, JACOBSON, & ALEXANDER.

DEANS MANSEL, JOHNSON, PLUMPTRE,
PAYNE SMITH, HOWSON, SCOTT.

ARCHDEACONS LEE, ROSE.

CANONS WESTCOTT, ESPIN, RAWLINSON,
COOK, ELLIOTT, KAY, DRAKE, GIFFORD, EVANS, WAITE.

PROFESSORS GANDELL, LUMBY, FULLER.
PREBENDARIES CURREY, HUXTABLE,
KINGSBURY, MEYRICK, WACE, AND
BULLOCK.

REVS. S. CLARK & J. F. THRUPP.

— ♦♦ —

The Student's Commentary on the Holy Bible.

ABRIDGED FROM THE SPEAKER'S COMMENTARY.

Edited by JOHN M. FULLER, M.A.,

Vicar of Bexley, and Professor of Ecclesiastical History, King's College, London.

6 Vols. Crown 8vo. 7s. 6d. each.

- I. GENESIS TO DEUTERONOMY.
- II. JOSHUA TO ESTHER.
- III. JOB TO ECCLESIASTES.

- IV. ISAIAH TO MALACHI.
- V. GOSPELS AND ACTS.
- VI. EPISTLES AND REVELATION.

"The result of a careful examination of this new Commentary is in all respects satisfactory. The execution is as good as the idea—which is saying a great deal."—*Church Bells*.

"There can be no question that the Speaker's Commentary has marked an era in Biblical literature, as the most successful of all scientific expositions of the Bible yet given to the public in this abridgment we are glad to see the essential portion of the great original is faithfully preserved."—*English Churchman*.

ALBEMARLE STREET,

July, 1889.

Mr. Murray's
LIST OF
FORTHCOMING WORKS.

Our Viceregal Life in India.

SELECTIONS FROM MY JOURNAL DURING THE
YEARS 1884—1889.

By THE MARCHIONESS OF DUFFERIN AND AVA.

2 Vols. Crown 8vo.

.....
Lux Mundi.

A SERIES OF STUDIES IN THE RELIGION OF THE
INCARNATION.

Edited by Rev. CHARLES GORE, M.A.,
Principal of Pusey House, and Fellow of Trinity College, Oxford.

CONTENTS :

1. FAITH. Rev. H. S. HOLLAND, M.A., Canon of St. Paul's, sometime Senior Student of Christ Church, Oxford.
2. THE CHRISTIAN DOCTRINE OF GOD. Rev. AUBREY MOORE, M.A., Hon. Canon of Christ Church, Tutor of Magdalen and Keble Colleges.
3. THE PROBLEM OF PAIN: ITS BEARING ON FAITH IN GOD. Rev. J. R. ILLINGWORTH, M.A., Rector of Longworth, sometime Fellow of Jesus College, and Tutor of Keble.
4. THE PREPARATION IN HISTORY FOR CHRIST. Rev. E. S. TALBOT, D.D., Vicar of Leeds, sometime Warden of Keble College.
5. THE INCARNATION IN RELATION TO DEVELOPMENT. Rev. J. R. ILLINGWORTH.
6. THE INCARNATION AS THE BASIS OF DOGMA. Rev. R. C. MOBERLY, M.A., Vicar of Great Budworth, sometime Senior Student of Christ Church.
7. THE ATONEMENT. Rev. and Hon. ARTHUR LYTTTELTON, M.A., Master of Selwyn College, Cambridge, sometime Tutor of Keble College.
8. THE HOLY SPIRIT AND INSPIRATION. Rev. C. GORE, M.A., Principal of Pusey House, Fellow of Trinity College, Oxford.
9. THE CHURCH. Rev. W. LOCK, M.A., Fellow of Magdalen, Sub-Warden of Keble College, Oxford.
10. SACRAMENTS. Rev. F. PAGET, D.D., Canon of Christ Church, and Regius Professor of Pastoral Theology.
11. CHRISTIANITY AND POLITICS. Rev. W. J. R. CAMPION, M.A., Tutor of Keble College.
12. CHRISTIAN ETHICS. Rev. R. L. OTTLEY, M.A., Vice-Principal of Cuddesdon, late Senior Student of Christ Church.

