

INDIAN ARCHIPELAGO



CHINA. & JAPAN.
DIRECTORY.

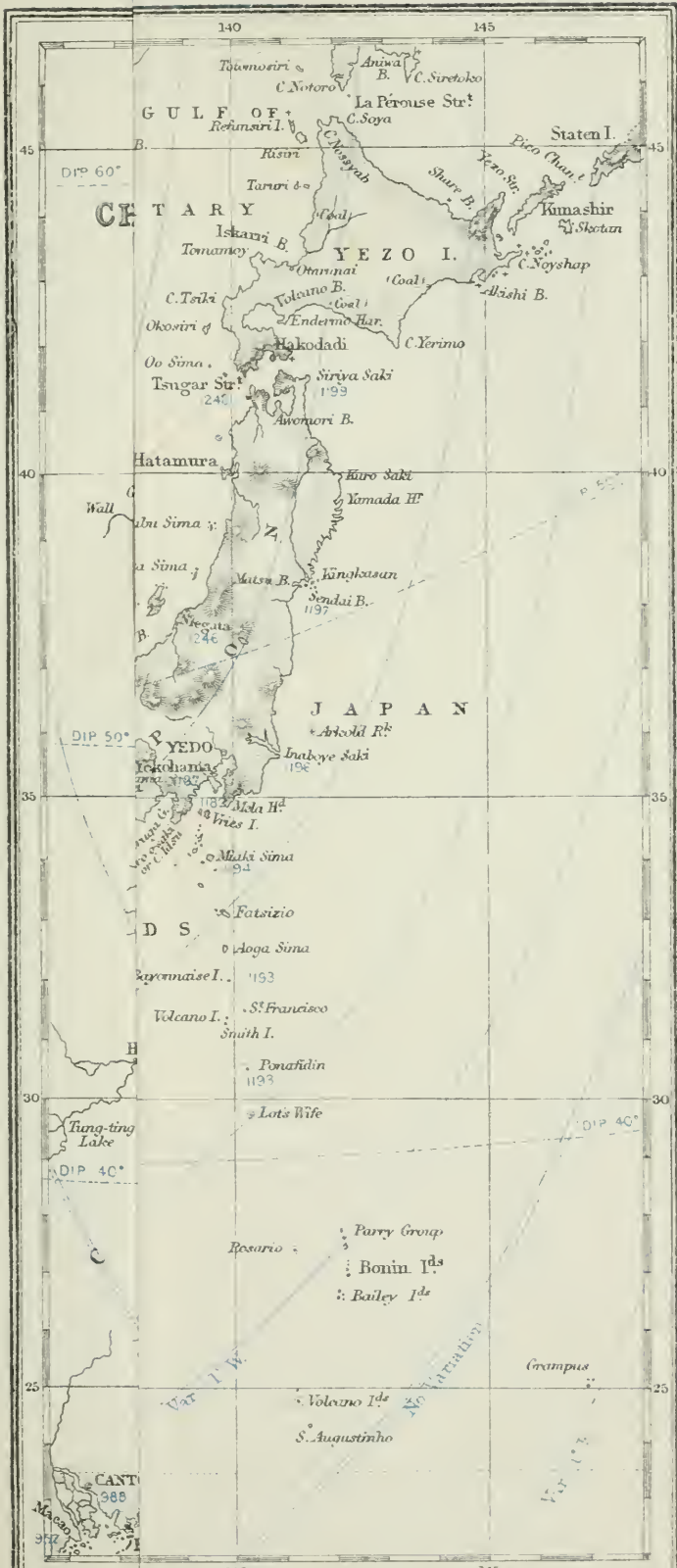
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A DIRECTORY

FOR THE NAVIGATION OF THE

INDIAN ARCHIPELAGO,

CHINA, AND JAPAN,

FROM

THE STRAITS OF MALACCA AND SUNDA, AND THE PASSAGES
EAST OF JAVA.

TO

CANTON, SHANGHAI, THE YELLOW SEA, AND JAPAN,
WITH DESCRIPTIONS OF THE WINDS, MONSOONS, AND CURRENTS,

AND GENERAL INSTRUCTIONS FOR THE VARIOUS CHANNELS, HARBOURS, ETC.



SECOND EDITION.

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R.L.

ENTERED AT STATIONERS' HALL.

PREFACE,

THIS volume may be considered as a sequel to our Sailing Directory for the Indian Ocean, which describes all the coasts and islands between the Cape of Good Hope and the Straits of Malacca and Sunda, the great westward portals of the vast archipelago which is described in the present work. Although each book is complete in itself, still they may be taken together as the modern representative of our old "Oriental Navigator," which was first issued from this house by the predecessors of the present publisher, in 1775, a fourth edition being completed in 1808. The arrangement of that quarto volume is very much the same as that now followed in these two works; and, as is stated in the Preface to the Indian Ocean Directory, was copied, with most of its matter, from the Oriental Navigator, by the late Captain James Horsburgh, in the first edition of his work, published in 1809—11. Captain Horsburgh died in May, 1836.

This Directory completes the series of those drawn up or edited by the writer. Those for the North Atlantic and South Atlantic Oceans, embracing all the area northward, between Cape Horn and the Cape of Good Hope; those for the Indian Ocean and Indian Archipelago giving all the countries between the Cape of Good Hope and the North of China, while the circuit is completed by the Directories for the Pacific Ocean. These last named works were designed by the author 20 years ago; and, with the exception of this book, all have been before the world for some years, and, it is hoped, have done good service. They were drawn up from materials scattered over a wide range of literature, and the collection of which involved much labour and research.

This book differs in some degree from the others, for a considerable portion of it is taken from the "Pilots," published by the Hydrographic office, so carefully compiled, chiefly by Commander John W. King, R.N., and embracing all the information given by former works, combined with the recent observations of many naval officers.

For the China Sea and Coast of China we are thus indebted to these Admiralty works, and we fully acknowledge our indebtedness to them. In

many parts we have somewhat curtailed the details, without, it is hoped, impairing their utility to the Mercantile Marine.

The other portions of this book have been derived from various and numerous sources, the chief of which we may briefly indicate, proceeding in the geographic order in which the book is arranged.

The Strait of Malacca was partially surveyed, by direction of the East India Company, by Captains Moresby, Ward, and Moore, and part of the Sands by Captain Daniel Ross. The labours of these zealous officers, in the early days of hydrography as at present understood, have been alluded to in the introductory remarks to the Indian Ocean Directory. The northern part of the Sumatra coast was re-examined by Commander Fell, under the same auspices, in 1851—8. Subsequently to this the Sumatran side was surveyed by Lieutenant Jackson, in 1860.

The second great entrance to the Indian Archipelago—the Strait of Sunda—has been well surveyed by the Dutch; and it is to this nation, and the zeal and talent of their officers, that we are largely indebted for our exact acquaintance with the hydrography of the archipelago; and, also, it may be at once stated, that larger portions of the ensuing work are derived from the same sources.

Subsequent to the cession of Java, and other possessions, to the Dutch nation, after the vigorous policy inaugurated by Sir Stamford Raffles during the British occupation of that fine island, the queen of the archipelago, very much attention was paid by the Netherlands officers to the acquisition of knowledge in almost every branch of science relating to their extensive territories; and, however much may have been said as to their exclusive policy, it is certain that a vast amount of knowledge, and the records of the experience of a large number of most competent observers, was given to the world; but their memoirs being too frequently in the Dutch language, one not universally understood, they were left unheeded by those most interested in them, and thus it became a general opinion that this enterprising nation desired to keep the information that was acquired under these auspices to itself. Of late years this opinion has been fully met, and it is now accorded that no country has done better service to science.

For hydrography, the establishment of the Commission for the improvement of the Indian sea charts, at Batavia, under the enlightened Governor-General, the Baron Van der Capellen, in 1821, a period when our nautical surveys were first being commenced on a more extended scale, has led to great results. They are detailed generally in the ensuing pages; but it is desired that every acknowledgement of our obligations to the labours of this commission should be given. They are continued to this day, and are constantly adding to our stock of information. The works of Capt.-Lieut. Baron Peter Melvill van Carnbee have been alluded on page 150 hereafter. It is to this young officer, perhaps, more than any other individual, that we

owe a connected view of the labours of the commission to which he was secretary, as well as one of its most active surveyors.

The Strait of Sunda, as before said, was surveyed by Lieuts. Rietveld and Boom, in 1848, and since that time many additional observations have been added for its improvement. Of the North Coast of Java we have surveys of some minuteness, executed by Lieutenants Escher, Eschauzier, Staring, Rietveld, Boom, and others, which are generally sufficient for navigation.

A portion of the Java Sea is still incomplete on the charts, and is imperfectly described, and dependant on old observations; but the part between the Straits of Sunda, comprising the Thousand Islands, &c., has been more recently examined. Banka Strait has been excellently surveyed by Lieuts. Stanton and Reed, R.N., in H.M.S. *Saracen*, in 1859-60; and this important service has discovered a more direct and open channel through this great highway. The charts and directions for the strait leave little to be desired. Gaspar Strait, as now shown, is from the survey by the U.S. officers, in 1854. Carimata Strait, the easternmost of the western passages between Sumatra and Borneo, is still unsurveyed, although many of its dangers and features were fixed by Captains Ross and Maughan.

The labyrinth of islands and passages to the north-westward, the channels leading to Singapore, have not been completely and systematically surveyed, but the charts and directions are now so far complete that the main routes are quite sufficiently known and described for safe navigation. Lieutenants Melvill van Carnbee, Blommendal, and Edeling, have executed considerable portions, and their charts have been improved, especially Rhio Strait, by the examination of Lieuts. Reed and Stanton, R.N.

Singapore Strait was surveyed by a very zealous officer, J. T. Thompson, Esq., F.R.G.S., the government surveyor at Singapore, and the constructor of those excellent monitors the Horsburgh and Raffles Lighthouses, which mark its East and West entrances. A portion of this important strait has since been re-surveyed by Lieuts. Reed and Richards, R.N.

The Gulf of Siam, which has been very imperfectly laid down on our charts, was well surveyed, and its dangers and main features accurately delineated in H.M.S. *Saracen*, commanded by Staff-Commander J. Richards, a coast line of 1,000 miles in extent in the short space of twenty months, in 1856-8, a work which reflects much credit on its author. Cambodia, or Lower Cochin China, was also surveyed by the same officers. Of the coast of the Annamite empire, which now belongs to the French, our knowledge is less perfect. The Gulf of Tong King and Hainan Island are also mainly dependent upon the former surveys of Daniel Ross and other officers, improved by the observations of Mr. Kerr, R.N.

The western shores of the great island of Borneo are well laid down and described. A large portion of it was surveyed, minutely and excellently, by Sir Edward Belcher, and other parts were completed by Lieut. D. M.

Gordon, partially so by Capt. Drinkwater Bethune, and of late some points have been revisited by the Admiralty surveyors, conducted by Commander Ward.

Palawan, and some of the islands North of Borneo, were elaborately surveyed and profusely described by Captain Bate. The western coast of the Philippine Islands have been generally laid down from the surveys of various Spanish officers.

The China Sea is perhaps the locality where hydrography has made the greatest changes of late years. Up to 1862 the charts of this great highway exhibited a labyrinth of detached shoals, scattered about without order or connection, laid down from the isolated observations of zealous officers of the East India service, many of which are now difficult of recognition, from the vague manner of their announcement. The increasing importance of the China commerce, and the advance in the sailing powers of the ships employed in it, caused this great sea to be much more frequented than in former years. Since the year above named, Commander Reed, with a moderate staff, in H.M.S. *Rifleman*, has examined the outer line of dangerous shoals which limit the two great channels, which are separated by a vast range of dangerous coral reefs and shoals, leaving the clear main channel to the north-west, and the Palawan Channel to the south-east of them perfectly free from danger for those vessels which beat up or down the China Sea by either passage in the opposite monsoons. In the work these dangers are fully described and enumerated.

The Eastern Passages are less known, and their hydrography, generally, is less advanced than in other parts. A great portion of the islands, claimed by the Dutch, are, with the exception of their noble possessions in Java, more or less under the control of native chiefs, and therefore their commerce, in a European sense, is of minor importance; therefore they have attracted less attention. Still very much has been done by the Dutch officers.

Of Java we have before spoken. Of the volcanic range, to the eastward, the coasts have been surveyed by various officers, under the direction of the Commission at Batavia; and the account of its navigation was drawn up by Mr. J. Swart and Melvill van Carnbee.

The remarkable island of Celebes is, in many parts, very vaguely represented, but its main points are well fixed and delineated. Thus Makassar, its chief port, was surveyed by Sir Edward Belcher, as were the ports at its N.E. end. The remainder of its coasts rest on the more vague authorities of Dutch travellers and voyagers, and, for the great Southern Gulf of Boni, on the single voyage of Rajah Sir James Brooke. The groups to the eastward of this are also but indifferently known, although there are several tracks of eminent voyagers which have served to correct the main points and features. Of these, the surveys of Lieut. Gregory of the Dutch navy, with those of M.M. Kolff, Modera, Müller, and other Dutch officers, may

be enumerated. The celebrated Dumont D'Urville also made a cruise through a portion of the archipelago and settled many of its points. To these may be added the names of Sir Edward Belcher, Owen Stanley, and other British officers, so that although as a whole our charts and directions may be somewhat defective, they are still sufficient for the general purposes of navigation.

The coast of China is of vastly greater importance to commerce now that its ports and coasting trade are open to the world. The British Government, alive to the importance of this, commissioned those two well-known officers (now Admirals) R. Collinson, C.B., and Kellett, to replace the vague outlines left to us by the Jesuits in the first part of the last century, as alluded to on page 940 hereafter. The most important result of this extensive and difficult enterprise has been to give to every one a complete picture of the labyrinthine coast of this great empire, as perfect as of any other portion of the globe. Many minor features have been added to this great achievement, a portion of which was attained under difficult and perplexing circumstances. The directions drawn up appeared at first in the Chinese Repository, but have been followed implicitly in this work.

The foregoing brief and imperfect enumeration of the authorities upon which the physical portion of this book rests, will show how laborious and extensive must be the operations which can bring together such a mass of materials as is here given.

The Editor feels it due to his readers to state, as has been before alluded to, that a large portion has been already found to his hands and purpose, and he has only to unite these scattered memoirs into one more complete work by filling up the vacancies from the many sources which it is hoped, as it is intended, are acknowledged throughout.

London, March 1, 1869.

The foregoing preface to the FIRST EDITION was written before a description of the Japanese Archipelago was added to this work. For this description we are indebted to the China Sea Directory, Vol. IV., and recent reports from H.M. surveying vessels. Previous to 1867, the shores of Japan were represented in our charts from the descriptions of its own ingenious geographers. In the year 1867, Commander Brooker commenced an examination of its coasts in H.M.S. *Sylvia*, and was succeeded in the year 1869 by Commander St. John, who continued the survey without interruption till the year 1872, when the *Sylvia* was ordered home for repairs,

and did not return to Japan till July, 1874, since which time she has remained as a surveying ship on the Japanese coasts. Of late years some surveying operations have also been carried on by the Japanese government.

New and important information has been gained from the operations carried on in H.M. surveying vessels *Rifleman* and *Nassau*. In the former of these vessels, Staff-Commander J.W. Reed, after carefully examining the dangers in the China Sea, surveyed Balabac Strait and its approaches, and added to the completeness of the survey of Singapore Strait. In the years 1870—1872, Commander W. Chimmo, in H.M.S. *Nassau*, was employed in the Sulu and adjacent seas. The hostility of the natives, however, prevented a complete survey of the Sulu Archipelago. In the year 1877, the *Nassau*, under Commander Napier, R.N., was engaged in examining the many dangers recently reported as lying near the shore by vessels engaged in trade between the treaty ports of China.

H.M.S. *Challenger*, with the Deep-sea Exploring Expedition on board, between August, 1874, and March, 1875, was some months in the archipelago; and from several books edited by the officers, and from official reports, much has been taken to add to the completeness of the ensuing descriptions. The places visited in the passage from Torres Strait to Hong Kong were the Arru and Ki Islands, Banda, Amboina, and Ternaté in the Molucca Sea; Samboangan, Iloilo, and Manila in the Philippines. In returning, the vessel passed through the Philippine Archipelago eastward of Mindoro and Zebu, and westward and southward of Mindanao, thence to the Admiralty Islands N.E. of New Guinea, before proceeding to the northward to Yokohama.

The above labours of our own government, and those of the Spanish and Dutch governments, have afforded most of the newly incorporated information in this book; but no trouble has been spared to make the work complete up to the date of issue by the careful examination of all other available sources of information.

London, September, 1878.

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Dinding Island, N.W. Id. off N.W. pt. -	4 15 24	100 32 42	Bruce, 1875.	114
„ Anchorage off North end -	4 14 35	100 34 20	„	114
„ Anchorage off S. end -	4 11 40	100 34 40	„	115
„ S.E. point -	4 10 50	100 36 0	„	115
„ Port Pancore; Police Station -	4 12 40	100 36 0	„	114
Pulo Katta -	4 9 10	100 37 55	„	116
One-fathom Bank Lighthouse -	2 52 8	109 59 2	Various.	124
MALACCA, flagstaff -	2 11 30	102 15 36	Ward (corrected).	130
Pulo Pisang, lighthouse -	1 29 0	103 15 0	„	134
Little Carimon Island, summit -	1 10 0	123 23 0	„	136
COAST OF SUMATRA.				
Pulo Brasse Lighthouse -	5 45 0	95 4 15	Netherlands Go-	138
Achin River, East entrance point -	5 35 35	95 20 45	vernment Sur-	139
Pulo Way, N.W. extreme -	5 54 35	95 13 45	vey, 1872-1874	139
Diamond Point, North extreme -	5 16 0	97 30 0	„	141
Prauhila Point, extreme -	4 53 15	97 52 30	Lieut. Jackson,	142
Lanksa Bay, Ujong Byan, N.W. point -	4 36 30	98 2 40	I.N., 1860.	143
Ujong Tannang, extreme -	4 21 0	98 17 20	„	143
Dehli River, entrance -	3 48 28	98 43 30	„	143
Pulo Varela, summit -	3 46 20	99 29 15	„	145
Point Mattie, outer point -	3 22 0	99 31 0	„	145
Batu Barra River, entrance -	3 14 0	90 35 30	„	145
The Brothers, Pulo Pandan -	3 25 5	99 47 40	„	146
Assarhan River, entrance -	3 1 15	99 52 45	Rose & Moresby.	146
Reccan River, Pulo Lalang Besar -	2 12 0	100 36 30	„	146
Pulo Roupat, Ujong Bantan -	2 8 0	101 40 30	„	147
Pulo Bucalisse, Tanjong Jati, or N. pt. -	1 36 30	101 59 0	„	148
Siak River, entrance -	1 11 30	102 12 30	„	148
Campou River, entrance -	0 43 0	103 0 30	„	149

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Java Head, extremity -	6 46 40	105 12 22	1874.	153
First Point, Lighthouse -	6 44 30	105 11 30	"	154
Prince's Island, Southern Carpenter rock	6 41 0	105 9 45	"	155
" N.E. point -	6 30 45	105 14 45	"	155
" S.W. point -	6 36 15	105 4 35	"	155
Second Point, extremity -	6 37 15	105 21 30	"	157
Panter Reefs, North end -	6 44 5	105 27 30	"	159
Third Point, North extremity -	6 27 0	105 38 28	"	159
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Anjer, flagstaff -	6 3 10	105 54 30	"	162
Thwart-the-Way, South point -	5 59 30	105 50 45	"	163
Great M'rak Island, West point -	5 55 45	105 58 30	"	164
St. Nicholas Point, extreme -	5 52 33	106 2 10	"	165
COAST OF SUMATRA.				
Flat Point, West extreme -	5 58 30	104 32 35	"	166
Little Fortune Island, East point -	5 55 45	104 26 40	"	166
Rada Point, East extreme -	5 57 30	104 44 30	"	166
Keyser Island, or Labuan, S.E. end -	5 51 30	104 53 30	"	167
Borne, fort -	5 32 20	104 31 45	"	167
Kalang Bayang Harbour, Klappa Island	5 46 8	105 2 15	"	167
Tikoos Point, extreme -	5 49 0	105 13 15	"	169
Telok Betong, Light column -	5 28 10	105 15 30	"	170
Lagoendy Island, West extreme -	5 50 45	105 14 20	"	172
" Soengal Id., S.E. pt. -	5 50 0	105 21 25	"	172
Krakatoa Island, peak 2,623 feet -	6 9 0	105 26 40	"	173
Bezee Island, peak 2,825 feet -	5 57 40	105 29 0	"	174
Sebuko Island, peak 1,416 ft. -	5 53 15	105 31 0	"	175
Hog Point or Varkenshoek, extreme -	5 55 20	105 43 0	"	176
Zutphen Islands, Hout Island, S.E. pt. -	5 54 20	105 47 0	"	176
Stroom Rock -	5 56 10	105 48 45	"	178
Winsor Rock, 2 $\frac{3}{4}$ fathoms -	5 53 30	105 53 20	"	178
Pulo Logok -	5 48 0	105 47 50	"	179
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EAST COAST OF SUMATRA.				
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South Brother Island, South point -	5 10 25	106 6 c	Bullock.	195
Swallow Rock -	5 17 40	106 3 50	Wilds.	185
Lynn Bank -	5 12 0	106 12 0	Bullock.	185
Brouwers Reefs, North reef -	5 4 45	106 15 0	"	186
Clifton Reef -	4 56 0	106 3 0	Dutch Charts.	186
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Ocean Mail Reef -	4 18 0	106 26 0	"	187
Arend Bank, 4 $\frac{1}{2}$ fathoms -	3 45 0	106 16 0	Various.	187
Boreas Bank, 5 fathoms -	3 44 0	106 27 30	"	187
City of Carlisle Bank, South end -	3 58 30	106 25 20	"	187