8vo.

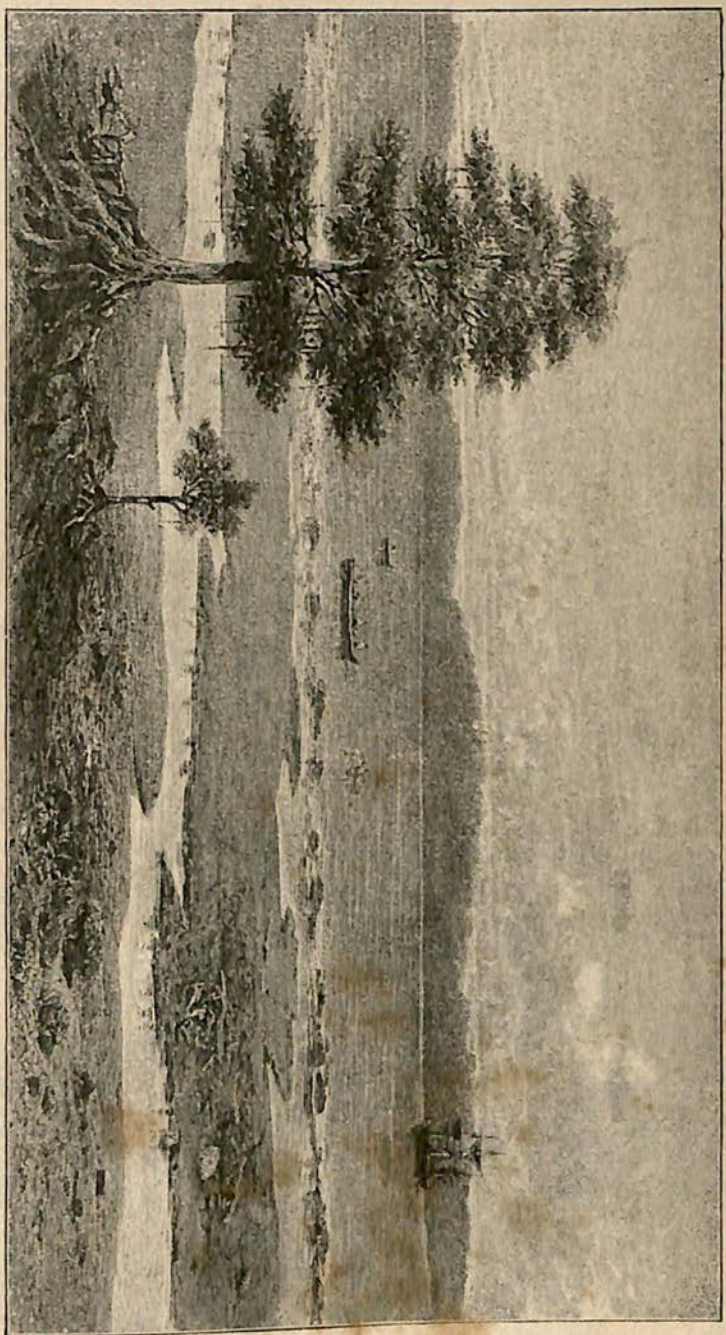


FIG. 17.—CORAL REEF AND LAGOON NEAR KOA, IN TALISSE ISLAND, AT LOW WATER.
On the left a mangrove tree. In the distance Banka Island. The edge of the coral reef may be seen above the water just beyond the sand-banks of the lagoon.

The Foundations of the Creed.

By **HARVEY GOODWIN, D.D.,**

Lord Bishop of Carlisle.

8vo.

A Naturalist in North Celebes.

ZOOLOGICAL AND ANTHROPOLOGICAL RESEARCHES
DURING SOME MONTHS' RESIDENCE.

By **SIDNEY J. HICKSON, M.A. Cantab., Hon. M.A. Oxford.**

With Illustrations. 8vo.

The Viking Age.

THE EARLY HISTORY, MANNERS, AND CUSTOMS OF THE
ANCESTORS OF THE ENGLISH-SPEAKING NATIONS.

ILLUSTRATED FROM

THE ANTIQUITIES DISCOVERED IN MOUNDS, CAIRNS, AND BOGS
AS WELL AS FROM THE ANCIENT SAGAS AND EDDAS.

By **PAUL B. DU CHAILLU,**

Author of "Equatorial Africa," "Land of the Midnight Sun," &c.

With 1400 Illustrations. 2 Vols. Medium 8vo.

Authentic Portraits

OF

Mary Queen of Scots.

AN ATTEMPT TO DISTINGUISH THOSE TO BE RELIED UPON FROM
OTHERS INDISCRIMINATELY BEARING HER NAME,
AND TO DISPEL THE CONFUSED IDEAS THAT HAVE SO LONG
PREVAILED RESPECTING HER PERSONAL APPEARANCE.

By **GEORGE SCHARF, C.B., F.S.A.,**

Director and Secretary, National Portrait Gallery.

With Photogravure Illustrations, and Woodcuts. Large 8vo.

Among Cannibals.

FOUR YEARS' TRAVELS IN AUSTRALIA

AMONG THE LITTLE KNOWN SAVAGE TRIBES IN
THE NORTH-EAST PART OF QUEENSLAND.

By **CARL LUMHOLTZ, M.A.**,
Member of the Scientific Academy of Christiania.

With Maps and upwards of 100 Illustrations. Medium 8vo.



The Life of Alexander Pope.

BY W. J. COURTHOPE, M.A.

With Portrait of the Bust by Roubiliac. 8vo.

**** Being the COMPLETING VOLUME of the WORKS Edited by CROKER, ELWIN, and COURTHOPE, with COPIOUS INDEX.**

" The excellent edition of Pope, which is now approaching completion, not only supersedes all its predecessors, but to a study of Pope's life and works is absolutely indispensable. . . .

"All that is valuable in the notes of previous editors is preserved; the superfluities and errors only are omitted. . . .

"The new Prefaces and Notes contain an extraordinary amount of information, much of which appears for the first time. It is impossible to praise too highly the patient care and painstaking industry with which facts are sifted, omissions supplied, errors corrected. Equally admirable is the ingenuity, combined with wide reading, that has elucidated many passages in the life of the poet and contemporary allusions in his poetry, which were formerly regarded as hopelessly obscure. . . .

"Mr. Elwin's chief contribution to the work was his treatment of the questions raised by Pope's correspondence. In this edition are collected more than Four Hundred and Thirty new letters, including letters from Caryll, Oxford, Orrery, Bolingbroke, Bathurst, Broome and Fenton. 'The size and importance of this new collection would alone rank this edition above its predecessors.'—*Edinburgh Review*.



The English Poor.

A SKETCH OF THEIR SOCIAL AND ECONOMIC HISTORY:

AND AN ATTEMPT TO ESTIMATE THE INFLUENCE OF
PRIVATE PROPERTY ON CHARACTER AND HABIT.

By **THOMAS MACKAY, B.A.**

Crown 8vo.

CONTENTS:—Property—Primitive forms of Society—The Village Community—English Villenage—The Black Death, and the Divorce of the Labourer from the Land—The Increase of Sheep Farming, and Growth of the Proletariate—Town Life and the Trade Gilds—Social Legislation and the Poor Law—The Industrial Revolution of the XVIII. Century—The Theory of Wages—Private Property and Population—The Modern Aspect of the Poor Law—Insurance a Substitute for the Poor Law—Some Forms of Socialistic Legislation—The Ethical Aspect of the Question.

Nature and Revelation.

OCCASIONAL THOUGHTS OF AN ASTRONOMER.

By **CHARLES PRITCHARD, D.D.**,

Savilian Professor of Astronomy at Oxford.