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Lucipara Island - - -	3 13 0	106 13 0	Stanton.	192
„ Point - - -	3 13 30	106 3 30	„	192
Eerste or First Point - - -	2 59 0	106 2 30	„	192
Tweede or Second Point - - -	2 41 0	105 46 20	„	193
Derde or Third Point - - -	2 23 0	105 36 0	„	194
Vierde or Fourth Point - - -	2 20 0	105 13 0	„	195
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Baginda Point - - -	3 4 40	106 44 0	„	199
Toboe Ali Fort - - -	3 0 48	106 27 25	„	201
Nangka Islands, West Rock - - -	2 22 53	105 44 50	„	205
Monopin Hill - - -	2 1 45	105 11 0	„	207
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Lucipara Lightvessel - - -	3 7 30	106 5 40	„	219
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„ Highest peak of Gunung Marass - - -	1 51 0	105 52 0	„	225
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Hippogriffe Shoal - - -	3 33 0	106 53 40	Wilds.	229
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Larabe Shoal - - -	3 33 0	107 10 0	American Survey	230
Sand Island - - -	3 29 0	107 9 20	„	230
Middle Reef - - -	3 27 30	107 10 20	„	230
Branding Breakers - - -	3 26 0	107 9 30	„	230
Fairlie Rock - - -	3 27 15	106 59 0	„	230
Shoal Water Island - - -	3 19 30	107 11 45	„	230
Embleton Rock - - -	3 17 20	107 10 0	„	231
Entrance Point - - -	3 1 40	106 53 10	„	234
Pulo Lepar, light - - -	5 26 30	106 55 0	„	235
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Brekat Point - - -	2 34 0	106 50 0	„	238
Akbar Shoal - - -	2 39 0	107 11 0	Akbar, 1843.	238
Tree Island - - -	2 27 30	106 57 0	American Survey	238
Gaspar Island, peak - - -	2 24 45	107 3 20	„	239
Low Island, centre - - -	3 2 15	107 7 45	„	245
Saddle Island, centre - - -	3 1 40	107 9 10	„	245
South Island, centre - - -	3 0 0	107 12 40	„	245
Table Island, centre - - -	3 0 0	107 15 0	„	245
Hewett Shoal - - -	2 53 20	107 10 40	„	246
Pulo Leat, S.E. point - - -	2 54 30	107 4 0	„	247
Heroine Shoal, doubtful - - -	3 37 0	107 45 30	„	250
Carnbee Rocks - - -	3 33 30	107 39 0	„	250
Selio Island, South point - - -	3 14 0	107 30 0	„	251
Six Islands, Ross Island - - -	3 5 0	107 20 0	„	252
Table or Klemar Island, summit - - -	3 0 0	107 15 0	„	252
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Tanjong Bienga, extreme - - -	2 34 40	107 37 0	„	255
N.E. COAST OF BANKA, ETC.				
Tutawa Bank, Pulo Bocar - - -	2 14 0	106 31 0	J. Robinson.	260

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Fathool Barie Shoal, 2½ fathoms - - -	2 4 0	106 27 0	"	261
Djederika Shoal, 3 feet - - -	1 59 0	106 28 0	"	262
Palmer Reef - - -	1 54 0	106 27 30	"	262
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Pare Joie - - -	2 19 0	107 3 0	"	264
Belvedere Shoals, S.W. end - - -	2 14 30	106 59 0	"	264
Dutch Shoal - - -	2 10 40	106 44 0	"	265
Magdalen Reef - - -	1 59 0	106 59 30	Ross.	266
Lanrick or Newland Reef - - -	1 50 40	106 59 30	"	266
Actæon Rock - - -	1 39 48	106 37 58	Ward.	266
Scheweningen Shoal - - -	1 19 12	106 39 48	Scheweningen, 1870	267
CARIMATA STRAIT.				
Kebatoe or Shoe Island - - -	3 47 45	108 4 0	H.M.S. <i>Nassau</i> ,	272
White Island - - -	3 48 50	108 3 20	1876.	272
Zephyr Rock - - -	3 48 20	108 3 10	"	272
Karang Kawat, North Reef - - -	3 42 40	108 7 30	"	272
" South Reef - - -	3 44 10	108 6 5	"	272
Katapang Island - - -	3 23 20	107 55 30	Dutch Survey.	273
Scharvogel Islands, East Island - - -	3 17 0	108 28 0	"	274
Discovery West Bank - - -	3 38 0	108 44 30	H.M.S. <i>Nassau</i> ,	275
" Reef - - -	3 35 45	108 49 25	1876.	275
" East Bank - - -	3 34 40	109 12 35	"	275
Lavender Bank - - -	3 24 5	109 1 30	"	275
Cirencester Shoal - - -	3 14 30	108 59 0	"	275
Bower Shoal - - -	3 28 45	108 40 30	"	276
Osterly South Shoal - - -	3 19 0	108 37 0	H.M.S. <i>Sylvia</i> , 1874	276
Cirencester Bank - - -	3 14 30	108 59 0	Dutch Survey.	276
Montaran Islands, East Island - - -	2 29 0	108 51 40	H.M.S. <i>Sylvia</i> ,	277
Catherine or Evans Reef - - -	2 31 30	108 54 30	1874.	278
Ontario Reef, centre - - -	2 1 45	108 39 0	Dutch Survey.	279
Soruetou Island, West point - - -	1 42 0	108 42 0	"	279
Carimata Island, peak - - -	1 35 40	108 52 30	"	280
Greig Shoal, 8 feet spot - - -	0 53 30	108 28 0	"	280
Columbus Shoal - - -	0 51 0	108 16 0	Croot, 1869.	281
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Sambar Point - - -	2 56 30	110 14 0	Dutch Survey.	281
Mount Minto - - -	2 14 0	110 3 40	"	281
Succadana, centre of bay - - -	1 12 30	110 0 10	Reed.	282
North.				
Pontianak River, entrance - - -	0 2 0	109 10 0	"	282
Tanjong Mampawa, extreme - - -	0 21 0	108 54 0	Various.	283
Pulo Sitendang, centre - - -	0 23 0	108 43 0	"	284
Pulo Baroe, centre - - -	0 36 15	108 43 40	"	284
Tanjong Batoe Blad, W. extr. of Borneo - - -	0 47 35	108 50 10	"	286
Sambas River, South point of entrance - - -	1 11 0	108 59 0	"	287
Tanjong Api - - -	1 56 36	109 20 24	Sir E. Belcher.	287
South.				
Fox Shoal, West Rock - - -	3 32 0	110 7 45	"	288
Clemencia Reef - - -	3 24 0	110 7 45	"	288

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Mankap Island - - - -	3° 4' 30"	110° 13' 0"	Dutch Survey.	288
Kumpal Island, West point - -	2 47 40	110 1 50	"	289
Toekan Mengkoedoe (Gilbert Rocks) -	2 14 20	109 57 0	"	290
Birds' Nest Islands, Boorong Island -	1 43 0	109 17 30	"	290
Ginting Island - - - -	1 41 0	109 4 30	"	291
Pyramid Island, centre - - - -	1 29 30	108 59 0	"	291
Tallack Shoal - - - -	1 21 0	109 6 0	M. D. Tallack.	291
Maleden or Maleidong Island - -	1 31 0	109 21 30	Dutch Survey.	291
Panambungun Island, West point -	1 12 0	109 9 30	"	292
Masien Tiega Islands, West Island -	0 54 30	109 12 30	"	292
—				
BANKA STRAIT TO SINGAPORE.				
Tocjoe Island, S.E. point - - - -	1 9 10	105 20 0	Various.	295
Pulo Joe - - - -	1 15 40	105 16 20	"	295
Docan Island, centre - - - -	0 58 0	105 38 30	"	296
Toty Island, centre - - - -	0 54 0	105 45 45	"	296
Taya Island, centre - - - -	0 43 30	104 54 0	"	296
Ilchester Bank, centre - - - -	0 24 30	104 57 0	"	297
Pulo Sinkep, Bockoe or South point -	0 39 50	104 22 0	"	297
Linga Island, Diang or East point -	0 14 20	104 58 0	"	298
Linga, Dyak Town - - - -	0 13 40	104 33 30	"	298
East Domino, centre - - - -	0 6 0	104 58 20	"	300
North.				
Kintar Island, South high bluff - -	0 2 40	104 46 0	"	301
Rodong Island, peak - - - -	0 24 12	104 26 36	Tizard.	301
Frederick Reef, centre - - - -	0 37 0	105 9 0	Stanton.	301
Gin or Great Island, Pulo Terobi -	0 42 40	104 48 0	"	302
Geldria Banks, Boat Rocks - - -	0 49 40	104 56 45	"	302
Pulo Panjang, Passage Rock - - -	1 1 30	104 51 30	"	303
Bintang Island, Brakit point - - -	1 14 30	104 35 0	"	304
ISLANDS BETWEEN BORNEO AND SINGAPORE STRAIT.				
Datu Island, peak - - - -	0 10 0	108 35 50	Reed.	304
Direction Island - - - -	0 14 39	108 1 53	"	305
St. Barbe Island, N.E. hill - - -	0 8 6	107 13 30	"	305
Welstead Shoal - - - -	0 32 0	107 53 0	"	305
St. Esprit Group, S.E. Island - - -	0 30 45	107 8 30	"	306
" S.W. Island - - - -	0 33 15	106 58 15	"	306
" Head Island, S. point - - - -	0 35 44	107 4 41	"	306
" Hill on South end of largest island - - - -	0 37 31	107 0 50	"	306
Green Island, centre - - - -	0 44 43	107 18 52	"	306
Rodger Rock - - - -	0 41 15	107 31 12	"	307
Tambelan Island, highest peak - -	1 1 5	107 32 22	"	307
" North end, Observa- tory Station - - - -	1 0 27	107 24 10	"	308
Europe Shoal, 3-fathom patch - -	1 11 19	107 25 27	"	310
Rocky Islets, northern - - - -	1 11 9	107 13 0	"	310
Gap Rock, summit - - - -	1 12 30	107 34 20	"	310
St. Julian Island, summit - - - -	0 55 40	106 43 30	"	310
Camels Hump Island, summit - - -	1 11 46	106 52 58	"	310
Saddle Island - - - -	1 19 21	107 2 17	"	310
Barren Island - - - -	1 31 50	106 25 35	"	310
Victory Island - - - -	1 34 46	106 18 40	"	311
St. Pierre Rock - - - -	1 51 42	108 38 57	Belcher.	311

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RHIO STRAIT.				
WEST SIDE.				
Missana Island, North point - -	0° 26' 20"	104° 31' 0"	Reed and Tizard.	313
Niamok, South point - - - -	0 20 20	104 33 45	"	313
Rodong Peak - - - - -	0 24 15	104 26 35	"	314
Binan Island, South point - -	0 27 32	104 27 50	"	314
Selanga Islands, largest - - -	0 30 8	104 21 30	"	314
Oedik Island - - - - -	0 32 10	104 18 20	"	314
Pulo Rondo or Dumbo - - - -	0 36 10	104 18 30	"	314
East Bank, 10-foot patch - - -	0 40 35	104 21 5	"	315
Little Garras Island, <i>lighthouse</i> -	0 44 30	104 22 18	"	315
Moeboet Island, East point - -	0 49 15	104 18 12	"	316
Sembolang Point, extreme - - -	0 51 30	104 16 12	"	316
Little Tiemara Island, N.E. end -	0 56 45	104 12 25	"	317
Sau Island, <i>lighthouse</i> on East point -	1 3 6	104 11 5	"	317
Malang Orang Shoal, centre - -	1 8 30	104 9 40	"	318
Pan Reef Beacon, North end - -	1 9 45	104 11 25	"	318
Little Pan Reef, centre - - - -	1 11 12	104 9 18	"	318
EAST SIDE.				
Talang Island, West point - - -	0 43 30	104 36 0	"	319
Siolon or Mantang Island, S.W. hill -	0 44 45	104 31 0	"	319
Rotterdam Reef - - - - -	0 45 25	104 25 25	"	320
Pankel Island, South summit - - -	0 49 30	104 21 40	"	321
Dumpa Island, West point - - -	0 52 40	104 25 0	"	321
Rhio, Fort Crown Prince - - - -	0 56 36	104 26 35	"	322
Terkolei Island, <i>lighthouse</i> - - -	0 57 10	104 20 25	"	322
Isabella Shoal, West end - - - -	0 57 30	104 15 15	"	323
Little Loban Island, West point - -	0 58 55	104 13 35	"	323
Bintang Island, West point - - -	1 4 5	104 13 0	"	324
„ Subong Point, Andying Id. - -	1 10 55	104 18 36	"	325
VARELLA & DURIAN STRAITS.				
	South.			
Tanjong Jaboeng, or Cape Bon, extreme	0 58 0	104 22 10	Van Carnbee,	334
Varella or Brahalla I., summit - -	0 48 10	104 24 0	Stanton, &c.	335
Pollux Rock - - - - -	0 43 10	104 29 0	"	335
Sinkep Island, Boekoe or South point -	0 38 0	104 22 0	"	336
Speke Rock - - - - -	0 33 30	104 6 0	"	336
Atkin Rock - - - - -	0 30 0	104 3 0	"	336
Alang Tiga Group, South Island - -	0 29 50	104 2 0	"	337
Basso or Bakauw Point, extreme - -	0 19 0	103 45 10	"	337
	North.			
Baroe or Dato Point, extreme - - -	0 0 45	103 47 10	"	337
	South.			
Poneobo Island, West end - - - -	0 17 0	104 23 10	"	338
	North.			
Leda Rock - - - - -	0 12 0	104 9 0	"	339
Irene Rock, <i>doubtful</i> - - - - -	0 24 5	104 8 30	"	339
Allor Island - - - - -	0 27 50	104 18 10	"	339
Great Abang, North end - - - -	0 36 20	104 12 0	"	341
Potong Island, South end - - - -	0 36 10	104 5 0	"	342
South Brother, centre - - - - -	0 33 30	103 45 40	"	342
False Durian, East point - - - -	0 37 20	103 41 50	"	343
Little Durian, South point - - - -	0 43 25	103 39 50	"	344

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Dolphin Island, summit - -	0° 50' 0"	103° 38' 40"	"	345
Sabon Island, Deepwater Point - -	0° 47' 0"	103° 32' 20"	"	346
Little Carimon Island, N.E. point - -	1° 10' 0"	103° 23' 0"	"	347
Pulo Duncan, centre - -	0° 58' 0"	103° 43' 0"	"	349
Tree Island, centre; beacon proposed - -	1° 8' 40"	103° 40' 0"	"	349

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Tanjong Bolus or Baru, extreme - -	1° 16' 10"	103° 30' 0"	Thompson and others.	358
Carimon Islands, North Brother - -	1° 11' 50"	103° 20' 45"	"	358
" Little Carimon, N.E. point - -	1° 10' 0"	103° 23' 0"	"	358
Coney Island, <i>Raffles lighthouse</i> - -	1° 9' 50"	103° 44' 50"	"	361
SINGAPORE, Fort Fullerton - -	1° 17' 20"	103° 51' 18"	"	366
Bintang Great Hill - -	1° 4' 20"	104° 27' 20"	"	392
Barbukit Hill, summit 645 feet - -	1° 24' 20"	104° 12' 20"	"	355
Pedra Branca, Horsburgh lighthouse - -	1° 20' 0"	104° 24' 30"	"	388

THE GULF OF SIAM.

MALAY PENINSULA, EAST COAST.

Pulo Eu - - - - -	2° 7' 0"	104° 17' 0"	Thompson.	401
Pulo Tingy, summit - - - - -	2° 18' 0"	104° 9' 0"	"	401
Pulo Aor, South peak 1805 feet - -	2° 26' 30"	104° 34' 15"	"	403
Pulo Pemangil, South peak - - - -	2° 34' 30"	104° 22' 0"	"	404
Pulo Varela - - - - -	3° 18' 0"	103° 38' 0"	Various.	405
Howard Shoal - - - - -	4° 17' 0"	103° 38' 30"	"	406
Pulo Brala - - - - -	4° 49' 0"	103° 38' 0"	"	406
Pulo Kapas, S.W. point - - - - -	5° 13' 1"	103° 16' 4"	Richards.	406
Kalantan, entrance of small river East of Kalantan River - - - - -	6° 11' 53"	102° 20' 47"	"	407
Great Redang Island, Bukit Mara - -	5° 44' 21"	103° 1' 39"	"	407
" peak - - - - -	5° 48' 16"	103° 0' 48"	"	407
Turtle-back Island, South side - - -	5° 49' 40"	102° 37' 9"	"	408
Baltu Rackil Rock, centre - - - - -	6° 40' 36"	101° 43' 56"	"	409
Cape Patani, N.E. point - - - - -	6° 58' 1"	101° 18' 39"	"	410
Singora, S.W. point of Pulo Ticos - -	7° 13' 54"	100° 36' 12"	"	410
Koh Kraih, S.E. point - - - - -	8° 24' 47"	100° 45' 27"	"	410
Pulo Obi, Square rock on S.W. point -	8° 25' 37"	104° 48' 49"	"	412
Pulo Panjang, N.W. corner of S.W. bay	9° 18' 14"	103° 29' 14"	"	413
Pulo Way, South extreme of sandy bay, near middle of N.E. side of W. island	9° 55' 11"	102° 53' 29"	"	413
Koh Tang or Koh Prins, South rock of group - - - - -	10° 21' 20"	102° 56' 34"	"	413
Tanqualah, North point of middle island of group - - - - -	10° 15' 24"	103° 8' 49"	"	414
Condor Reef - - - - -	10° 43' 0"	102° 51' 0"	Lieut. Veron.	414
False Pulo Obi, West side - - - - -	8° 56' 43"	104° 31' 33"	Richards.	415
Teeksou Island, N.W. side - - - - -	9° 57' 12"	104° 49' 10"	"	416
Pulo Dama, Rocky Island on E. Side -	9° 41' 54"	104° 21' 29"	"	416
Water Island (Tianmoi) W. point - -	10° 24' 44"	103° 47' 4"	"	417
Rocky Island, Kamput, centre - - -	10° 27' 58"	104° 11' 55"	"	418
Kusrovie Rock, centre - - - - -	11° 6' 25"	102° 47' 49"	"	419

	Lat. North.	Long East.	Authorities.	Page
Ellen Bangka Shoal - - -	11 11 0	102 47 0	<i>Ellen Bangka,</i> 1870.	420
Koh Kong, South point of river entrance - - -	11 33 0	102 57 14	Richards.	420
Koh Chang, small island on W. side - - -	12 1 20	102 15 49	"	421
Chentabun River, entrance, Kho Chula, or Bar Island - - -	12 27 43	102 4 19	"	421
Koh Samit, Brown rock, off Lem Ya - - -	12 30 32	101 26 39	"	422
Koh Luem, peak - - -	12 57 30	100 38 59	"	423
Cape Liant, N.W. rock of Koh Mesan - - -	12 35 8	100 56 52	"	423
Koh Si-chang, S.W. point of Koh Kam - - -	13 9 56	100 49 22	"	423
Bangkok River, pile lighthouse - - -	13 29 26	100 35 20	"	425
BANGKOK, Old British factory - - -	13 44 20	100 28 42	"	425
Maconchisi - - -	13 39 0	100 11 0	"	427
COAST OF COCHIN CHINA, TONG KING, ETC.				
Cape St. James, lighthouse - - -	10 19 14	107 5 25	Reed.	433
Sigon, Observatory - - -	10 46 39	106 42 31	"	437
Kega Point - - -	10 42 0	107 59 40	French charts.	444
Cape Padaran - - -	11 21 0	108 58 0	"	446
Cape Varela - - -	12 55 0	109 24 30	"	450
Cape San-ho - - -	13 44 0	109 14 0	"	453
Pulo Canton - - -	15 24 0	109 6 0	"	454
Cape Touron - - -	16 8 0	108 21 0	"	455
Touron Bay, Observatory island - - -	16 7 0	108 17 0	"	455
Cape Choumay, extreme - - -	16 21 0	108 3 0	"	455
River Hué, extreme - - -	16 35 30	107 42 0	"	455
GULF OF TONG KING.				
Cape Lay - - -	17 6 0	107 7 30	British & French	456
Tseu or Goat Island - - -	18 8 0	106 17 10	partial surveys	457
Matt Island - - -	18 54 30	105 56 0	to 1877.	458
Lacht Kouenn - - -	19 4 30	105 43 9	"	458
Mè Island, centre - - -	19 21 0	105 55 30	"	459
Né Island - - -	19 52 0	106 0 0	"	459
Lacht Huen River, Houdau Island lighthouse - - -	20 37 30	106 49 30	"	462
Haiphong - - -	20 49 0	106 40 0	"	462
Gowtow Island, South point - - -	107 44 30	20 56 0	"	465
Cape Pakhlung - - -	21 31 0	108 17 0	"	467
Pakhoi - - -	21 28 57	109 6 40	"	468
Cape Cami - - -	20 13 0	109 55 0	"	470
HAINAN ISLAND,				
Hainan Head - - -	20 12 0	110 44 30	"	472
Hoi How town, N.W. end - - -	20 4 30	110 19 0	"	473
Pyramid Point - - -	18 55 0	108 21 30	"	477
Cape Bastion - - -	18 9 30	109 33 0	"	478
Tinhosa Island, South end - - -	18 39 30	110 42 0	"	480

TABLE OF GEOGRAPHICAL POSITIONS.

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N.W. COAST OF BORNEO.				
Tanjong Api - - - -	1 56 36	109 20 24	Belcher.	480
Tanjong Datu - - - -	2 5 15	109 39 13	Reed.	480
Sarawak River, Santubong entrance, Kra Island - - - -	1 42 0	110 18 0	Belcher.	480
Cape Sipang - - - -	1 48 2	110 20 0	"	489
Po Point Light - - - -	1 43 10	110 31 30	"	481
Tanjong Barram - - - -	2 36 15	113 58 35	Reed.	488
Gunung Malu, summit - - - -	4 5 20	114 55 8	Belcher.	489
Bruni Bluff, extreme - - - -	5 3 0	115 3 20	Gordon.	490
Bruni River, palace - - - -	4 52 40	114 55 20	"	490
Labuan Group, Victoria Harbour, Ram- sey point flagstaff - - - -	5 16 33	115 15 15	Mean of Belcher, Richards, & Reed.	496
Mangalum Island, S.W. point - - - -	6 10 40	116 35 20	Gordon.	505
North Furious Shoals, 11 fathoms - - - -	7 3 19	116 18 15	Reed.	510
South Furious Shoals, 7 fathoms - - - -	6 48 30	116 14 45	"	510
Batomandé Rocks - - - -	6 52 42	116 36 24	Belcher.	511

BALABAC STRAIT.				
Balambangan Island, South point - - - -	7 12 20	116 51 40	Reed, 1868-9.	513
" Tiga Islet, centre - - - -	7 21 12	117 2 50	"	514
Banguay Peak, 1876 feet - - - -	7 18 10	117 5 20	"	515
Lit. Molleangan Island, centre - - - -	7 5 25	117 1 30	"	516
Mallawallé, South extreme - - - -	7 1 45	117 18 10	"	518
Balabac Island, South point - - - -	7 48 40	117 1 0	"	518
Calandorang Bay Lt. on S. pt. of entr. - - - -	7 59 0	117 4 20	"	516
S. Mangsee Island, centre - - - -	7 31 5	117 18 20	"	531
Lumbucan, N.W. extreme - - - -	7 50 20	117 12 50	"	534
Nasubatta Island - - - -	8 1 45	117 9 50	"	535
Secam Island, East end - - - -	8 10 40	117 1 35	"	536
PALAWAN ISLAND—WEST COAST.				
Cape Bulilyan, S. extreme of Palawan - - - -	8 20 25	117 9 41	Bate.	539
Capyas Island - - - -	8 26 25	117 10 16	"	540
Cancepaan River, entrance - - - -	8 34 40	117 14 41	"	540
Bulanhow Mountain, highest part - - - -	8 36 25	117 21 11	"	540
Cape Secacle - - - -	8 36 30	117 14 1	"	541
Pagoda Cliff, highest part - - - -	8 43 45	117 29 6	"	541
Balansungain Islands, West island - - - -	8 45 35	117 21 21	"	541
Mantaleengahan Mountain, highest part - - - -	8 49 22	117 39 26	"	542
Illaan Hill - - - -	8 55 10	117 31 41	"	542
Pampangduyang Point - - - -	8 57 40	117 31 56	"	542
Gantung Peak, highest part - - - -	8 57 53	117 47 56	"	542
Eran Quoin, highest part - - - -	9 3 25	117 38 56	"	542
Bivouac Islet, North extreme - - - -	9 4 52	117 42 28	"	543
Pu-lute Peak, highest part - - - -	9 8 8	117 56 11	"	543
Malapakkun Island, highest part - - - -	9 14 50	117 50 11	"	543
Tay-bay-u Bay, entr. of Malanut R. - - - -	9 14 50	117 59 46	"	544
Victoria Peak, 5,680 ft., highest part - - - -	9 22 30	118 17 26	"	545
Palm Islet, highest part - - - -	9 22 40	118 1 48	"	545
Long Point, West extreme - - - -	9 38 8	118 19 6	"	546
Anipahan, huts - - - -	9 43 50	118 27 11	"	547

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Thumb Peak, highest part of range -	9 47 45	118 35 26	Bate.	547
Hen and Chickens, largest islet -	9 58 23	118 36 16	"	547
Ulugan Bay, Observatory Head -	10 6 11	118 46 26	"	547
Cleopatra Needle, highest part of range -	10 7 38	118 59 16	"	551
Mount Peel, highest part -	10 0 10	118 32 26	"	551
Cape Sangbown -	10 11 45	118 47 56	"	551
Jib-boom Bay, Zoe islet -	10 20 20	118 57 11	"	551
May-day Bay, watering place -	10 24 22	119 1 56	"	551
Port Barton, Bubon point -	10 29 19	119 5 37	"	553
Pagdanan Point -	10 33 0	119 13 21	"	553
Bold Head, highest point -	10 35 10	119 6 56	"	552
Wedge Island -	10 43 35	119 11 44	"	554
Mount Capoas, highest part -	10 48 10	119 16 56	"	554
Cape Capoas, extreme -	10 51 38	119 12 6	"	554
Malampaya Sound entrance, Round Islet	10 59 25	119 14 16	"	555
Pirate Bay, Look-out Hill, highest part	10 56 10	119 16 26	"	557
Pancol Village, Stockade -	10 52 9	119 22 56	"	560
Baulao Village -	10 46 15	119 26 4	"	560
Bacuit Bay, Old Village -	11 2 30	119 24 56	"	563
Bacuit Village, or Talan-dac, Stockade -	11 11 0	119 22 56	"	563
The Horn, Matinloc, highest part -	11 11 0	119 16 41	"	562
Tapiutan Island -	11 12 50	119 15 18	"	562
Cadlao, or Table Top Id. -	11 13 5	119 21 1	"	564
High Table Range -	11 14 45	119 27 50	"	566
North extreme of Palawan, highest part of Cabuli Island -	11 26 25	119 29 46	"	567
PALAWAN—EAST COAST.				
Ursula Island, West end -	8 20 42	117 29 56	"	568
Rocky Bay, Pirate Inlet -	8 33 0	117 32 31	"	568
Tac-bo-lu-bu, entrance of rivulet -	8 43 21	117 44 26	"	569
Point Sir James Brook -	8 46 0	117 48 46	"	569
Nose Point -	8 53 0	117 59 11	"	569
East Island, N.W. extreme -	8 53 45	118 13 56	"	570
Ma-la-nut Mound -	9 9 15	118 2 41	"	570
Casuarina Point -	9 15 0	118 24 16	"	571
30th of June Island, highest part -	9 22 30	118 33 56	"	572
Port Royalist, Fresh Water Rivulet entrance -	9 34 30	118 40 6	"	573
" Tide-pole Point -	9 43 43	118 43 3	"	573
Deep Bay, Anchorage Island, N.E. end -	9 56 30	118 55 19	"	575
Bold Point -	10 1 45	119 8 56	"	575
Green Island Bay, Relief Point -	9 9 45	118 12 1	"	577
Barbacan Village, Stockade -	10 21 45	119 23 1	"	577
Mount Baring, 2,100 feet -	10 24 55	119 32 56	"	577
Illan Village -	10 25 12	119 34 31	"	578
Dumaran Island, East extr. Pirate Hd. -	10 34 40	120 0 11	"	579
" Village, fort -	10 32 0	119 45 51	"	579
Carlandagan Island, highest part -	10 40 0	120 14 56	"	580
Barren Island, Watering Bay -	10 42 0	119 41 36	"	580
Tai-Tai Village, fort -	10 50 0	119 30 56	"	581
Silanga Village, Stockade -	11 1 45	119 33 46	"	582
Broken Island, highest part -	11 7 25	119 44 41	"	584
Santa Monica Village, Stockade -	11 18 0	119 33 41	"	584
East peak, highest part -	11 17 40	119 31 31	"	584

	Lat. North.	Long. East.	Authorities.	Page
N.W. COASTS OF PHILIPPINE ISLANDS, ETC.				
Observatory Island, West side - -	11 30 15	119 39 33	Spanish Surveys	586
Green Island - - - -	12 3 0	119 47 0	to 1871.	587
Haycock Island - - - -	12 10 0	119 48 0	"	587
Calavite Island - - - -	12 21 30	119 53 30	"	587
N.W. Rock - - - -	12 24 15	119 52 0	"	588
North Rock - - - -	12 28 0	120 1 30	"	588
Hunter Shoal - - - -	12 40 0	120 13 10	"	588
Merope Shoal - - - -	12 43 30	120 17 0	"	588
Mangarim Bay, Sandy Tongue - -	12 20 0	121 2 8	Belcher.	589
Garza Bay, Garza Island - -	12 12 26	121 10 50	"	589
Appo Island - - - -	12 39 10	120 26 10	Various.	590
Menor Island - - - -	12 40 0	120 28 0	"	590
Paluan Bay, beach - - - -	13 23 30	120 29 18	Bate.	591
Cape Calavite - - - -	13 26 0	120 18 0	Various.	592
Looc Bay, Lubang Island - -	13 43 48	120 16 0	Belcher.	592
Fortun Island - - - -	14 2 45	120 28 34	"	594
Cabra Island, S.E. extreme - -	13 52 30	120 2 30	"	593
Pulo Caballo lighthouse - -	14 22 30	120 36 0	"	596
Cavite Port, Naval head quarters	14 23 55	120 54 54	Villaviciencio.	598
MANILA, N. pier lighthouse - -	14 36 24	120 57 20	Various.	598
" Cathedral - - - -	14 36 3	120 58 8	"	598
Capones Point - - - -	14 54 0	120 3 0	"	601
Port Sual - - - -	16 7 20	120 2 44	H.M.S. <i>Magicienne</i>	603
Dile Point - - - -	17 34 30	120 20 30	Various.	604
Cape Bojeador - - - -	18 30 0	120 34 0	"	605
Scarborough Shoal, S.W. extreme -	15 6 44	117 44 3	Wilds&Stanley.	606
Pratas Island, N.E. end - -	20 42 30	116 43 22	Richards.	606
" Reef, N.E. point - -	20 47 0	116 53 0	"	606
THE CHINA SEA, WITH ITS ISLANDS AND DANGERS.				
ANAMBA ISLANDS.				
White Rock - - - -	2 20 0	105 34 0	Various.	610
Repon Island - - - -	2 25 0	105 52 0	"	611
Domar Island - - - -	2 45 0	105 25 0	"	611
Guerite high rock - - - -	3 29 0	106 12 20	"	612
NATUNA ISLANDS.				
Marundum Island - - - -	2 4 0	109 7 20	"	614
South Haycock Island - - - -	2 17 0	108 55 15	"	614
Serai or West Island - - - -	2 40 0	108 35 0	"	616
Low Island - - - -	3 0 0	107 48 0	"	616
Jackson Reef - - - -	2 56 0	107 55 0	"	616
North Haycock Island - - - -	3 17 0	107 34 30	"	618
Seluan Island - - - -	4 9 0	107 50 0	"	619
Pyramidal Rocks - - - -	4 3 0	107 21 45	"	619
Success Reef - - - -	4 22 0	107 55 0	"	620
Semione or Saddle Island - -	4 31 0	107 42 30	"	620

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EASTERN SIDE OF MAIN ROUTE.				
Vanguard Bank, S.W. extreme -	7 16 30	109 26 0	Ward.	621
Grainger Bank, centre -	7 47 45	110 29 0	"	621
Prince Consort Bank, S.W. extreme -	7 46 0	109 55 0	"	621
Prince of Wales Bank, centre -	8 8 30	110 32 30	"	621
Alexandra Bank, 3-fathoms patch -	8 1 30	110 36 45	"	621
Rifleman Bank, 11-feet patch, N.E. end -	7 55 20	111 42 0	"	622
Ladd Reef, East extreme -	8 40 15	111 41 0	"	622
Spratly Island, centre -	8 38 0	111 54 30	"	622
West London Reef, Sandy cay -	8 52 0	112 14 45	"	624
Central London Reef, centre -	8 55 30	112 20 0	"	624
East London Reef, East end -	8 49 38	112 37 26	"	624
Cuarteron Reef, East extreme -	8 50 54	112 49 34	"	624
Fiery Cross or N.W. Investigator Reef, S.W. end -	9 32 0	112 53 0	Reed.	625
Discovery Great Reef, South end -	10 0 42	113 51 30	"	625
" Small Reef -	10 1 30	114 1 30	"	625
Western or Flora Temple Reef, centre -	10 15 0	113 37 0	"	626
Tizard Bank, Outer edge of West Reef -	10 13 20	114 13 7	"	626
Itu Aba Island -	10 22 25	114 21 45	"	626
" Eldad Reef, N. extreme -	10 23 0	114 42 0	"	627
" S.W. extreme, Gaven Reefs -	10 13 20	114 13 7	"	627
Loai-ta or South Island, N.W. extreme -	10 40 45	114 24 54	"	628
Soubie Reef, S.W. end -	10 53 30	114 4 0	"	628
Thi-tu Island, tree on S.W. end -	11 3 9	114 16 25	"	628
Trident Shoal, centre of patch at North extreme -	11 31 30	114 39 15	"	629
Lys Shoal, 17-feet patch -	11 19 40	114 34 24	"	630
North Danger Reef, tree on N.E. cay -	11 28 0	114 20 45	Ward.	630
MAIN ROUTE.				
Charlotte Bank, 8 fathoms -	7 7 15	107 37 15	Reed.	631
Scawfell Shoal -	7 19 0	106 51 0	Thompson.	631
Banda Shoal -	8 0 0	107 0 0	<i>Banda</i> , 1871.	631
Large Island of Pulo Condore Group, Landing-place in Great Bay -	8 40 57	106 36 11	Wilds & Reed.	632
Brothers Islands, West Island -	8 34 0	106 11 0	Various.	429
Royal Bishop Bank, 10 fathoms -	9 40 0	108 14 0	Reed.	634
Raglan Bank -	9 24 0	109 26 0	<i>Jackmel</i> , 1875.	634
Pulo Sapatu, summit -	9 58 23	109 5 57	Reed.	635
Julia Shoal -	9 56 30	109 9 20	"	635
Great Catwick Island -	10 2 56	108 55 7	"	638
Little Catwick Island, summit -	9 59 30	109 3 57	"	637
Yusun Shoal -	10 16 0	109 2 15	"	638
Pulo Ceieer de Mer, S.W. hill -	10 32 36	108 56 30	"	638
Holland Bank, centre patch -	10 39 0	108 43 0	"	640
Paracel Islands and Reefs—				
Triton Island -	15 46 0	111 11 0	Ross.	641
Bombay Shoal, S.W. extreme -	15 59 0	112 26 0	"	642
Pyramid Rock -	16 34 0	112 36 0	"	643
Lincoln Island, S.E. point -	16 39 34	112 44 23	Ward.	643
Passoo Keah Island -	16 6 0	111 46 0	Ross.	643
Discovery Shoal, West extreme -	16 11 40	111 33 0	"	643
Vuliddore Shoal, centre -	16 18 0	112 2 0	"	643
Observation Bank -	16 36 0	111 40 30	"	644
Amphitrite Islands, E. extreme of reef -	16 54 0	112 22 0	"	645
Woody Island -	16 50 30	112 19 0	"	645
Rocky Island -	16 52 0	112 19 30	"	645
North Shoal, East extreme -	17 6 30	111 32 30	"	645

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St. Esprit Shoal, centre - -	19 33 0	133 2 0	Reed.	647
Helen Shoal, centre - -	19 12 0	113 53 39	"	648
SHOALS IN PALAWAN PASSAGE.				
South Luconia Shoals, Luconia Breakers	5 3 24	112 41 36	"	649
North " Seahorse Breakers	5 31 0	112 34 0	"	650
" " N. part of Friend- ship Shoal - - -	5 59 30	112 31 30	"	651
Louisa Shoal, S.W. rock - -	6 19 45	113 18 30	Bate.	651
Vernon Bank, centre of Fury Rocks -	5 43 30	115 2 15	Reed.	651
" " 2 $\frac{3}{4}$ -fathoms patch - -	5 49 20	115 5 50	"	651
Samarang Bank, centre - -	5 35 15	114 53 45	"	652
Saracen Bank, centre - -	6 7 30	115 20 30	Richards.	652
Royal Charlotte Shoal - -	6 57 0	113 35 15	Horsburgh.	652
Viper Shoal, <i>doubtful</i> - -	7 30 0	115 0 0	Various,	653
North Viper Shoal, South end -	7 59 0	115 23 0	"	653
Commodore Reef, centre - -	8 20 30	115 25 0	"	654
ON THE WESTERN SIDE.				
Half-Moon Shoal, Inclined rock on East side - - -	8 51 45	116 16 45	Bate.	654
Royal Captain Shoal, Observation Rock, at North extreme - -	9 1 45	116 39 36	"	655
Bombay Shoal, Madagascar Rock, on N.E. extreme - - -	9 26 7	116 56 4	"	655
Carnatic Shoal, centre - -	10 6 0	117 21 0	Horsburgh.	656
ON THE EASTERN SIDE.				
Herefordshire Shoal, centre - -	8 35 0	116 59 19	"	655
Scaleby Castle Shoal, centre - -	9 5 0	117 17 11	Bate.	656
York Breakers, centre - -	9 53 30	118 8 26	"	659
Crescent Reef, centre - -	10 40 0	118 42 26	"	660
SHOALS WEST OF PALAWAN ROUTE.				
Owen Shoal - - -	8 8 0	111 59 0	Various.	662
Amboyna Cay - - -	7 51 45	112 55 0	Ward.	662
Lizzie Webber Shoal - - -	8 4 0	113 12 0	Chart.	663
Stags Shoal, <i>doubtful</i> - - -	8 24 0	112 57 0	Horsburgh.	663
Pearson Reef - - -	8 56 0	113 44 0	Pearson.	663
Swallow Reef, eastern high rock -	7 23 0	113 50 23	Reed.	664
Dallas Breakers - - -	7 38 0	113 54 0	Dallas.	664
Ardasier, South Breakers - - -	7 34 0	114 9 0	Various.	664
Gloucester Breakers - - -	7 50 0	114 15 0	Doubtful.	664
Ardasier Breakers - - -	7 56 0	114 2 0	"	664
Investigator Shoal, West point -	8 5 0	114 31 0	Crawford.	665
Cay Marino (?) - - -	8 30 0	114 21 0	(?)	665
Amy Douglas Shoal - - -	10 52 0	116 25 0	Pensberry.	667
Fairy Queen Shoal - - -	10 39 0	117 38 0	Chart.	667
Coral Bank, 12 fathoms - - -	11 26 0	116 53 0	Reed.	667
Routh Shoal, North extreme - -	10 50 0	117 46 0	"	667
Seahorse, North extreme - - -	10 50 0	117 46 0	Reed.	667
Sandy Shoal - - -	11 2 0	117 37 0	Chart.	667
Templer Bank, centre - - -	11 7 0	117 13 0	Templer.	667