CONTENTS:--

CONTINUITY OF THE SCHEMES OF NATURE AND REVELATION.

NATURAL SCIENCE AND NATURAL RELIGION.

ON THE RELATIONS OF MIRACLES TO THE LAWS OF NATURE.

THE GREAT MIRACLE IN JOSHUA.

A SOLUTION OF THE DIFFICULTIES IN GENESIS.

THE SLOWNESS OF THE DIVINE PROCEEDINGS IN NATURE AND IN GRACE.

THE STAR AND THE MAGI.

Crown 8vo.

.....

A Handbook to the Death Duties.

By **SYDNEY BUXTON, M.P.**, AND

GEORGE STAPYLTON BARNES, Barrister-at-Law.

Post 8vo.

.....

A Dictionary of Hymnology.

SETTING FORTH THE

ORIGIN AND HISTORY OF THE CHRISTIAN HYMNS OF
ALL AGES AND NATIONS,

WITH SPECIAL REFERENCE TO THOSE CONTAINED IN THE
HYMN BOOKS OF ENGLISH-SPEAKING COUNTRIES,
AND NOW IN COMMON USE;

TOGETHER WITH BIOGRAPHICAL AND CRITICAL NOTICES OF THEIR AUTHORS AND
TRANSLATORS, AND HISTORICAL ARTICLES ON NATIONAL AND DENOMINATIONAL
HYMNODY, BREVIARIES, MISSALS, PRIMERS, PSALTERS, SEQUENCES, &c., &c.

By VARIOUS WRITERS.

Edited by **JOHN JULIAN, M.A.**,

Vicar of Wincobank, Sheffield.

One Volume. Medium 8vo.

UNIFORM WITH DR. SMITH'S "DICTIONARY OF THE BIBLE."

Mahommed and Mahommedism.

By R. BOSWORTH SMITH, M.A.,

Assistant Master in Harrow School; late Fellow of Trinity College, Oxford.

Third Edition. Crown 8vo.



The Minister of Baptism.

A HISTORY OF CHURCH OPINION FROM THE TIME OF
THE APOSTLES.

ESPECIALLY WITH REFERENCE TO HERETICAL AND LAY
ADMINISTRATION.

By Rev. WARWICK ELWIN, M.A.

Curate of St. George's, Beckenham, Kent.

8vo.



A History of the Modern Styles of Architecture.

By the late JAMES FERGUSSON, D.C.L. & F.R.S.

A NEW EDITION, REVISED AND ENLARGED.

By ROBERT KERR.

By ROBERT HARRIS,
Professor of Architecture at King's College, London.

With Numerous Additional Illustrations. 2 Vols. Medium 8vo.



An Introduction to the Study
of the New Testament.

AND AN INVESTIGATION INTO MODERN BIBLICAL CRITICISM.

By GEORGE SALMON, D.D.,

Provost of Trinity College, Dublin.

¹ 4th and Cheaper Edition. Crown 8vo.

"We can promise the student that he will find in Dr. Salmon as unfailing *esprit* as in Veuillot, though with no tinge of his abusiveness, or as in Renan, though historical truth be never sacrificed to literary interest. . . . We recommend the work before us as learned and interesting in every page. It is a new bastion of formidable power in the Church's defences, or rather let us say, it is a new buttress to the old house of God in which the Church's children live at peace."—*Church Quarterly Review*.

The Student's History of the Roman Empire.

FROM THE ESTABLISHMENT OF THE EMPIRE TO THE
ACCESSION OF COMMODUS, A.D. 180.

Post 8vo.

*** This work will take up the History at the point at which Dean Liddell leaves off, and carry it down to the period at which Gibbon begins.

The Expression of the Emotions in Men and Animals.

By CHARLES DARWIN.

New Edition, Revised, with Illustrations. Crown 8vo.

THE Power of Movement in Plants.

By CHARLES DARWIN.

New and Cheaper Edition. Crown 8vo.

London;

Its Historical Associations, Antiquarian and Modern.