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JAVA AND THE JAVA SEA.				
JAVA, NORTH COAST.				
St. Nicholas Point, extreme - -	5 52 33	106 2 10	Staring.	165
Pulo Panjang, N.W. Point - -	5 55 30	106 7 32	"	672
Pontang Point, North extreme - -	5 56 50	106 16 0	"	674
Pulo Babi, centre - -	5 48 45	106 16 0	"	672
Bantam, flagstaff of fort - -	6 1 39	106 8 48	"	673
Menschen-eter Id., Lighthouse proposed - -	5 57 42	106 30 25	Escher, &c.	674
Ontong Java, extreme of point - -	6 3 2	106 40 20	"	679
Onrust Island, flagstaff - -	6 2 20	106 43 40	"	679
Great Kombuys, bright lt. on N.W. pt. - -	5 55 30	106 34 30	"	681
BATAVIA, Observatory and <i>Timeball</i> - -	6 8 0	106 48 7	Melville v. Carnbee	684
Krawang Point, extreme - -	5 57 0	107 1 7	Escher, &c.	688
Pamanoekan Point, extreme - -	6 12 0	107 45 30	Chart.	689
Indramayoe Point, North extreme - -	6 12 30	108 17 37	Staring.	690
Rackit or Boompjes Island, lighthouse - -	5 54 0	108 20 0	Chart.	690
Cape Tanna - -	6 30 0	108 31 30	Various.	691
Cheribon, lighthouse - -	6 45 30	108 34 30	"	691
Cheribon Peak, summit 10,323 ft. - -	5 54 0	108 24 30	"	691
Tegal Peak, summit 11,300 ft. - -	7 13 30	109 13 3	Staring, &c.	691
Tegal, flagstaff of fort - -	6 54 0	109 8 7	"	691
Pekalongan, lighthouse West of entrance - -	6 54 30	109 39 0	"	692
Samarang, flagstaff - -	6 57 20	110 24 37	"	693
Iapara Road, anchorage - -	6 32 30	110 37 30	"	694
Karimon Java Island, settlement on - -				
Great Karimon - -	5 53 30	110 28 0	"	694
Rembang, flagstaff - -	6 40 30	111 29 0	"	696
Panka Point, flagstaff - -	6 54 0	112 33 0	"	696
Soerabaya Strait, Lightvessel at N. end - -	6 57 0	112 40 0	Chart.	697
Kresik, light on pier-head - -	7 9 30	112 39 15	"	701
Soerabaya Strait, Fort Erfprins - -	7 0 10	112 36 9	Jansen.	696
Soerabaya, Marine Establishment, <i>timeball</i> - -	7 15 20	112 43 30	"	703
Madura Island, Wodon or N.W. point - -	6 55 40	112 48 39	"	704
" East point - -	6 59 0	114 7 33	Fokke.	705
Bawean or Lubeck Island, Alang Alang, or S.W. point - -	5 54 0	112 39 10	"	704
Milton Rock - -	5 44 0	112 33 0	S.S. <i>Milton</i> , 1875	705
Hastings Rock - -	6 7 0	112 32 0	Chart.	705
Nahmen's or Osterling Rock - -	5 33 0	112 28 0	<i>Osterling</i> .	705
Arrogant Reef - -	5 12 0	112 55 0	H.M.S. <i>Arrogant</i>	705
Giliang or Pondi Island, East point - -	6 59 0	114 10 48	Fokke.	705
Sapoedie Island, West point - -	7 5 20	114 17 30	"	706
Gili Lawak, or Turtle Island, centre - -	7 12 20	114 3 0	"	706
Sumanap, flagstaff - -	7 2 30	113 55 0	"	707
Kangeang Island, Katapan or N.W. pt. - -	6 50 30	115 12 0	Lockemeijer.	708
Kamirian or Urk Island, centre - -	7 4 15	115 11 0	Fokke.	709
Karang Takat Bank, N.W. dry Bank - -	7 0 0	114 57 0	Gregory.	709
Kambang or Bukken Island, centre - -	7 19 36	113 12 40	Fokke.	713
Koko Reef, Lighthouse - -	7 28 0	113 7 30	Chart.	713
Katapang or Krabben Island, centre - -	7 41 0	113 16 10	Fokke.	715
Probingo, flagstaff - -	7 43 30	113 12 36	Chart.	715
Mount Lamongan or Belierang, 6,824 ft. - -	8 0 30	113 20 0	Junghun.	715
Bezoekie, flagstaff - -	7 43 45	113 38 0	Fokke.	715
Mount Ringit - -	7 44 20	113 51 0	"	715
Panarukan, flagstaff - -	7 43 30	113 53 32	"	716
Cape Tjina, North extreme - -	7 38 0	114 1 30	"	716
Cape Sedano, N.E. Point of Java - -	7 49 0	114 26 53	Rietveld.	717
Meinders Droogte, Lighthouse - -	7 41 30	114 22 30	Chart.	718

TABLE OF GEOGRAPHICAL POSITIONS.

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	Lat. South.	Long. East.	Authorities.	Page
JAVA, SOUTH COAST.				
South Point, extreme - -	8 47 0	114 25 13	Escher.	719
Barung Island, Labuan or South point -	8 32 0	113 15 0	"	719
Dampar Bay, South point - -	8 18 0	113 11 0	"	720
Sempoe Island, West point - -	8 28 30	112 39 0	"	720
Boemboen Bay, Pakis Point - -	8 18 0	111 53 30	"	721
Gemah Bay, Popoh village - -	8 15 4c	111 48 0	"	721
Scembreng Bay, Sroyoe Island - -	8 20 0	111 34 0	"	721
Pangoel Bay, Government storehouse -	8 15 0	111 31 0	Rietveld.	722
Patjitan Bay, centre - -	8 15 0	111 3 0	"	722
Wedie Hombo Bay, South Point - -	8 12 0	119 39 0	"	723
Baglen or Meganties Point, centre head	7 45 40	109 24 0	Perez.	723
Kambangan Island, Karang Bollong or East point, Lighthouse - -	7 44 40	109 1 35	Chart.	724
Tjilatjap, Bollong Rock - -	7 44 40	109 1 35	Rietveld.	724
Kambangan Island, Bessek or S.W. pt. -	7 41 45	108 49 0	"	728
Penaniong Bay, Cape Mandararie - -	7 46 50	108 33 0	"	730
Boemie Point, Islet off - -	7 47 30	108 17 0	"	731
Cape Anjol, extreme - -	7 25 0	106 24 30	"	731
Wynkoops Bay, storehouses - -	6 59 30	106 35 0	"	731
Zand Bay, Mandra Island, N.W. point	7 11 7	106 5 0	"	733
Cape Sangian Sira, S.W. extreme - -	6 51 55	105 13 15	"	735
JAVA SEA, ETC.				
Thousand Ids., Peblakan or West Island	5 28 45	106 23 0	Dijsunk.	736
" " Doea or North Island - -	5 24 30	106 28 0	"	736
Arnemuiden Rock - -	5 12 30	106 42 0	Charts.	736
Molenwerf Shoal (?) - -	5 13 0	106 50 0	"	736
Etna Shoal - -	5 17 18	106 55 0	Groll.	736
Brouwers Shoal - -	5 17 30	107 0 20	Dutch Charts.	736
South Watcher, centre - -	5 42 47	106 42 17	Dijsunk.	736
Nassau Bank, centre - -	5 49 0	106 49 0	Groll.	737
Maria Elise Shoal, 7 fathoms - -	5 50 15	107 35 30	Schut.	737
Solombo Islands, Great Solombo, hill on South end - -	5 35 0	114 27 0	Chart, 1878.	738
" " Little Solombo, centre - -	5 28 0	114 28 0	"	738
" " Arentes Island, centre - -	5 1 0	114 36 30	"	738
Rosalie Rock - -	5 57 0	114 14 0	"	739
BORNEO, SOUTH COAST.				
Tanjong Sambar, S.E. point - -	2 57 0	110 15 0	"	739
Dieley River, East entrance point - -	2 53 30	110 44 0	"	739
Point Malataiyo - -	3 30 0	113 30 0	"	740
Cape Salatan, South point of Borneo -	4 10 0	114 41 0	"	740
Little Pulo Lant Ids., S.W. Id., centre -	4 51 30	115 43 30	"	741
Moesa Siri, highest islet - -	4 23 0	115 50 0	"	741
EASTERN PASSAGES, ETC.				
BALI ISLAND.				
Bali Peak, 11,326 ft. - -	8 21 0	115 28 0	Rietveld, &c., to	742
Cape Passier, N.W. point - -	8 6 10	114 26 0	1878.	743
Minjangan Island, East point - -	8 6 50	114 32 30	"	744
Mount Goendel - -	8 11 0	114 47 0	"	744
Tebonkos, Road - -	8 10 0	114 58 0	"	744
Beliling, entrance of river - -	8 6 30	115 4 45	"	745

	Lat. South.	Long. East.	Authorities.	Page
Sangsit Road, light - - -	8 4 0	115 7 0	Rietveld, &c.	745
Karang Assem Cape, East point of Bali	8 23 0	115 41 0	"	746
Padang Cove - - -	8 31 20	115 30 0	"	746
Pandita Isles, peak - - -	8 45 0	115 31 0	"	746
Tafelhoek, Boekit or West point - - -	8 48 0	115 3 30	"	747
Bali Badong Bay, Kotta village - - -	8 42 15	115 8 0	"	747
Djembrana, bay - - -	8 23 0	114 34 0	"	747
Manok Bay, entrance - - -	8 10 5	114 26 0	"	748
BALI STRAIT.				
Cape Sedano, N.E. point of Java - - -	7 47 12	114 26 53	"	749
Meinders Droogte and Lighthouse - - -	7 41 30	114 22 30	"	718
Duiven Island, Lighthouse - - -	8 2 30	114 27 0	"	749
Banjoewangie, Fort Utrecht, light - - -	8 12 20	114 23 0	"	751
Mount Ikan, extreme of point - - -	8 27 0	114 23 22	"	752
Cape Slokko, East point of Java - - -	8 42 0	114 36 0	"	753
LOMBOK ISLAND AND STRAIT.				
Rindjanie Peak, 12,379 feet. - - -	8 23 0	116 27 30	Melville v. Carnbee	754
Roembek, or N.W. point, extreme - - -	8 24 30	116 0 30	Smits, &c.	755
Tweelings, or Twins Islands, E. point - - -	8 17 0	116 47 0	"	755
Lombok, village - - -	8 30 0	116 41 30	"	755
Labuan Hadji, Mouth of stream - - -	8 42 0	116 37 40	"	756
Pedioe, Cape Louar, flagstaff - - -	8 47 0	116 31 12	"	756
Cape Ringit, S.E. point - - -	8 54 0	116 37 0	"	756
Cape Bangko, S.W. point - - -	8 44 0	115 51 15	"	757
Labuan Tring, entrance of cove - - -	8 42 0	116 0 0	"	757
Ampanam Bay, anchorage - - -	8 32 0	116 2 30	"	757
Trawangan, Island off N.W. point - - -	8 20 0	116 0 30	"	758
ALLAS STRAIT AND SUMBAWA.				
South-west Point of Table Hill - - -	9 2 0	116 47 0	"	759
Taliwang Bay, Knoop Island - - -	8 49 0	116 50 40	"	760
Madang or Flat Island, West end - - -	8 8 40	119 16 0	"	761
Majo Island, Setonda Island, off N.E. pt.	8 6 30	117 42 30	"	761
Tambora Volcano, summit on East side of crater - - -	8 12 30	117 57 0	"	763
Dompo Bay, East side, Kila Road - - -	8 18 0	118 24 0	"	763
Bima Bay, Kambing Island - - -	8 26 45	118 41 45	"	764
Sangeang, highest peak - - -	8 12 0	119 1 20	"	764
Sapie Bay, Doembia Point - - -	8 32 30	119 2 0	"	765
Tempie Bay, entrance - - -	8 52 0	118 26 0	"	765
SAPI STRAIT.				
Banta Island, peak - - -	8 22 30	119 16 0	"	766
Setan Island, peak - - -	8 31 0	119 14 0	"	766
Channey or Schoorsteen Island, W. pt. - - -	8 46 0	119 22 0	"	767
Comodo Island, South point - - -	8 47 0	119 24 0	"	768
" N.W. point - - -	8 26 30	119 20 0	"	768
" N.E. point - - -	8 23 0	119 28 30	"	768
FLORIS OR MANGARAI ISLAND, ETC.				
Badiak Cove - - -	8 27 0	119 48 0	Dutch charts.	769
Bodo Island - - -	8 19 30	119 59 35	"	770
Reo Bay, village - - -	8 15 0	120 32 0	"	770
Potta, roadstead - - -	8 17 0	120 46 15	"	770

TABLE OF GEOGRAPHICAL POSITIONS.

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	Lat. South.	Long. East.	Authorities.	Page
Diederika Reef - - -	8 21 0	121 9 30	Kingdom.	771
Paloweh Island, peak - -	8 19 30	121 42 0	Dutch Charts.	771
Linguett or Sukur Island, peak - -	8 6 0	122 8 0	"	771
Doffer Islands, East islet - -	8 19 25	122 19 30	"	771
Bastaard Islands, centre of East island -	8 23 0	122 30 0	"	771
Larantuka Road - - -	8 20 0	122 59 0	"	771
Floris Head, or Iron Cape, N. extreme -	8 4 45	122 52 0	"	771
Angelica Reef - - -	7 48 39	122 17 0	"	771
Kauna or Post Horse Island - -	7 25 0	122 3 0	"	772
Toea or Kalatoa Island, Cornelia Road -	7 24 0	121 45 0	"	772
Madu or Pondiang Island, East point -	7 27 40	121 43 30	"	772
Kalao Island, West point - -	7 16 0	120 48 0	"	773
Boneratoe Island, South point - -	7 20 15	121 2 20	"	773
Djampea Island, Kambarraghie Bay, E. point - - -	7 5 0	120 57 30	"	773
" East point - - -	7 5 0	120 48 20	"	773
" Bimbe Island, off West point - - -	7 2 30	120 31 30	"	773
Kajoewaddie, peak on West end - -	6 46 0	120 47 30	"	773
Mamaluk Island, centre - - -	6 40 0	120 12 30	"	773
Alligator Bay - - -	8 45 0	119 49 0	"	774
Flores Island, S.W. point (C. Sosa) - -	8 49 0	119 55 0	"	774
Toren or Tower Island, peak - -	8 52 30	120 12 10	"	774
South Point, Mount Rokka - - -	8 54 0	121 0 0	"	775
Romba Volcano, summit - - -	8 50 0	121 12 0	"	775
Ende Bay, West point - - -	8 56 0	121 20 0	"	775
Ambogaga Road - - -	8 52 0	121 39 0	"	775
Api Volcano - - -	8 55 0	121 41 0	"	775
Lofty peak on S. coast - - -	8 48 0	122 4 0	"	775
Lobetobie Volcano, Sugarloaf peak - -	8 32 0	122 46 0	"	775
Sandalwood Island, Mandieli or E. point	10 6 0	120 51 0	"	775
" Cape Atta, extreme - - -	9 35 0	120 30 0	"	776
" Nangamessie Har., entrance - -	9 36 0	120 16 0	"	776
" Palmedo Road - - -	9 21 0	119 45 0	"	776
" Reef or West Point - - -	9 40 0	118 59 0	"	776
" Cape Blackwood, or S. point - -	10 19 0	120 30 0	"	776
Savu Island, Seba Bay on N.W. side - -	10 29 0	121 46 0	"	777
Dana or Hokie Islad, hill - - -	10 49 0	121 16 0	"	777
Floris Strait, Kambing Island - - -	8 40 0	122 51 0	"	777
" Larantaka, Portuguese Settle- ment - - -	8 19 30	122 58 30	"	778
" Serbette Island - - -	8 8 30	123 1 0	"	779
Komba Island, volcanic peak - - -	7 48 0	123 33 0	"	779
Solor Island, Lamarkwera or E point - -	8 26 0	123 8 30	"	779
" Lawang on N. coast - - -	8 27 0	123 3 30	"	779
Adenara Island, Mount Woka, summit -	8 20 30	123 15 0	"	779
Lombata or Lomblen Island, Mount La- mararap - - -	8 33 0	123 22 0	"	780
" Soangie Island, off S.W. pt. - -	8 35 0	123 13 0	"	780
Lobetolle peak - - -	8 11 30	123 43 30	"	781
Pantar Island, South peak of Saddle on South point - - -	8 34 0	124 6 0	"	781
" S.W. point - - -	8 25 0	123 55 0	"	781
" Pandai on N. end - - -	8 11 30	124 12 0	"	781
Pantar Strait, North or Panjang Island -	8 8 0	124 17 30	"	782
" High or Pura Id., peak - - -	8 16 0	124 16 30	"	782
" South or Twerin Island - - -	8 29 0	124 13 30	"	7-2
Ombay Island, Dololo anchorage - - -	8 12 0	124 23 0	"	782
" S.W. point - - -	8 25 0	124 18 0	"	782
" S.E. point, white rock - - -	8 21 0	125 14 0	"	782
Wetter Island, Honden Island off N.W. point - - -	7 41 0	126 0 0	"	782

	Lat. South.	Long. East.	Authorities.	Page
Wetter Island, East point - -	7 45 0	126 47 0	Dutch Charts.	782
" Sauw village on S. coast -	7 56 0	126 24 0	"	783
Liban Island, summit - -	8 5 0	125 46 30	"	783
Kambing Island, S.W. point - -	8 19 30	125 33 0	"	784
Kissa Island, anch. on W. side -	8 6 40	127 9 0	"	784
Roma or Teralta Island, West point -	7 38 0	127 19 0	"	784
Timor. Oijsma or S.W. point - -	10 20 0	123 26 0	De Vrieze.	784
" Samao Island, West point -	10 14 0	123 16 30	"	785
" Koepang, Fort Concordia flag- staff - - - - -	10 10 0	123 35 0	"	785
" Pakoela Point, low extreme -	10 2 0	123 34 30	"	786
" Selama peak, summit - - -	9 57 0	123 39 30	"	786
Rotti Island, W. point - - -	10 46 0	122 52 0	"	787
" Cyrus Harbour - - - -	10 53 0	123 5 15	Spratley.	788
" Baa Road - - - - -	10 43 0	123 1 40	Dutch charts.	788
Timor North Coast, Gomok Point -	9 27 0	123 46 30	"	788
" Gula or Goela Island - - -	9 15 0	124 0 0	"	789
" Liefou, Portuguese settlement -	9 11 0	124 25 0	D'Entrecasteaux.	789
" Atapopa,, Dutch settlement -	9 0 0	124 50 0	Baars.	789
" Gedeh, Portuguese settlment -	8 57 0	124 55 0	"	789
" Dielli, Portuguese settlement flag- staff - - - - -	8 34 0	125 37 0	Kolff.	789
" Mantotte, village - - - -	8 30 0	125 58 0	Dutch chart.	791
" Cape Jackee, N.E. point - -	8 20 0	127 11 0	Edeling.	791
" Nusa Besie or Jackee Island -	8 25 0	127 18 0	"	791
Gunong Api, summit of volcano -	6 43 0	126 43 0	"	792

ISLANDS AND PASSAGES EAST-
WARD OF BORNEO.

STRAIT OF MAKASSAR.

Two Brothers - - - - -	4 19 30	116 12 30	Chart.	794
Bira Birakan Islands, N. extreme -	4 6 0	116 16 0	"	794
Pulo Sebuku, North end - - -	3 22 0	116 27 0	"	794
Pamantyan Point - - - - -	3 12 0	116 15 0	"	794
Pulo Laut, Pulo Kungit off South point	4 6 20	116 4 0	Dutch chart.	794
Dwaalder Island, E. side - - -	4 15 0	116 10 30	"	794
Three Alike Islands, centre - - -	3 39 0	116 39 30	"	795
Sibbald Bank, 5 fathoms - - -	5 46 0	117 3 0	Forbes, &c.	795
Aurora Bank, 4 $\frac{3}{4}$ fathoms - - -	5 25 0	116 58 0	"	795
Nusa Komba, centre - - - - -	5 14 0	117 4 0	Chart.	795
Pudsey Dawson, 4 $\frac{1}{2}$ fathoms - -	4 42 0	117 4 0	"	796
Laurel Reef, 2 $\frac{1}{2}$ fathoms patch -	4 30 0	117 8 0	"	796
Martaban Shoal - - - - -	4 11 0	117 10 0	"	796
Sea Serpent Shoal - - - - -	3 56 0	117 28 0	"	796
Bank, dries - - - - -	3 31 50	117 29 40	"	796
Bank - - - - -	3 34 0	117 37 30	"	796
Bank - - - - -	3 38 0	117 35 0	"	796
Twee Vrienden Reef - - - - -	3 40 0	117 8 0	Vrienden, 1876.	796
Franklin Bank - - - - -	3 2 0	117 33 0	Chart.	796
Triangles, southern - - - - -	3 5 0	117 30 0	"	796
Laurs Bank, S. end - - - - -	6 2 0	118 14 0	"	796
Sallana or Dewakan Island - - -	5 26 0	118 25 0	"	796
Tonyn Island or Benkoeloean- Brill Shoal - - - - -	5 31 0	118 35 0	"	797
Shoal Point or Tanjong Mirra -	6 8 0	118 53 0	"	797
	2 32 0	116 32 0	"	798

TABLE OF GEOGRAPHICAL POSITIONS.

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	Lat. South.	Long. East.	Authorities.	Page
Ragged Point or Tanjong Aris -	2 8 30	116 37 0	Chart.	798
Little Paternosters, N.E. isle -	2 10 0	117 48 30	"	799
" " N.W. isle -	2 8 0	117 33 0	"	799
Hannah Shoal -	2 18 0	117 0 0	"	799
Pasir or Passier River, entrance -	1 51 0		"	799
Jason Reefs, S.E. end -	1 51 0	116 57 0	"	799
" " N.W. end -	1 48 30	116 52 0	"	799
River Koetei, S.W. entrance -	1 0 0	117 20 0	"	800
" " Tanjong Bayor, E. point of delta -	0 45 0	117 37 0	"	800
Bontheim, on South coast of Celebes -	5 32 0	119 54 0		802
Klambang Point, Cape Bulu Bulu -	5 42 0	119 41 0		802
Point Laykan, S.W. point of Celebes -	5 36 0	119 26 0	Sir E. Belcher.	803
MAKASSAR, Ft. Rotterdam, North angle	5 8 9	119 21 18	"	803
Spermonde Archipelago, Kapo Posang Island or West Island -	4 43 0	118 55 0	Chart.	805
Teignmouth Bank -	4 56 0	118 35 30		805
Pareh Pareh Bay, village -	4 1 0	119 34 0	"	805
Balanipa, village -	3 29 0	119 2 30	"	806
Cape Mandhar, West extreme -	3 34 0	118 54 0		806
Penamboeang, village -	3 28 0	118 52 30		806
Cape William -	2 40 0	118 47 0		806
Palos Bay, village at the head	0 57 0	119 47 30	Van Loo, &c.	806
	North.			
Cape Temoel or Samsa -	0 0 0	119 35 30	Chart.	807
Seven Islands, North Watcher -	0 34 0	119 43 30	"	807
Cape Donda -	0 58 30	120 13 30	"	807
Cape Kaniongan, E. point of Borneo -	1 4 0	118 56 0	"	807
ISLAND OF CELEBES.				
Cape Rivers, N.E. Cape, Slime Islet -	1 20 0	120 43 30	Sir E. Belcher.	809
Cape Kandi -	1 20 0	121 25 0	Chart.	810
Bwool, anchorage -	1 10 0	121 24 0	"	810
Kwandang Bay, village in S.E. part -	0 52 0	122 44 30	"	810
Lombok Bay, Maririe Point -	1 1 0	124 9 0	"	811
Manado, Fort Amsterdam -	1 29 25	124 46 30	"	811
Mount Klobat, summit 6315 feet -	1 27 9	125 0 0	"	811
North Cape or Papalumpongang -	1 46 0	124 56 0	"	812
Limbe Island, North point -	1 35 0	125 15 0	"	812
Kema, Fort -	1 21 0	125 1 30	"	812
Cape Flesko, extreme -	0 27 0	124 26 0	Melvill v. Carnbee	812
Cape Tolo, extreme -	0 15 0	123 50 0	"	812
Gorontalo, entrance of river -	0 25 0	122 50 0	"	812
	South.			
Togean Isles, Great Wallah, N. point -	0 14 0	122 13 0	"	813
Cape Talabo, East end -	0 46 0	123 27 0	"	813
Cape Nederburg -	2 53 0	122 16 0	"	813
Wowoni or Weywongi Island, N. point -	3 58 0	123 0 0	"	813
Kendari or Vosmaer Bay, entrance -	3 57 0	122 32 0	"	813
Boeton or Buton Island, North point -	4 23 30	123 4 0	"	813
" " East point -	5 15 0	123 16 0	"	813
" " Siumpu or South Id., S.W. point -	5 41 20	122 26 30	"	814
" " Bolio or Boeton -	5 28 0	122 36 0	"	814
Moena or Mnna Island, C. Willa, or S.W. point -	5 23 0	122 15 0	"	815
Kabeina Island, peak 4,000 feet -	5 19 30	121 53 0	"	815
Cape Lassa or Berak, extreme -	5 35 0	120 29 0	Sir J. Brooke.	815
Point Patiro, extreme -	4 38 0	120 27 0	"	816
Cape Marasanga or Siwa -	3 48 0	120 26 0	"	816

	Lat. South.	Long. East.	Authorities.	Page
Beraoe or Burn, head of Gulf of Boni -	2 40 0	120 40 30	Sir J. Brooke.	816
Cape Bunging Katto -	4 55 0	121 45 0	Chart.	818
Mansfield Shoal, centre 3 fathoms -	5 44 0	120 13 0	"	818
Salayar Island, North point -	5 47 0	120 30 0	"	818
" South point -	6 26 0	120 28 30	"	819
Tiger Islands, Perch Island at E. end -	6 55 0	122 15 0	"	820
Postilion Island, North Island -	6 31 0	118 43 0	"	820
" S.E. Island -	6 50 0	119 10 0	"	820
" S.W. Islands, Maria Reigersbergen Islands -	7 30 0	107 56 0	"	820
Pulo Tenga or Paternoster Ids., South Ids. or Maria Reigersbergen Ids. -	7 50 0	117 5 0	"	820
" Ardassier Islands, South one -	7 35 0	117 22 0	"	820
" N.E. Paternosters, North one -	6 35 0	118 17 0	"	820
MOLUCCA ISLANDS.				
Xulla Isles—Taliabo, N.W. point -	1 44 0	122 20 0	"	821
" Mangola, S.E. point -	1 55 30	126 14 0	"	821
" Lisamatula, E. point -	1 50 0	126 29 0	"	821
" Besi, S.E. point -	2 28 0	126 1 0	"	821
" Saniana Bay, fort -	2 2 0	125 57 0	Brennivala.	821
Bouro Island, Balatetto or N.W. Cape -	3 7 0	126 4 0	Chart.	822
" Cayeli Bay, Fort Defansie -	3 22 49	127 6 27	Sir E. Belcher.	822
" Pela or East point -	3 23 0	127 17 0	Chart.	822
" Amblau Island, E. point -	3 52 0	127 17 0	"	823
" Pekka or South point -	3 53 0	126 39 0	"	823
Manipa Island, centre -	3 17 0	127 34 0	"	823
Amboina Island, Wawolle or W. point -	3 44 30	127 54 30	"	825
" Amboina, Fort Victoria -	3 41 30	128 10 18	Sir E. Belcher.	825
Haruku, S.W. point -	3 39 0	128 25 0	Chart.	828
Saparoea, Melano Id., off S.W. point -	3 40 0	128 36 0	"	828
" Fort Duurstede -	3 35 50	128 38 18	Melville v. Carnbee	828
Banda Ids., Gunong Api summit 2200 ft. -	4 31 0	129 53 0	Chart.	829
" Great Badda, N.E. point -	4 30 30	129 56 30	"	831
" Neira, Fort Nassau -	4 32 0	129 52 50	"	832
" Rosengain or Rozagin, centr -	4 34 0	130 2 30	"	833
" Way or Ai, centre -	4 32 0	129 46 20	"	833
" Rhun or Rung, S. point -	4 36 0	129 43 0	"	833
Token Bessi Ids., Wangi-Wangi, N.W. point -	5 15 0	123 32 0	"	835
" Binongko, South point -	6 17 0	123 59 0	"	835
" St. Matthew Id., centre -	5 20 0	124 14 0	"	835
" Veldhoen, centre -	5 58 0	124 46 0	"	835
Hegadis Island, Lagu Rocks, off S. pt. -	6 9 0	122 38 0	"	835
Lucipara Islands, North islet -	5 28 30	127 30 0	Dutch chart.	836
Gunong Api -	6 43 0	126 43 30	"	836
Roma Island, West point -	7 38 0	127 19 0	"	836
" Serussa anchorage -	7 42 0	127 39 0	Chart.	837
Letti Island, West point -	8 14 20	127 36 0	Owen Stanley.	837
" Anchorage on N. side -	8 10 15	127 41 0	"	837
Moa Island, Buffalo Peak, 4,100 feet -	8 12 0	128 1 0	"	837
Sermatta Island, N.E. point -	8 14 0	129 0 0	"	838
Damona Island, Kulewatta Harbour, North point -	7 3 0	128 28 0	Chart.	838
Nila Island, centre -	6 44 0	129 29 0	"	839
Mano or Bird Island, centre -	5 33 0	130 20 0	"	839
Tenimber Islands, Timor Laut, Oliliet on East coast -	7 55 0	131 23 30	Owen Stanley, &c.	840
" " S. point -	8 18 45	130 43 0	"	840

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Tenimber Islands, Laarat, E. point -	7 12 0	132 1 0	Owen Stanley, &c.	841
„ Vordate, S. point -	7 4 0	131 55 0	„	841
„ Mulu, N. point -	6 35 0	131 40 0	Chart.	841
„ Serra, S.W. point -	7 38 0	130 44 0	„	841
Arru Islands, Ngor or S. Island -	7 10 0	134 24 0	„	841
„ Dobbo Harbour, point -	5 45 18	134 13 35	Owen Stanley, &c.	844
„ North point -	5 20 0	134 40 0	Chart.	842
Ki Islands, Great Ki, South point -	5 56 0	132 54 0	Owen Stanley.	846
„ „ North point -	5 16 30	133 10 0	„	847
„ Little Ki, Doulan Har. pier -	5 34 42	132 45 11	Tizard, 1874.	847
Victoria Shoal? -	9 13 0	131 22 0	Chart.	848
Lynedoch Bank, 7 fathoms -	9 55 0	130 40 0	Stead.	848
Money Shoal -	10 19 0	132 47 0	Chart.	848
Tionfolokker Group, S.W. island -	5 47 0	132 9 0	„	850
Three Brothers, Ta or South Brother -	5 41 0	131 54 0	„	850
Tello Islands, Kanalur or S. Id., summit -	5 20 0	131 58 0	„	850
„ Bun or N. Id., summit -	5 8 0	131 58 0	„	850
Tehor Island, N.E. point -	4 44 0	131 47 0	„	850
Matabella Islands, Kukur -	4 33 0	131 50 0	„	850
„ Ingar -	4 20 0	131 34 0	„	850
Goram Isles, Monovoko, E. point -	4 11 0	131 29 0	„	851
„ Goram, S.E. point -	4 4 0	131 30 0	„	851
Ceram Laut Isles, high tree on western isle -	3 50 0	131 0 0	Kolff.	851
„ Kilwari Island, town -	3 49 0	130 58 0	„	851
Keffing Isles, E. point -	3 51 0	131 53 0	Dutch Chart.	852
Ceram Island, Rozuket or N.E. point -	3 32 30	130 56 0	„	852
„ Waroe or Wharu anch. -	3 25 0	130 43 0	„	852
„ Cape Talanuru, N.W. ext. -	2 52 0	128 11 0	„	854
„ Bonoa Island, N.E. point -	2 56 0	127 59 0	„	854
„ Seal or Sial Pt., S.W. ext. -	3 33 0	127 55 0	„	854
„ Piero Bay, Kassara Id. -	3 16 0	128 10 0	„	854
„ Amahai Bay, Dutch fort -	3 19 30	128 56 7	Koning.	854
New Guinea, Cape Valsche -	8 22 0	137 40 0	Kolff, &c.	855
„ Triton Bank -	6 0 0	138 4 0	„	855
„ Providential Bank -	5 35 0	137 55 0	„	855
„ False Utanata River -	4 45 0	136 18 0	„	855
„ Cape Champel or Steenboom -	4 45 0	136 20 30	„	856
„ Cape Buru -	4 23 0	135 9 0	„	856
„ Lakahia Mount -	4 12 0	134 50 0	„	856
„ Cape Perier -	4 8 30	134 31 30	Chart.	856
„ Chasot Island, centre -	4 2 0	134 17 30	„	856
„ Aidumea Island, centre -	4 0 0	134 0 0	„	856
„ Triton Bay, Port du Bus -	3 46 0	134 4 0	„	856
„ Namatotte Island -	3 54 0	133 57 0	„	857
„ Wessel Island, S.E. point -	4 17 0	133 34 0	„	857
„ Arguna Bay, C. Boucher -	3 48 0	133 20 0	„	857
„ Cape Kaffoera -	4 5 0	132 47 0	„	857
„ Cape Sapey -	3 38 0	132 37 0	„	857
„ Gudin Island, N.W. end -	3 27 30	132 33 0	„	857
„ Drei Cap Pen'a, Wass Id. -	2 44 0	132 4 0	„	857
„ McCluer Inlet, village at head -	2 23 0	134 7 0	„	857
Sabuda Island, S. point -	2 40 0	131 36 0	„	858
Mysole Island, Effe Harbour -	2 4 0	130 12 0	Forrest.	858
Canary Islands, western extreme -	1 50 0	129 35 0	Chart.	858
Popa Island, S.E. point -	1 12 0	129 50 0	„	859
Salawati Island, Van Dady or N.W. pt. -	0 59 0	130 35 0	„	860
Batanta Island, Cape Mubo or W. pt. -	0 56 0	130 25 0	„	860
Waigiui Island, Piapis Harbour -	0 5 30	130 12 0	D'Urville.	861

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Waigiu Island, Offak Harbour, entrance	0 1 20	130 43 0	"	862
" " Rawak Harbour -	0 1 30	130 57 0	"	862
" " Cape Lamarche, N.E. pt.	0 7 30	131 14 0	"	862
" " Chabrol Bay, Port Blos-				
seville - - -	0 5 0	130 41 0	"	863
Dampier Island, Buccleuch Shoal -	0 13 0	131 21 0	"	863
" " King William Island,				
West point - - -	0 34 0	130 29 0	"	863
" " Pigeon Island, centre -	0 39 0	130 34 0	"	863
" " Fowl Isle, centre -	0 43 0	130 42 30	"	863
Obi Major, Rocky or W. point -	1 30 0	127 18 0	Chart.	866
Gomona Island, centre -	1 42 30	127 30 0	"	866
Lukisong or Loyang Island, S. end -	1 42 0	128 2 0	"	866
Gasses Island, S.E. end -	1 38 0	128 14 0	"	866
Kekik Island, East end -	1 30 0	128 37 0	"	866
Boe or Bu Islands, W. end -	1 8 0	129 11 30	"	867
Gebi or Gebeh Islands, N.W. point -	North. 0 2 2	129 17 30	Duperrey.	869
" " Fow Id., S. pt. -	South. 0 8 0	129 30 0	"	869
Gagy Island, South point -	0 25 0	129 54 0	Chart.	870
Syang Island, S.E. point -	North. 0 18 0	129 53 0	"	870
Wyang or Vayag Island, West end -	0 11 0	129 57 0	"	870
Ormsbee Shoal, 12 fathoms -	0 41 0	130 0 0	"	870
Halmaheira or Gillolo, South point -	South. 0 50 0	128 23 0	Dutch Chart.	871
" " Cape Tabo, E. extr. -	North. 0 11 0	128 52 0	"	872
" " Canton Packet Reef -	0 36 30	128 56 30	"	873
" " Ardasier Rock -	0 45 0	129 0 0	"	873
" " Bitjoli or Wassa,				
Dutch settlement - - -	0 38 0	128 20 0	"	873
" " Cape Salaway, N.E.				
point - - -	1 26 0	128 37 0	"	873
" " Tanjong Batu Bessao	2 14 0	127 32 0	"	873
" " Talendang Ids., Dili	2 17 0	127 33 0	"	873
" " Gillolo village -	1 10 0	127 28 0	"	873
" " Dodingo, village -	0 52 0	127 46 0	"	874
Molucca Islands, Ternate, Fort Oranje -	0 47 0	127 21 0	"	874
" " Tidore, summit of volcano	0 39 0	127 22 30	"	876
" " " N.E. end -	0 46 0	127 25 0	"	876
" " Mareh, W. point -	0 34 0	127 21 0	"	876
" " Motir, summit -	0 28 0	127 23 0	"	877
" " Makkian, Fort Reeburgh	0 24 0	127 21 0	"	877
" " Wolf Rock -	0 13 0	126 50 0	"	877
" " Batjan or Batchian, Fort	South.			
Barneveld - - -	0 37 0	127 25 30	"	878
" " S.E. point - - -	0 47 0	127 52 30	"	878
Bahia Reef, coral - - -	1 10 0	126 50 0	"	879
Mayor or Meys Island, North point -	North. 1 22 30	126 22 0	Bethune.	879
Tifore Island, N.W. point -	1 1 0	126 8 0	"	879
ISLANDS NORTH OF THE MOLUCCAS.				
Bajaren Island, summit - - -	2 7 0	125 22 0	Spanish charts, &c	881
Tagulanda Island, peak - - -	2 22 0	125 24 30	"	882

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Seao Island, conical peak - - -	2 44 0	125 26 0	Spanish charts, &c.	882
Sangir Island, S. point, Cape Palumbatu	3 21 0	125 39 0	"	882
Talaut Islands, Kabruang, S.E. point -	3 49 0	127 2 30	"	882
" Karkelang, N. point - - -	4 29 0	156 52 0	"	883
Tulur Islands, Kaman village - - -	3 49 0	127 2 0	Chart,	883
Meangis Islands, southern - - -	4 39 0	127 7 0	"	883
SULU ARCHIPELAGO.				
Tapul, centre hill - - -	5 44 30	120 55 0	Chimmo, 1871-2	885
Bulipongpong, centre hill - - -	5 41 30	120 49 45	"	885
Cuad Basang, S.W. point - - -	5 27 10	120 11 30	"	885
Bubuan, Lagoon entrance - - -	5 25 15	120 35 0	"	886
Keenapoussan Island, centre - - -	5 13 0	120 40 45	"	886
Bongalao, South point - - -	5 0 30	119 44 15	"	886
Simonor, N.W. point - - -	4 55 30	119 46 45	"	887
Manuc Manca, West point - - -	4 49 30	119 48 0	"	887
Sibutu, hill, East coast - - -	4 49 30	119 24 0	"	887
Borneo, Unsang anchorage - - -	5 16 30	119 16 0	"	888
Omapui, N.W. extreme - - -	4 54 10	119 22 45	"	888
Talantam Bank, 5 fathoms - - -	5 42 0	119 26 30	"	888
Pearl Bank, western Island - - -	5 50 45	119 37 30	"	888
" East Islet - - -	5 50 45	119 44 0	"	888
Doc-can, West extreme - - -	5 52 30	119 55 45	"	889
Sulu Island, Dalrymple Harbour, well on S.E. coast Tulyan Island	6 2 30	121 18 20	"	890
Pangituran, S.W. point - - -	6 15 15	120 29 30	"	891
Basilan Id., Passanha or Isabela -	6 42 45	121 58 0	Spanish charts.	893
" Island, Malusa - - -	6 32 50	121 52 43	<i>La Sabine</i> , 1844.	893
Sibago Isles - - -	6 45 0	122 24 0	Spanish charts.	893
Teinga Island, centre - - -	6 54 0	121 38 0	<i>Wild Rover</i> , 1870.	894
Sta. Cruz Island, S.E. one - - -	6 52 15	122 4 0	Spanish charts.	894
PHILIPPINE ISLANDS.				
Mindanao, Cape Panguitan or S. point -	5 36 0	125 21 0	Spanish charts.	897
" Illana Bay, Rio Grande, Co- tabatu fort - - -	7 13 0	124 14 30	"	898
" Port Dumanquilas, entrance -	7 29 0	123 4 0	"	898
" Samboanga, pier - - -	6 54 0	122 4 0	"	898
" La Caldera, fort - - -	6 58 0	121 58 0	"	898
" Santa Cruz Islands, S. point -	6 52 0	122 4 30	"	898
" Port Sta. Maria, village at head - - -	7 46 0	122 7 30	"	898
" Murcielagos Islets, W. point -	8 8 0	122 26 0	"	898
" Point Taglo, N.W. point - - -	8 43 0	123 22 30	"	898
" Laguna de Panguil, Misamis, at entrance - - -	8 10 0	123 49 0	"	898
" Macajalar Bay, Barra de Ca- gayan - - -	8 31 10	124 45 0	"	899
" Camiguin Island, W. point -	9 12 30	124 37 0	"	899
" Point Banajan or Bilaan - - -	9 50 0	125 25 30	"	899
" Surigao, landing place - - -	9 48 30	125 29 0	"	900
Surigao Islands, Siargao, N.E. point -	10 4 0	126 3 30	"	900
" Dinigat, N. point - - -	10 28 0	125 38 0	"	900
Panaon Island, S. point - - -	9 55 0	125 17 0	"	901
" Puerto Liloan, E. entr. - - -	10 10 0	125 8 0	"	901
Leyte Island, S.W. point - - -	10 0 0	125 1 30	"	901
" Tacloban - - -	11 16 0	124 59 0	"	901
" Carigara on N. coast - - -	11 19 0	124 41 0	"	901
Samar Island, Punta Sangui, ? Samar -	10 55 30	125 52 0	"	902