ORIGINALLY COMPILED BY THE LATE PETER CUNNINGHAM, F.S.A.

A Library Edition, Revised, Re-written and Re-arranged.

By JAMES THORNE and H. B. WHEATLEY, F.S.A.

3 Vols. Medium 8vo.

A Dictionary of Latin Etymology.

By JOHN K. INGRAM, LL.D.

Trinity College, Dublin.

One Volume. 8vo.

2nd Edition with Additions. Illustrations. Crown 8vo.

With Plans and Illustrations. One Volume. Crown 8vo.

A New and Cheaper Edition. With Portrait. Post 8vo.

Author of "The Life of William Carey," &c.

A New and Popular Edition with Portrait and Illustrations. Post 8vo. 7s. 6d.

"It would have been difficult to find anyone better fitted for the task of writing this biography than Dr. Smith. Missions that can boast of missionaries of the stamp of Stephen Hislop cannot be altogether a failure."—*Pall Mall Gazette*.

DARWIN'S VOYAGE ILLUSTRATED.

**A Naturalist's Voyage Round
the World.**

WITH VIEWS OF THE PLACES VISITED AND THE
ANIMALS DESCRIBED.

By **CHARLES DARWIN, F.R.S.,**

*A Revised Edition. Illustrated chiefly from Sketches taken on the Spot by
R. J. PRITCHETT. Medium 8vo.*

DARWIN'S NATURALIST'S VOYAGE.—"One of the most interesting narratives of voyaging that it has fallen to our lot to take up, and one which must always occupy a distinguished place in the history of scientific navigation."—*Quarterly Review*.

DARWIN'S NATURALIST'S VOYAGE.—"This volume contains the story of the author's adventures and experiences during the memorable Voyage of the *Beagle*. The author's patience and industry led him to obtain results that seem marvellous when compared with those that fall to the lot of ordinary observers. Had Darwin written nothing else but this 'Journal' his fame as an author and a naturalist would have been considerable."—*Literary World*.

.....

Virgil in English Verse.

ECLOGUES, AND. ÆNEID, BOOKS I—VI.

By the Rt. Hon. **SIR CHARLES BOWEN,**

Lord Justice of Appeal, F.R.S., Hon. D.C.L. of the University of Oxford, Fellow and now Visitor of Balliol Coll.

Second Edition Revised with Map and Frontispiece. 8vo. 12s.

.....

A Handbook for India,

BENGAL, BOMBAY, MADRAS, PUNJAB, &c.

**A PRACTICAL GUIDE FOR TRAVELLERS ALONG THE PRINCIPAL
ROUTES AND SUMMER RESORTS IN SIMLA, DARJEELING, &c.**

One Volume. Maps and Plans. Post 8vo.

.....

**Handbook—South Germany,
and Austria.**

WURTEMBERG, BAVARIA, TYROL, AUSTRIA,
SALZBURG, STYRIA, HUNGARY, AND THE DANUBE
FROM ULM TO THE BLACK SEA.

A New Edition, for the most part re-written. With Maps. Post 8vo.

Handbook—Central Italy and Florence,

LUCCA, TUSCANY, UMBRIA, THE MARCHES AND THE
LATE PATRIMONY OF ST. PETER.

New Edition, thoroughly Revised. With Maps and Plans. 2 Parts. Post 8vo.

.....

Handbook—England and Wales.

ALPHABETICALLY ARRANGED.

New and Revised Edition. One Volume. Map. Post 8vo.

.....

Handbook—Durham and Northumberland.

New and Revised Edition. Map and Plans. Post 8vo.

.....

Handbook—The Lakes of Cumberland and Westmoreland.

New and Revised Edition. Maps. 8vo.

.....

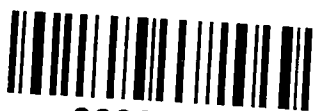
Handbook—Bedfordshire and Huntingdon.

Map. Post 8vo.

.....

Handbook—Lincolnshire.

With Maps and Plans. Post 8vo.



00085411