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Samar Island, Point Binugayan -	12 12 0	125 33 0	"	902
" C. Espiritu Santo, N.E. end	12 32 30	125 13 30	"	902
" Puerto de Palapa, S.E. pt.				
of Batag Island -	12 37 20	125 4 0	"	902
" Balicuatro Isles, N.W. pt.				
of Viri -	12 43 0	124 23 0	"	902
St. Bernardino Island, East entrance of				
Strait -	12 46 0	124 18 30	"	904
Capul Island, N. point -	12 30 0	124 10 0	"	904
Ticao Island, Puerto San Jacinto, fort -	12 35 0	123 45 0	"	904
Masbate, Point Caduljuan or S.E. point	11 44 0	124 5 0	"	905
" Puerto Barreras, Point Lanan	12 33 0	123 24 9	"	905
" Point Bugui or N.W. point -	12 36 0	123 15 0	"	905
Zebu or Cebu Island, Point Bulalague or				
N. point -	11 17 0	124 4 0	"	906
" Port Zebu, <i>lighthouse</i>				
on Bacacay Point -	10 24 0	124 1 20	"	907
" Naga coal mines -	10 13 30	123 46 0	"	907
" Point Tanon or S. pt. -	9 25 0	124 20 0	"	907
Bohul Island, N.W. point -	10 9 0	124 10 0	"	908
Siquijor Island, N. point -	9 18 30	123 37 30	"	908
Negros Island, Bombonon or S. point -	9 3 30	123 6 0	"	908
" Himamaylan, on W. coast	10 7 0	122 52 0	"	908
" Bacolot, village -	10 43 0	122 57 0	"	908
Burias, Busin Harbour, San José Id. -	13 9 0	122 57 0	"	908
Panay, Punta Bulacane or N.E. point -	11 36 30	123 8 0	"	909
" Silanga Islands, North Gigante,				
N. point -	11 39 0	123 22 0	"	909
" Pan de Azucar, summit -	11 17 0	123 10 0	"	910
" Ilo Ilo, fort -	10 43 0	122 36 0	"	910
" Nugas Island, off S.W. pt. -	10 24 40	121 54 0	"	915
" San José de Buenaventura -	10 45 0	121 55 30	"	915
" Point Naisog, or N.W. point -	11 53 30	121 52 20	"	915
SULU SEA.				
Sandakan Harbour, Bahalatolis Island -	5 50 0	118 11 0	"	917
Cagayan de Sulu, entrance of basin -	6 58 5	118 29 0	"	918
" Sulu, observation spot, middle				
West coast -	7 0 38	118 26 6	Chimmo, 1871.	918
San Miguel Isles, East point of Manuk				
Manukan -	7 43 0	118 27 0	Spanish charts.	920
Carayanes Islands, Observatory between				
the islands -	9 35 30	121 23 30	"	921
Caueli or Cavilli, N.W. point -	9 14 0	120 52 30	"	922
Sombrero Rock -	10 43 0	121 33 0	"	923
Piedra Blanca -	10 27 0	121 3 0	"	922
Mindoro Island, Cape Calavite, N.W. pt.	13 26 0	120 18 0	"	924
" Abra de Ilog -	13 26 20	120 46 0	"	924
" Calapan -	13 25 30	121 10 30	"	924
" Punta Buruncan or S. pt.	12 13 0	121 14 30	"	924
Sibuyan Island, South point -	12 17 0	122 38 30	"	924
" West point -	12 27 0	122 26 30	"	924
Romblon Island, light on N.E. point -	12 36 30	122 18 0	"	924
Marinduque Island, Elefante, off S. pt. -	13 11 30	122 0 0	"	925
Luzon, S., E., and N. Coasts, Cape San-				
tiago -	13 45 40	120 40 0	Montero, Spanish	926
" Balayan -	13 56 0	120 44 0	Surveys, &c.	927
" Batangas -	13 45 0	121 3 40	"	927
" Verde Island, N.W. point -	13 34 0	121 2 20	"	927
" Point Bantigui -	13 41 15	121 27 40	"	927

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Luzon, Lagummanoc, entrance -	13 53 0	121 49 0	Montero, Spanish	927
„ Bondog Head -	13 10 0	122 36 0	surveys, etc.	928
„ Tamba Point -	13 0 30	123 19 0	„	928
„ Sorsogon -	13 0 30	123 59 30	„	929
„ Calintan Island -	12 31 20	124 5 0	„	929
„ Ungay Point -	13 10 40	124 9 20	„	929
„ Catanduanes Island, S.E. point -	13 31 40	124 21 0	„	931
„ „ N. point -	14 8 10	124 13 40	„	931
„ Matandumaten Island -	14 18 0	123 5 30	„	932
„ Calagnas Isles, Cacbalisay Id.,				
East end -	14 25 40	122 57 30	„	932
„ Lamon Bay, Gumaca -	13 57 45	121 54 45	„	933
„ Polillo Island, peak -	14 56 30	121 58 0	„	933
„ Cape San Ildefonso -	16 4 30	121 46 0	„	934
„ Paranan Bay, South pt. -	17 9 30	122 28 0	„	934
„ Yligan Point -	18 20 0	122 18 0	„	934
„ Cape Engano -	18 34 30	122 5 40	„	934
„ Pt. San Vincente, entrance -	18 30 0	122 6 0	„	935
„ River Cagayan, entrance -	18 23 0	121 35 0	„	935
„ Pamplona Bar -	18 30 0	121 22 0	„	935
„ Pt. Dialao -	18 37 40	120 48 0	„	935
„ Cape Bojeador -	18 29 30	120 34 20	„	935
Babuyan Islands, Dalupiri Id., N. point	19 9 30	121 13 0	„	936
„ Calayan Island, N.E. pt.	19 22 0	121 32 0	„	936
„ Claro Island, W. point -	19 30 0	121 52 0	„	936
„ Camiguin Island, Port				
Pio V., entrance -	18 53 0	121 48 0	„	936
„ Bashi or Batan Islands,				
Balintang Island (P.D.) -	19 58 30	122 14 0	„	937
„ Batan Island, Mt. Irada,				
3,806 ft. -	20 28 30	122 1 20	„	938
„ Ibayat Island, Mt. Santa				
Rosa -	20 48 0	121 52 30	„	939
„ Y'Ami Island, islet off				
S.W. point -	21 4 56	121 58 24	„	939

CHINA.

HAINAN TO HONG KONG.

Now Chow Island, West point -	20 59 0	110 38 0	Chart,	942
Ty-fung-kyoh Island -	21 24 30	111 10 30	„	943
Pauk Pyah Rock -	21 24 15	111 15 25	„	943
Song-yui Point -	21 32 0	111 38 30	„	944
Mamee-chow Islets, S.W. pt. of W. islet	21 34 0	111 47 0	„	944
Tyoa Point -	21 44 0	112 14 0	„	945
Mandarins Cap -	21 29 0	112 21 30	„	945
Hawcheun Island, S.W. point	21 35 0	112 33 0	„	946
Namoa Harbour, entrance -	21 36 0	112 35 0	„	946
Wycaup Island, S.E. part -	21 34 0	112 54 0	„	948
Cou-cok Island, Sail Rock off S. point -	21 50 0	113 7 30	„	949

CANTON RIVERS.

San Chow Island, Stragglers off S.E. pt.	22 0 0	113 24 50	Domville.	950
Montanha Id., Water Islands off S. pt. -	22 3 30	113 30 0	„	950
MACAO, Fort Guia, lighthouse -	22 12 0	113 33 30	„	950
Great Ladrone Island, S.W. point -	21 55 25	113 42 0	„	954

HONG KONG TO RIVER MIN.

Hong Kong, Wellington Battery -	22 16 23	114 10 2	Belcher, 1841.	963
„ Cathedral -	22 16 23	114 9 37	„	963

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Ninepin Rock - - -	22 15 45	114 22 7	Collinson, 1845.	994
Single Island, East summit - -	22 24 6	114 39 12	"	998
Tuni-ang Island, summit - -	22 27 6	114 36 45	"	998
Mendoza Island, summit - -	22 30 42	114 50 0	"	1000
Pedro Blanco Rock, summit - -	22 18 30	115 6 54	"	1002
Pauk Piah Rock, summit - -	22 32 54	115 1 0	"	1002
Chino Peak, summit - -	22 44 24	115 46 50	"	1005
Cupchi Point, hill on it - -	22 48 7	116 4 26	"	1006
Breaker Point - - -	22 56 0	116 27 45	"	1008
Cape of Good Hope - - -	23 14 0	116 47 0	"	1009
Swatow, Double Island - -	23 20 0	116 43 20	"	1011
Brothers Islets, S.E. islet - -	23 32 30	117 42 0	"	1 15
Tongsang Harbour, Fall Peak - -	23 47 15	117 36 48	"	1015
Chapel Island, light - -	24 10 18	118 13 30	"	1017
Tsing Seu Island, lighthouse - -	24 22 15	118 7 0	"	1018
Amoy, Hanseu Island Pagoda - -	24 28 20	118 3 0	"	1019
High Lamock, light - -	23 15 0	117 17 30	"	1013
Chin-chu Harbour, Pisai Island - -	24 49 13	118 41 0	"	1025
Pyramid Point - - -	24 52 12	118 58 0	"	1026
Sorrel Rock - - -	25 2 18	119 10 36	"	1026
Ockseu Islands, western island, lightho. - -	24 59 0	119 27 30	"	1027
Lam-yit Island, high cone peak - -	25 12 0	119 35 0	"	1027
Hungwha Channel, Sentry Island - -	25 16 30	119 45 0	"	1028
Hai-tan Island, Kiangshan Peak - -	25 36 18	119 50 42	"	1028
Turnabout Island, summit, light - -	25 26 0	119 58 42	"	1030
Middle Dog Island, light - -	25 58 20	120 2 30	"	1030
FORMOSA, PESCADORES, ETC.				
Gadd Rock - - -	21 43 10	121 37 0	Ross, 1817, and	1033
Vele Rete Rocks - - -	21 45 30	120 48 40	Brooker, 1866.	1033
Botel Tobago sima, South extreme - -	22 1 40	121 39 45	Beechy, 1826.	1033
Little Tobago sima - - -	21 57 30	121 40 30	"	1033
Formosa Island, South cape - -	21 55 0	120 50 30	Wilds, 1865.	1033
" Sau-o Bay, Obs. spot - -	24 35 28	121 49 27	Brooker, 1867.	1034
" Samasana Island - -	22 41 0	121 28 0	Collinson, 1845.	1034
" Takau, Saracen Head - -	22 36 14	120 16 33	Richards, 1855.	1037
" Port Heongsan - - -	24 46 0	120 55 0	Brooker, 1866.	1042
" Tam-sui Har., White fort - - -	25 10 24	121 25 0	Brooker, 1867.	1043
" Foki Point - - -	25 19 0	121 37 0	Collinson, 1845.	1045
" Ke-lung Harbour, Observation spot - - -	25 8 25	121 45 30	"	1045
Hoa-pin-su Island, North face - -	25 47 7	123 30 31	Belcher, 1845.	1047
Raleigh Rock - - -	25 35 0	124 35 0	Bullock, 1866.	1048
Meiaco-sima Group, Kumi Id., N. beach - -	24 26 0	122 56 0	Belcher, 1845.	1048
" Broughton Bay, landing place - -	24 21 30	124 17 40	"	1050
" Port Haddington, Hamilton Point - - -	24 25 0	124 6 40	"	1050
" Tai-pin-san, S.W. Bay - -	24 43 35	125 17 49	"	1050
Pescadores Islands, Makung Harbour, 2nd point on N. side of harbour - -	23 32 54	119 30 12	Collinson, 1845.	1053
" Fisher Id., light - -	23 33 0	119 28 0	"	1054
RIVER MIN TO SHANGHAI.				
River Min, Temple Point - - -	26 8 26	119 37 42	Richards, 1854.	1056
Alligator Island, summit - - -	26 9 0	120 26 0	Collinson, 1845.	1062
Tung-ying Island, peak - - -	26 23 12	120 31 0	"	1062
Cony Island, summit - - -	26 30 0	120 10 0	"	1062
Double Peak Island, highest peak - -	26 36 6	120 11 12	"	1064
Pih-scang Islands, Town Island - -	26 42 30	120 22 42	"	1065
Dangerous Rock, summit - - -	26 53 0	120 34 18	"	1065
Tae Islands, easternmost - - -	26 59 12	120 43 48	"	1065

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Pih-quan Peak, summit - -	27 18 48	120 28 42	"	1066
Nam-quam Harbour, Bate Island - -	27 9 20	120 25 50	"	1066
Port Namki, eastern horn - -	27 26 18	121 6 36	"	1067
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Chikkok Island, summit - -	28 22 24	121 44 12	"	1071
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Just-in-the-way Islet, summit - -	29 57 42	121 54 12	"	1097
Yung River, Chin-hai citadel - -	29 57 8	121 43 6	"	1098
" Square Island light - -	29 59 22	121 45 0	"	1098
" Pas-yew light - -	29 57 43	121 43 50	"	1098
Video Island, summit - -	30 8 0	122 46 0	Collinson, 1845.	1102
Barren Isles, centre - -	30 43 0	123 7 14	"	1090
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Chapu, battery - -	30 36 0	121 8 0	Collinson, 1845.	1102
Shaweishan Island, light on summit - -	31 24 30	122 14 15	Wilds, 1864.	1107
Entrance of river, Tungsha bank light-vessel - -	31 7 40	122 1 0	Shanghai, 1873.	1108
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Yellow River, southern entrance - -	34 2 0	120 10 0	Admiralty Chart.	1131
Wang-kia-tai Bay, Lung-wang temple - -	35 39 0	119 51 30	Bullock, 1861.	1132
Shan tung promontory, lighthouse on N. E. extrem ^e - -	37 24 30	122 42 30	Ward, 1860.	1138
Miau-tau Group, peak of northern island - -	38 23 37	120 55 0	"	1145
" Hope Sound, Obs. spot - -	37 56 0	120 40 42	"	1146
Pei Ho, S. Taku Fort, S. Cavalier - -	38 8 16	117 42 48	"	1147
" Tientsin, Observation spot - -	39 9 0	117 11 44	"	1147
Shalutien Island, Joss house - -	38 53 0	118 32 30	"	1152
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" New Chwang Lightvessel - -	40 35 0	122 0 0	"	1154
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Port Adams, Entry island - -	39 16 0	121 35 30	"	1159
Thornton Haven, Observation spot - -	39 4 0	123 10 50	Bullock, 1860.	1159
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„ Kutsino sima -	29 59 0	122 55 0	rities.	1169
„ Kuro sima, centre -	30 50 0	129 57 0	„	1171
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Siriya Saki, lighthouse -	41 26 10	141 29 25	Jap. lt.-ho. Bd.	1199
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Kii Channel I., Sima, N. end -	33 51 45	134 50 45	„	1203
„ Naruto Passage, Su Saki -	34 14 56	134 42 51	Maxwell.	1203
„ „ Tobi Sima -	34 13 50	134 39 0	Chart.	1203
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„ Siwo Misaki, light -	33 26 0	135 46 30	Jap. lt.-ho. Bd.	1207
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„ Iwo Sima, lighthouse -	32 43 0	129 46 0	Jap. lt.-ho. Bd.	1235
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Yebosi Sima, light -	33 41 30	129 58 50	„	1242
Kado Sima, lighthouse -	34 21 30	130 50 0	Jap. lt.-ho. Bd.	1244
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Port Negat, lighthouse -	37 56 30	139 4 0	Ward.	1246
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THE INDIAN ARCHIPELAGO
through the
WIND SYSTEMS
in the
SW and SE Monsoons



July
Aug
Apr
May
June
Sept

SW Monsoon
SE Monsoon

Apr
May
June
July
Aug
Sept

SW Monsoon
SE Monsoon



THE INDIAN ARCHIPELAGO

showing the WIND SYSTEMS

in the N E and N W Monsoons



THE
INDIAN ARCHIPELAGO,
ETC.

CHAPTER I.

I.—WINDS AND SEASONS.

THE Great Archipelago, which lies between Asia and Australia, by far the largest of the insular regions of the world, covering, as it does, an area of about six millions of square British miles, has been vaguely termed, by various authorities, the East India Islands—the Asiatic, or Eastern, or Oriental Archipelago, or the Malay Archipelago; but, following its great historian, Mr. John Crawfurd, we prefer to designate it as the *Indian Archipelago*, a name, also, by which it is generally recognised.

The Equator passes nearly through its centre, and thus much of it lies on the division between the meteorological systems of the North and South hemispheres, the general particulars of which have been recounted and described in our former works. This peculiar physical condition renders the attempt to define the characteristics of its climatology somewhat complicated and difficult.

It might be supposed that along this neutral line of separation, under the great cloud-ring, as it has been termed by Captain Maury, that there would be some uniformity of wind and weather. Not so, however, for the relative influences of the vast land of Australia, on the one hand; those of the continent of Asia on the other; the direction of the evaporating winds blowing over the Indian Ocean to the West, or over the Pacific Ocean on the eastern side, cause the climate and characteristic weather of the eastern or western portions of the Archipelago to be very different from each other.

For these reasons the changes in the monsoons, the alternation of the wet and dry seasons, in some parts, are very puzzling and difficult of explanation; a fact, also, due in some degree to the want of long series of accurate observations which would be required to elucidate them.

A large portion of the islands thus lies in what has been termed the "doldrums" of mid-ocean, and on the line of the maximum rain fall. This latter arises from the trade-winds in passing over the ocean, evaporating so much from the surface, that on their reaching this central line, or before that occurs, the winds become surcharged, and great deposition follows. It will be manifest that the case is altered when the wind has to pass over great breadths of arid land, and thus arises the complication caused by the reversed monsoons.

The disturbing effect of land influences on the great aerial currents, is more apparent in the Indian Seas than in any other part of the world. The result is a complete reversal of the N.E. trade, and in a minor degree of the S.E. trade wind, producing the well-known phenomena of the monsoons—winds which blow one-half the year in one direction, and in the other half in the opposite.

In the northern winter, when the sun is *South* of the Equator, and the great Asiatic continent is cool, the regular N.E. trade-wind prevails over the whole region North of the Equatorial calms, and is generally known as the *North-east Monsoon*, which is only liable to local deflection consequent on the direction of the land, its mountains, or the channels which separate the islands. To the South of the equatorial calms, the S.E. trade prevails throughout the season of October to April, when the sun is in southern signs; and therefore, in the western portion of the area now under consideration, the winds pursue their ordinary courses.

But when the sun enters into North latitude, or in the northern summer, and especially about the northern solstice, it is vertical over an immense area of land South of the Himalaya Mountains, the desert regions of Arabia, the burning plains of Western India, countries where the earth is fire, and the wind flame; and when this intense heat is extended to the southern portions of China, the S.E. trade-wind, receiving a *northern* impulse, follows up the retreating N.E. trade to the foot of the Himalayas, towards the northern tropic, drawn thither by the intense heat of the vertical sun, receiving this northern impulse, and that impulse carrying it into a region of less rotatory velocity than that which it has left, it assumes a relative S.W. direction, and is called the *South-west Monsoon*.

The features and seasons of this wonderful wind have been recounted in our volume on the Indian Ocean, pages 32—58; and it is there shown that it has a progressive course northward, in its greatest strength, along the African coast, reaching Bombay nearly a month later than it sets in in the commencement.

The effects of this S.W. monsoon are felt very far beyond the coasts, upon which its first furies fall in the burst of their commencement. The high temperature it brings advances so far to the North, that over ground per-

petually frozen at the depth of a few feet, the limit of arboreal vegetation extends in Siberia, even to 72° N. latitude.

While this deflected S.E. trade-wind, in the form of the S.W. monsoon, North of the Equator, is blowing between May and October, the S.E. trade proper prevails over all that part of the Indian Ocean which is not skirted to the South by large tracts of land. Where this is the case, as in the Java Seas as far as New Guinea, which lie North of the great Australian continent, there is again a double maximum temperature in the sea and the land, and the phenomenon of a N.W. monsoon taking the place of the S.E. trade.

The monsoons, therefore, of the Indian Archipelago are not *two* in number, but are *four*—the N.E. and S.W. to the North of the equator, and the S.E. and N.W. to the South of the line. To the two first the northern parts of Sumatra, Borneo, and Celebes, the Philippine Islands, and the Malay Peninsula, as well as the whole of the China Sea, are subject. To the two latter the southern parts of the above-named islands, with the range between Java and New Guinea, and the northern part of Australia, are subjected.

There is one natural indication of this superabundant rainfall in the exuberant vegetation manifest in most parts of the Archipelago. The greater portion is covered with one vast ever-verdant forest, clothing the land and the mountains from the shore to the summits of their loftiest peaks. In some parts this dense and gloomy jungle is not seen, and in its place are arid hills and plains, scantily covered with shrubs and trees.

The naturalist, Mr. Wallace, has well defined these and other characteristics, which need not be detailed here. A few words will suffice. Sumatra, New Guinea, Borneo, the Philippines, and the Moluccas, are all forest countries, except a few small and unimportant tracts. To this there is one important exception in the island of Timor, and all the smaller islands opposite, in which there is absolutely no forest, such as exists in the other islands, and their character extends in a lesser degree to Flores, Sumbawa, Lombok, and Bali.

In Timor and the islands between it and Java the vegetation is of the same character as that of Australia. This peculiar character is most probably owing to their proximity to that great continent. The S.E. monsoon which lasts for about two-thirds of the year (from March to November) blowing over the northern parts of that country, produces a degree of heat and dryness which assimilates the vegetation and general aspect of the adjacent islands to its own. A little farther eastward, in Timorlaut and the Ki Islands, a moister climate prevails, the S.E. winds blowing from the Pacific through Torres Straits; and, as a consequence, every rocky islet is clothed with verdure to its very summit. Farther West, again, as the same winds blow over a wider and wider expanse of ocean, they have time to absorb fresh moisture, and we accordingly find the island of Java possessing a less

and less arid climate in the dry season, till on the extreme West, near Batavia, rain occurs more or less all the year round, and the mountains are everywhere clothed with forests of unexampled luxuriance.

Mr. Wallace continues—Speaking generally, the whole south-western part of the Archipelago, including the whole range of islands from Sumatra to Timor, with the larger half of Borneo, and the southern peninsula of Celebes, have a dry season from April to November, with the S.E. monsoon. This same wind, however, bends round Borneo, becoming the S.W. monsoon in the China Sea, and bringing the rainy season to northern Borneo and the Philippines.

In the Moluccas and New Guinea the seasons are most uncertain. In the S.E. monsoon, from April to November, it is often stormy at sea, while on the islands it is very fine weather. There is generally not more than two or three months of dry, hot weather, about August and September. This is the case in the northern extremity of Celebes and in Boruru; whereas, in Amboyna, July and August are the worst months in the year. In Ternate it is difficult to find out which is the dry and which the wet season. The same is the case at Banda, and a similar uncertainty prevails in Menado, showing, perhaps, that the proximity of active volcanoes has a great disturbing meteorological influence. In New Guinea a great amount of rain falls more or less all the year round. On the whole, the only statement that can be made seems to be that the countries within about 3° on each side the equator have much rain, and not very strongly contrasted seasons, while those more South or North in latitude have daily rains during about four months in the year, while for five or six months there is almost a cloudless sky and a continual drought.

There is one evidence of the uncertain nature of the aerial currents, and of their varying direction and intensity in the frequent occurrence of waterspouts in some localities, as in the Malacca Straits. These columns of vapour or water, formed by a small vortex, are described at length hereafter, as seen in that strait, and are probably in some measure due to the peculiar configuration of the transverse line mountains crossing the normal line of direction of the prevalent winds.

These brief, general remarks will suffice to give a notion of the meteorology of the central or equatorial portion of the Indian Archipelago North and South of these limits. The remarks that have been given in the introductory chapter of our Indian Ocean Directory, will be equally applicable to this portion of the world.

Storms are of rare occurrence, and typhoons are unknown. They only occur beyond the limits of the equatorial calms, and are seldom felt so far South as the northern part of the Philippine Islands. On the coast of China they are experienced in both monsoons, as further alluded to hereafter.

In the Gulf of Siam, in the China Sea, and on the coast of China, the alternating monsoons prevail. In the Gulf of Siam they are comparatively feeble and of short duration. Farther to the East and N.E. they are more decided. The S.W. monsoon commences about the middle or end of April in the China Sea, a little after it is felt in the Gulf of Siam and Tongking, and before it reaches the northern part of its area. It also lasts longer in the southern part of its course than it does in the northern. It is at its height in June, July, and August. The N.E. monsoon or the bad weather season, sets in in the northern part of the China Sea about the end of September or early in October, and lasts till February or March. It sets in with a burst of stormy weather, lasting about a week or ten days, and is in its strength in November, bringing much rain and a turbulent sea. In a subsequent page a further notice of the monsoons will be found.

The ensuing remarks on this branch of our work, derived from various sources, is arranged in a geographical order, as being most convenient for reference. The foregoing introductory portion being sufficient to elucidate the general subject. In them there is necessarily some repetitions. The same topics having to be discussed in each case, necessarily involves this repeated allusion to one subject.

MALACCA STRAIT.—Although the Malacca Strait is within the region of the N.E. and S.W. monsoons, yet the winds are very variable within its limits. There are various reasons for this; the one is, that it lies almost within the limits of the equatorial calms, and therefore the monsoons reach it with diminished force; another is the high land of Sumatra, which impedes the course of the S.W. monsoon, and the N.E. monsoon being the fine season here, the wind is never very strong.

The land and sea breezes are regular on the West coast of Malacca, and also on the N.E. coast of Sumatra which limit the Strait. The monsoons are not always regular, except when they are at their height in the surrounding seas, and at the same time the winds are only moderate in the channel, and only last a part of the day.

The *north-east monsoon*, which, as before stated, is the fine season, lasts from November to May; the S.W. monsoon, bringing rain and thunder, generally commences at the end of April or the beginning of May, and ceases in October. In November the winds often come from the West, and during this monsoon the weather is in general cloudy and rainy, especially during the period that it is strongest. In October and November, at the end of the S.W. monsoon, the winds often vary from N.W. to W., but when the monsoon sets in from the N.E. they are regular in November. The winds are very strong till the month of March, but principally during December and January. Sometimes they vary to N. or N.W., and always during the months of the N.E. monsoon the breezes from the West last during one or two days. During the season of the N.E. monsoon the winds

vary between the N.N.E. and E.N.E. Towards the end of February and March, and sometimes also in the beginning of April, the breezes from the N.E. veer towards the North, and are light and variable. It is found also that the breezes are interrupted by calms during the middle of the day, but during the night and at sunrise they are fresh. The coast of Malacca is much less subject to calms during this monsoon than that of Sumatra.

The *south-west monsoon* is at its height in June and July. During the four months from May to September the winds in the Strait blow principally from S.W. to S., that is, when the S.W. monsoon is at its greatest height in the open sea. During this monsoon calms occur on the N.E. coast of Sumatra, but less frequently there than on the coast of Malacca, and they are rarely of long duration. In general it is calm in the middle of the day, and fresh breezes in the night and at sunrise. It is only in the northern part of the Strait of Malacca that the monsoons are regular.

During the S.W. monsoon sudden and heavy squalls come off the Sumatra coast, generally during the early part of the night. From their direction they are called *Sumatras*, and are accompanied by loud thunder and heavy rain. They are probably occasioned by the mountains on the Pedir coast, and blow sometimes for six or eight hours at a time, strongest at their commencement. In Malacca Road they generally set in at 7 or 8 p.m., and are at their height at midnight, and have caused many ships to part their cables.

The wind does not often come from the N.W., but at times it blows right through to Singapore. They come on very suddenly and violently, but do not last long. They are generally preceded by a black cloudy arch, rising rapidly from the horizon toward the zenith, which only allows sufficient monition to reduce sail as quickly as possible, and should a ship be at anchor, she should immediately weigh, or the burst of the storm will not allow her to do so.

Water Spouts.—In the very excellent and graphic account of the Horsburgh Lighthouse and its erection in the Strait of Malacca, by J. T. Thomson, Esq., F.R.G.S., are some interesting remarks on this curious phenomenon, which, as before stated, is somewhat frequent in these seas. The opportunities afforded during the progress of the works in 1847—1851 gave many unusually good opportunities for observing the peculiarities of their action, of which the following good account is given :—

The curious phenomenon, popularly known as the water-spout, was frequently seen in the Straits, and on two occasions I was fortunate enough to observe them in full action, at a distance of little less than half a mile. On the first occasion, when on board the gun-boat *Charlotte*, off Barbukit Point, at 4 p.m. on the 29th May, a heavy cloud, with rain about to fall from it, was observed to be approaching, driven by the S.W. breeze then blowing.

To the southward the atmosphere was observed to be damp and hazy, while to the North it was clear and dry. On the rain reaching the sea a vapour tube was seen to protrude in the midst from the cloud downwards, gradually lessening in its diameter till it reached two-thirds of the distance between the cloud and the sea, and below which point the tube did not descend. The altitude of the cloud was judged to be about 1,000 feet above the surface. A small attenuated column of white vapour was now noticed to rise out of the sea with a hissing noise, and which was soon surrounded by white vapour disengaged therefrom.

This column quickly effected a junction with the large and heavy vapour tube depending from above, into the centre of which it seemed to be received. The water-spout played for about five minutes, during which time the depending tube appeared alternately elongated and shortened, and the vapour surrounding it maintained a spiral motion. The day was hot.

Again, on the 1st of July another was seen from Pedra Branca, bearing S.W., and approaching the rock. This was at 4.15 p.m. The height of the spout seemed to be nearly 1,000 feet, and its diameter halfway up 50. The depending tube revolved with the hands of a watch, or from West by the North to East, &c. In this one, which was of very large diameter, two columns or tubes of vapour seemed to be in action, one within the other. The depending one, whose massive and opaque vapour was derived from the cloud, enveloped the other, which was thin and attenuated and rose from the sea, with the noise above described, and entered the lower end of the depending tube, through which it seemed to ascend up to the cloud.

The ascending column, as usual, disengaged much white vapour from the surface of the sea, and with which its lower end was surrounded. This water-spout depended from a nimbus, and rain was falling all round it. The nimbus was travelling N.E., and the water-spout was on the advanced edge of it. At 4.25 the depending tube gradually wasted away, until it vanished, when the white vapour of the ascending column parted from the surface of the sea and ascended, like the curling of smoke, up towards the cloud, at the same time the hissing noise ceased, and the surrounding minute spray entirely disappeared.* The atmosphere was clear and dry to the N.E., but rainy and threatening to the S.W., from whence the nimbus travelled. Probably twenty others were seen during the season, but at too great distances for satisfactory observations.

It was invariably remarked that water-spouts formed themselves in rain-clouds, or nimbi, at a time when the rain was about to fall or had fallen for a short time; the state of the atmosphere favourable to their formation

* In this one I observed what was entirely new to me, viz., that the particles of vapour contained in the outer and dependent tube, besides being driven in the helical curve round the inner or ascending column, revolved also round the threads of the helix.

would therefore appear to be just when the capability of the air to support the cloud was in a balanced state.

Squalls.—The larger atmospherical disturbances of squalls formed also interesting objects of observation, the frequency of their occurrence in the Straits of Malacca, and the force with which they sometimes press on the sail, render them of too much consequence to the frequenter of these seas to be lightly considered.

The squalls may be divided into local and general, the first forming in the isolated hills, and influencing the immediate districts only, and the latter termed the "Sumatras," as they invariably come from that island, affecting hundreds of miles on the same day.

The local squalls were observed to form on the only high hills within view from Pedra Branca, viz., Bintang and Barbukit. During the calm months of May and June, should the day be more than usually hot, by noon the moisture of the atmosphere was invariably seen to condense on the cool tops of these eminences, and form into high accumulated masses of vapour, by one or two o'clock the atmosphere being refrigerated and rendered dense in the process would rush down from the summits, displacing the hot and rarified air of the plains, and cooling with its accompanying showers the parched soil. At the change of the monsoons, before either had set in to blow regularly, the local squalls would be seen to spread themselves out from the locality of their formation equally in all directions, upon the surrounding plains. But when either monsoon was blowing, they would be carried in the direction of the prevailing wind,—during the S.W. monsoon towards the N. and N.E., and during the N.E. monsoon towards the S. and S.W. Even during the height of the N.E. monsoon, which blows more steadily than the S.W. one, at night its under current of air would always moderate, if not cease, though, as might be seen by the travelling clouds above, the upper current was not arrested in its progress. At the latter end of the monsoon it has not power to overcome the density of the air overspreading the peninsula, created during the cool of the night, until 10 and 12 and even 4 o'clock of the following day. On such occasions, if the weather be fair and hot, the atmosphere will have condensed its vapour on Barbukit Hill, and from whence heavy squalls will proceed across the Straits of Singapore, assisted by the monsoon. Of this we had many instances, heavy N.E. squalls having taken the gun-boats inside of the Straits, while at the same moment, 10 miles distant, an agreeable and permanent N.E. breeze has been experienced out at Pedra Branca.

The laws that have been observed to generate and direct the local squalls may be safely assumed to operate in the same manner, with regard to the general squalls or "Sumatras" that in the Straits come from the direction of that island during the S.W. monsoon. In Sumatra the regular prevailing wind may be supposed to meet obstruction in the high range of mountains,

that intersect the island in a longitudinal direction, and not having strength at all times to overcome the barrier, is curbed, until, as has been seen to be the case with the local squalls, condensed air has been formed on the highlands, which, with its accompanying vapours, rushes down to displace the heated and rarified atmosphere of the valleys and plains on the lee, and being at the same time urged on by the pent up force of the monsoon now let loose, stretches itself far and wide over the Malacca Straits and the generally low-lying surface of the Malayan Peninsula.

These "Sumatras" were found to arrive at Pedra Branca between the hours of 3 and 8 a.m., and if we be allowed to infer with regard to their time of origin that it is the same as obtains in local squalls, viz. from 11 a.m. to 4 p.m., assuming the distance travelled to be 300 miles, their rate of progression will be 19 to 20 miles an hour. This was corroborated by watching their arrival at distant high points of land seen from the rock, and noting the interval of time consumed in their coming to the rock. A storm or gale is generally estimated to travel at the rate of 32 miles an hour; but it is only for the first few minutes that a "Sumatra" assumes this character, and this only in sudden puffs; they soon decrease in force to a high wind, which is said to travel at the rate of 16 or 17 miles an hour. The approach of a "Sumatra" has much to attract the attention of the student of nature. The most imposing characteristic is in the immense arch that it forms, stretching from the zenith to opposite points of the horizon and below the arch, which is of the darkest hue, there are suspended dark grey vapours, about to descend on the surface of the earth. Above the dark arch will be seen light grey fog banks, over which a slighter arch will be spanning, and which is again crowned by white fleecy clouds, contrasting, if the squall approach at daylight, strongly with the blue sky above and the dark masses below.

SINGAPORE.—The following remarks on the climate, &c., of Singapore are by Dr. R. Little, derived from tables furnished him by Captain Elliott, M.E. They are very important, being based on adequate and well digested data. They are therefore given more at length than in other cases:—

Singapore, though within 80 miles of the equator, through its abundance of moisture, either deposited by the dews or gentle refreshing showers, keeps its atmosphere cool, prevents the parching effect of the sun, and promotes continual verdure. It never experiences furious gales. If more than ordinary heat has accumulated moisture and electricity, a squall generally sets in, followed by a heavy shower of rain; these squalls never exceed one or two hours in duration. According as the monsoon blows, you will have them rising in that direction. In 1841, during the N.E. monsoon, there were four squalls from that direction; but the most severe and numerous are from the S.W., which are called Sumatras, and they most frequently occur between 1 and 5 in the morning. The N.E. monsoon blows from

November to March, and after which the wind veers round to S.E., and gradually sets into the S.W., between which points it continues in May, June, July, and September. The N.E. monsoon blows more steadily than the S.W. one. The temperature of Singapore is one or two degrees cooler during the former than the latter, which also brings more rain. It is further remarked that the wind always lulls at night, during the height of either monsoon. During the S.W. monsoon a wind from the South prevails at times, which is termed by the natives Angin Jawa, or Java winds, because it comes from the direction of that island. This especially exists in September, which is attributed to the usual cooling land breeze being replaced in the mornings during that month by the hotter breeze from the sea; as we advance into the interior this hot breeze is not felt.

TABLE OF THE WINDS.

MONTHS.	Number of Hours in which the Wind is in each Quarter.					
	N.W.	S.W.	N.E.	S.E.		
January	1,389	94	2,097	126	} These observations were taken during five years.	
February	645	105	2,154	277		
March	422	276	2,145	537		
April	746	1,213	1,106	655		
May	524	1,070	356	1,028		
June	343	1,627	286	1,549		
July	456	2,142	185	925		
August	661	1,737	210	1,080		
September	481	1,332	287	704		} Four years.
October	941	1,048	726	347		
November	1,085	412	431	231		Three years.
December	1,207	237	1,370	162		Four years.
Total	8,899	11,293	11,347	7,621		

How beautiful an illustration, exclaims the writer, of the little variation we find in the general laws of nature; though how often do we remark how changeable is the weather. From these observations, carried on nearly five years, the wind blows from the N.E. during 474 days 9 hours, from the opposite direction, S.W., during the contrary monsoon, 470 days 13 hours; another deduction is made, that during the months of December, January,

February, and March, the wind blows more continuously from the N.E. than any other direction; while in the months of June, July, August, and September, the wind is principally to the S.W. During November the prevailing wind is N.W., while its antagonist, S.E., blows in the month of June. Another fact is elicited, viz., that in April we have the winds blowing from the direction of N.W. and N.E. 1,852 hours; and from the S.W. and S.E. 1,868 hours. In October we have them blowing from the N.W. and N.E. 1,567 hours; and from the S.W. and S.E. 1,395 hours: thus the wind, in changing from the N.E. monsoon to the S.W., seems to do so gradually from N.E. to N.N.E., then N.W. to West, then S.W.; and, in changing from the S.W. to the N.E., retraces its progress by retaining its westerly direction, and not reaching the N.E. by S., then S.E. and E., but adopting the same direction, by which it reached the S.W. from N.E., viz., a westerly.

In the same paper the following facts are announced with regard to the fall of rain and quantity of moisture in the atmosphere. In 1820, rain fell on 229 days; in 1821, on 203 days; in 1824, on 136 days; and in 1825, on 171 days; giving an average on 4 years of 185 rainy days, and 180 dry in a year. The quantity of rain that falls is well illustrated in the following table:—

FALL OF RAIN AT THE SINGAPORE OBSERVATORY.

SHOWN BY THE NUMBER OF INCHES.

MONTHS.	1841	1842	1843	1844	Total of 4 years.	Average of 1 year.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	3.750	22.585	18.070	10.219	54.624	13.656
February	6.750	10.900	3.050	6.923	27.623	6.905
March	5.009	7.220	8.045	4.150	24.424	6.106
April	3.010	10.071	5.645	12.300	31.035	7.758
May	6.095	9.003	9.000	7.775	31.873	7.968
June	7.490	6.320	2.270	6.025	22.105	5.526
July	7.228	5.098	8.500	5.890	26.716	6.679
August	7.095	6.025	5.545	5.750	24.415	6.103
September	4.220	4.250	4.055	5.075	17.600	4.400
October	4.070	21.005	12.145	10.200	47.420	11.855
November	12.225	9.420	9.560	6.060	37.265	9.316
December	6.175	4.350	3.415	8.750	25.690	6.422
TOTALS	73.126	116.244	92.300	89.117	370.790	92.697

It will be observed, from the above, that the greatest fall of rain during these four years occurred in January, 1842, and the least in June, 1843. The year 1841 was unusually dry, 73 inches only having fallen, while the succeeding was unusually wet, 116 inches having fallen. This was caused by the unusual dryness of January and October, in the former year; and the unusual wetness of both in the latter. By examining the average for each month, the seasons will be found to be very equable, the least average being for September and June, which respectively have 4.400 and 5.526 inches, and the greatest being, for January and October respectively, 13.656 and 11.855 inches. During the other months the rain averages from 6 to 9 inches. The annual average fall is 92.697 inches, a quantity which is about 2 inches less than the average fall for the latitude of Singapore, as stated by Humboldt, who gives 96 inches as the average fall at the equator.

With regard to the temperature of the atmosphere, in 1841 to 1845, the mean was $81^{\circ}.247$, the lowest mean of a month being, for January, $72^{\circ}.55$, the temperature increases to May, June, and July, which have $82^{\circ}.30$, $82^{\circ}.29$, and $82^{\circ}.24$ respectively. It is concluded, from the above, that the temperature of Singapore is $2^{\circ}.90$ less than other localities in similar latitudes, and that the range between the mean temperature of May and January extends over $2^{\circ}.76$, and adding up the mean temperature of each month of each year, we have the mean temperature as follows:—

Of 1841	1842	1843	1844	and	1845
As 81.28	81.6	81.09	80.82	and	81.66

From which this inference is drawn, that in five successive years the mean temperature did not vary one degree.

Deduction made from other tables gave the maximum temperature for five years at $87^{\circ}.5$, and the extreme minimum $74^{\circ}.7$; the former occurred in June, 1842, and the latter in January, 1843, giving the greatest range as $9^{\circ}.8$. To this I may add, that I have seen the thermometer down to $68^{\circ}.5$ in January of the present year, at Bonny Grass, the residence of Dr. Little, where the thermometer was hung in a building, well protected from the sun, but open on all sides.

From observations taken by Captain Davis during six years, the mean temperature was—

In 1820	1821	1822	1823	1824	and	1825
As 79.5	79.5	80.2	79.8	81.0	and	81.4

These observations were taken at 6 a.m. and noon, and the following taken at Singapore Observatory, during the same hours, gives—

In 1841	1842	1843	1844	and	1845
As 82.0	82.08	81.58	83.7	and	84.04

Thus showing that, in 20 years, the temperature of Singapore Town has increased $2^{\circ}.48$. The cause of this advance of the temperature is assigned to

the country, within 3 miles of the town, being now clear of jungle, and cultivated, which formerly was covered with primeval forest.

Dr. Little concludes his remarks by stating the mean annual solar radiation to be $121^{\circ}.50$, the mean terrestrial $66^{\circ}.10$, and the hourly mean reading of the barometer 29.884 inches, which never varies more than the twentieth of an inch.

Thunder showers frequently occur, particularly at the breaking up of the monsoons. That interesting and wonderful atmospherical phenomenon, called a water spout, is often to be seen in the seas and straits adjacent; they would more properly be called whirlwinds charged with vapour. They occur generally in the morning, between eight and twelve o'clock, and rise to the height of half a mile, in the distance appearing like large columns, supporting the heavy masses of Cumuli above them. I noticed, in October, 1841, six of these attached to one cloud, under action at the same time. In August, 1838, one passed over the town and harbour of Singapore, dismasting one ship, and sinking another, and carrying off the corner of the roof of a house in its passage landward. No other atmospherical disturbances of any moment occur. The typhoons of the China Sea, or Bay of Bengal, do not reach these parts, nor are there hot winds to parch the land. The equable and quiet state of the atmosphere and seasons of these regions consequently create analogous properties in the face of indiginous vegetation. Evergreens abound, few trees shed all their leaves at one time, and many of fruit trees produce all the year round; such that have their seasons of fruit will frequently produce their crops out of season, having small irregular ones at intervening times. This continual verdure is perhaps more grateful to the eye of the stranger than to those who have been accustomed to it; to the former it bears the pleasant appearance of exuberance and fecundity, where the lofty forest not only hangs over the beach, but clothes the mountains to their tops, so unlike the sterile bareness of higher latitudes; while to the other, the continued sameness palls the senses, which lack variety and call for a sterile winter only that they may renew, with doubly keen conception by the contrast, their acquaintance with the beauties of returning summer that here always reigns.

STRAIT of BANKA, &c.—The winds in Banka Strait follow the direction of the coasts, though with slight variations from the influence of the land and sea breezes; and fresh breezes may always be expected when working against the monsoon.

During the shifting months of the S.E. monsoon, sailing vessels are often five and six weeks in making the passage from Singapore to Bauka Strait. In the month of September H.M.S. *Saracen* had the S.E. monsoon strong, with much rain; about the equinox there were several heavy squalls. This monsoon is generally supposed to shift about the beginning of October, but during the whole of this month the wind was only 4 hours from the north-

ward, there being a succession of calms, light southerly airs, a close muggy atmosphere surcharged with electricity, and frequent heavy Sumatra squalls or south-westers. On the 9th of November the monsoon shifted with furious gusts.

These squalls at this season generally take place at night, accompanied with heavy rain, thunder, and lightning. They are of short duration, and it was noticed that when one occurs about the time of full and change, another may be expected an hour later every night till the next change of the moon.

In the **Strait of Sunda** the winds vary between S.S.E. and E.S.E. from April to October, and are then called the eastern monsoon. They are generally W.N.W. and N.W. during the western monsoon, which succeeds the preceding one. This monsoon comes in November, and brings bad weather. There are alternate breezes in this strait; they blow from the South before noon, and from the North in the afternoon, and are separated by an interval of calm.

On the *South Coast of Java* the wind blows from the N.W., while the N.E. monsoon is blowing to the North of the line, from October to April: it ceases in March. In April the winds are variable; and in May are settled in the East. The weather is fine, and the winds are strongest from June to August. In October the S.E. monsoon becomes weaker; and, till the return of the N.W. monsoon, the winds are variable. In May and November a great deal of rain falls on this coast. In February and the first part of the month of March, as well as in October, that is when the monsoon changes, the land and sea breezes are alternately regular; they are weaker in October, February, and March. In these two last months, and also in April, the land breezes commense with squalls, or at times with a heavy storm. After this has passed, the breezes from the land are moderate till the return of the sea breeze. In April and May, on this coast, the sea breeze commences with a heavy squall, or a storm, which does not last long.

JAVA SEA.—The following summary is by Captain Jansen, as quoted by M. Krecke:—

During the month of February the westerly monsoon is still strong and steady: in March it is interrupted by calms and squalls, which become less frequent and less violent in April. Now the easterly winds burst in suddenly; clouds collect and darken the sky, while there are incessant thunderstorms by day and night, and waterspouts are very common.

If the wind changes again to West or North, the sky clears again; but this wind does not last, and the clouds soon re-appear. The rain gradually ceases during the day time, and the S.E. winds prevail throughout the month of May. At the time of the reverse change of the East to the West monsoon, the calms last for a shorter period, as the wind assumes a decided N.W. direction at once, and the showers of rain, accompanied by violent squalls,

are felt only for a short time. Thunder storms are abundant, but only on land, or close to the coast. Toward the end of November the N.W. monsoon is again permanent.

On the *North Coast of Java*, from May to July, the winds blow from the S.E. with a return of the opposite winds, which vary to the N.E. near the West point of the island. During the S.E. monsoon, the winds are S.S.E., varying to E.S.E., and it is fine weather. In October the winds are light, weak, and variable. The N.W. monsoon generally commences in October, but sometimes it occurs in September, or is retarded till November, and ends in March. This is the season of the heavy rains. In the month of December the West winds predominate. Towards the middle of February squalls and tempests occur, accompanied by rain. At Batavia, from April to November, the weather is tolerably fine; but, after that, rain ensues till the end of the year.

On the *Southern Coast of Borneo*, from the Pulo-Laut to the Strait of Sunda, the S.E. monsoon prevails from May to September, like the West of Java. At the same time, in the Indian Ocean, the S.W. monsoon is found to the North of the line. From September to April the West winds blow on this coast, the rains are constant, and the weather often very bad. During the S.E. monsoon the weather, though still humid, is less rainy than during the N.W. monsoon.

Observations carried on for a series of years (1850—1856) at *Palembang*, on the N.W. coast of the south-eastern part of Sumatra, have led to the following results:—From November to March the prevalent winds are westerly and north-westerly. This is the regular rainy season during the West monsoon. April is the month of the change of the monsoons, when thunderstorms are most frequent. From May till September, easterly and south-easterly winds (of the East monsoon) are permanent, and the change comes in September or October.

From this it appears that the wind shifts pretty regularly round the compass, for its mean direction for each month in rotation, counting from South to West, is—

Jan.	Feb.	March.	April.	May.	June.
S. 7° W.	S. 20° W.	S. 30° W.	W. 25° N.	W. 79° N.	W. 85° N.
July.	August.	Sept.	Oct.	Nov.	Dec.
N. 6° E.	N. 21° E.	N. 18° E.	N. 25° E.	E. 30° S.	S. 4° W.

At *Banjermassing*, on the South coast of Borneo, the S.W. monsoon prevails from December to March; the S.E. monsoon from April to October. The change seems to be of short duration. Rain is most abundant from July to October, while thunderstorms are more frequent in the months of November, December, and May, at times consequently later than the changes of the monsoons. There is, however, in this respect, a considerable variation be-

tween individual years. In 1851, eighteen thunderstorms were observed, while eighty-three took place in 1857.

A close examination of the direction of the wind leads to the following results:—The predominant direction of the wind in December is S.W. and W.S.W., and it becomes more westerly in January and February. In March the direction during the day is less constant. In April the S.E. wind becomes prevalent, and increases in steadiness up to August and September. In October it gets round to the southward. In November this is the case, in the morning hours, in a still higher degree; in fact, in the afternoon the wind goes somewhat past the South towards the West. At last, in December, the S.W. monsoon is definitely established.—(*Krecke.*)

GULF of SIAM.—The following account of the winds and weather is by Lieutenant John Richards, R.N., who surveyed the gulf in H.M.S. *Saracen*, in 1855-8. The *N.E. monsoon* in the Gulf of Siam sets in early in November. It is usually preceded by a month of squally, variable, and uncertain weather.

In the months of November, December, and January, the wind blows between N.N.E. and East; generally strong breezes, with the temperature occasionally as low as 65°. Along the eastern shore of the gulf at this time the sky is frequently unclouded for a week together, but on the opposite coast the weather is wet and stormy.

In November and December, strong squalls, with heavy thunder and lightning, are occasionally met with near Pulo Panjang.

Towards the end of January the wind blows more from the eastward, is steadier, and abates in strength.

In February the wind is more constant from E.S.E. than from any other point; it veers between S.E. and N.E., with occasional calms and squalls. Fine weather and smooth water now prevail all over the gulf.

In March the monsoon cannot be depended on. In the middle of the gulf calms prevail; with southerly winds near the shore, and occasional land and sea breezes. Towards the end of the month the weather becomes hot and sultry.

April is the hottest month of the year; calms may be expected near the middle of the gulf; land and sea breezes near the shore, and occasional slight squalls. From the 2nd of April until the 15th of May, 1856, the *Saracen* remained at anchor off the Bangkok Bar, during which interval the river was surveyed, and the four-mile boundary line round the town of Bangkok defined. Towards the middle of April the weather changed, and became gloomy and threatening; at the latter end of the month there were several days continuous and heavy rain, after which the weather became snowery, and continued so during the remainder of the above period. On the 15th the *Saracen* sailed for Singapore, and in the upper part of the gulf had calms and light winds from the eastward, drawing round to the

southward as the Redang Islands were neared. A southerly current was experienced the whole way down to Pulo Aer.

S. W. Monsoon.—In May clouds begin to bank up, and an occasional shower relieves the intensity of a vertical sun. The S.W. monsoon sets in about the middle of the month, sometimes preceded by light flaws of wind and fine weather, but usually with squally weather, and occasional heavy falls of rain. In June, July, and August the S.W. monsoon blows strong, with occasional showers, but generally very fine weather along the western shore of the Gulf; out in the middle a rough sea, and along the eastern shore strong breezes with much rain, and occasionally a fresh gale.

In September the wind is very unsteady, veering between S.W. and W.N.W. in strong gusts. Heavy and continuous rain may be expected in this month.

In October the wind veers between West and North, and abates considerably in strength; the rain squalls are less frequent. Towards the end of the month the wind settles in the North, and the cold weather and fine season set in. Vessels bound to the Gulf from Hong Kong will not profit much by leaving China earlier than the middle of this month.

At the bar of Bangkok River land and sea breezes generally prevail, veering by the East or West according to the monsoon.

The S.W. monsoon is scarcely felt close in shore, between Cape Patani and the Redang Islands, its course being interrupted by the high land in that neighbourhood. To the southward of Pulo Kapas it takes the direction of the coast, veering a few points on or off shore by day or night, under the influence, alternately, of the sea and land breezes.

White squalls are said to prevail in the Gulf, particularly in the month of May.

Black squalls are frequent in the S.W. monsoon; they rise in the westward, accompanied by a heavy bank of clouds, and blow with great violence for a short time, and are frequently accompanied by heavy rain.

Heavy gales are unknown in the Gulf.

Cambodia.—On the coast of Cambodia, in June, July, and August, there are heavy rains, accompanied by S.W. winds. The monsoons are not regular on this coast, and land and sea breezes are met with when the prevailing monsoon is weak. The breezes do not last more than five or six hours during the S.W. monsoon, and are not so fresh as those which prevail at the end of the N.E. monsoon. In Pulo Timoan and Pulo Condore the N.E. monsoon is established towards the 15th of October with fine weather. The S.W. monsoon brings rain, and lasts during eight months. Near these islands, in November, there are alternately calms, storms, accompanied by rain, and typhoons. At Pulo Condore the rains last for a month after the N.E. monsoon is established, and at Pulo Timoan the wind becomes unsettled in September, and the change of monsoon brings bad weather. In

November the weather is fine. On the coast which extends between the Gulf of Siam and Cape Padaran the S.W. monsoon blows along the shore. Sometimes, near the land, during the night, a light land breeze is found succeeded by an interval of calm, which is followed by the wind of the monsoon, which blows fresh during the rest of the day. On the same coast the N.E. monsoon is established from the end of September or beginning of October to the middle of April.

Cochin China.—On the coast of Cochin China wintry weather is found with cold northerly winds and rain, which prevail from December to February. Heavy rains occur in the months of September, October, and November. During the N.E. monsoon easterly winds are frequent. Between the Paracels and the coast the same wind is found as far as Cape Varela; and in this channel calms are frequent, while on the offing from this bank the monsoon blows fresh and regularly. During the S.W. monsoon, on this coast, the land and sea breezes are tolerably regular, the sea breeze being replaced by a land breeze every evening, which blows every night, followed by a calm light wind, although not always commencing at the same time. This wind generally lasts till noon, when the S.E. wind again sets in. On the coast of Cochin China the winds are variable during the whole year, and the monsoons generally light. The leeward coast is not dangerous with the N.E. monsoon.

The EASTERN PASSAGES.—The foregoing remarks refer to the great highways which lead directly into the China Sea from the Indian Ocean, and are taken by most ships during the favourable monsoon.

The following will describe the winds and weather of that part of the Indian Archipelago to the eastward of Java, among the islands and channels which are sometimes called the eastern passages, those used during the adverse monsoon. Some of these remarks are extracted from the late Captain de Kerhallet's work on the meteorology, &c., of this region.

Around the islands East of the Strait of Sunda, as far as Timor, the monsoons are the same as have been described before; that from the East commences in May, and the winds vary from East to S.S.E. These winds are strongest in June and July. This monsoon is finer than that from the West, which brings bad weather during November and December. The rains commence in this month, accompanied by squalls and winds. The western monsoon commences in November, and attains its greatest force in January. The rains fall from December to the middle of February, accompanied by storms and tempests. Then the monsoon gradually weakens till March; in April the winds are variable, and the weather is fine.

Among the Archipelago and the intervening seas to the South and East of Borneo there are usually two monsoons, generally called the North or West monsoon, and the South or easterly monsoon, some saying that the wind hangs more to North than to West in the former and more South than East

in the latter. The first corresponds with the N.E. monsoon North of the equator, and the second with the S.W. monsoon. But from the configuration of the islands, the direction of their mountain chains, and the effect these have in causing the rain clouds to deposit their moisture, these alternating monsoons are much less regular than they are in the open ocean, far from these disturbing causes. In general, it may be remarked that to the South of the equator, as far as the parallels of 10° or 12° S., the direction of the wind differs ten or twelve points from that prevailing to the North of the equator at the same period; that is, to the North of the equator if the wind or monsoon is from North, that to the South of the line will be N.N.W.; and if the southerly monsoon is blowing North of the equator, in the Eastern Passages, it will be from E.S.E. or East.

In the *Strait of Bali* the wind often blows from the North with much violence, and in that of Sapy there are alternate breezes from land and sea. They blow from the South in the morning, and from the North about two hours after noon. There is often an interval of calm between them. In the other straits, to the East of Java, the winds are of a singular nature, and also very variable.

In the *Java Sea*, as in the neighbourhood of the Moluccas, the N.W. monsoon commences in the first part of November, but does not attain its greatest force till near the end of December. It lasts till the end of March, when the intervals of calm commence, with variable winds, squalls, and rain. The S.E. monsoon commences in April, and gets gradually stronger till May; it ends in October, during which month the winds are variable. This is the law generally observed in these two seas, except that it must be remembered that there are variations in the direction; it draws sometimes to the North and West, and sometimes to the South and East. Besides this, the changes of the monsoons do not take place at settled times; that of the S.E. is subject to calms, and the wind is less stormy, while it lasts, than during that of the N.W. monsoon.

Arafura Sea.—In the sea lying between New Guinea and Timor, the easterly monsoon commences in April, and continues until the beginning of October, when, after a few weeks of variable winds, the westerly monsoon sets in, and continues without intermission until the beginning of March. In the southern part of the Indian Archipelago generally, the easterly monsoon is attended with fine weather, but on the S.W. coast of New Guinea, and among the islands to the westward, as far as the East coast of Celebes, frequently squalls, with heavy rain, are experienced at this season, often accompanied with considerable swell from the southward, while, during the remainder of the year, the weather is fine. This rule, however, does not extend farther to the westward, for from Celebes to the western extremity of the Archipelago, and also on the North coast of Australia, the westerly is the rainy monsoon. The monsoons, when at their height, usually blow in

an E.S.E. and W.N.W. direction ; but towards the change they draw round more to the southward, sometimes continuing several days at S.W.

The easterly monsoon brings rain, on the eastern part of the Archipelago, as far as Celebes ; beyond this, to the westward, the westerly monsoon is the rainy season. The effect of this on the vegetation of the different islands has been before alluded to. It would seem to be only accounted for by the fact that the monsoons are deprived of their rain-cloud soon after encountering the land. The easterly monsoon, blowing over the Pacific, breaks over New Guinea, the Moluccas, and the eastern side of Celebes, the high mountains of the first-named keeping the rainfall off the North coast of Australia and Timor. The southern part of the latter and northern Australia are open to the westerly rain-bearing winds of the Indian Ocean.

On the *West Coast of New Guinea* two monsoons occur, one from the S.E., which lasts from April to October ; and the other from the N.W., which commences at the end of October, and terminates towards the end of April. In January the wind near this island varies from N.N.W. to N.E. ; in the spring the weather often changes ; and in March, April, and May, the weather is squally. From June to September a great quantity of rain falls ; and from October to May the weather is fine and calm, without clouds or fogs.

To the *North of Bourou and Ceram* the S.E. monsoon varies between S.S.E. and S.S.W., and at the Isle of Amboyna from East to S.E. In the same isles the N.W. monsoon varies from W.S.W. to N.W. This last, which is often called the westerly monsoon, is during the stormy season in these isles, and ends in April. The S.E. monsoon commences in March, and lasts till November, and is the rainy season. During this monsoon violent storms occur in the Moluccas, and rain falls abundantly over the largest islands of the Archipelago. This monsoon ceases in November. The North and N.W. monsoon does not set in till some time after ; for, during two months, the winds are alway variable in these seas towards the end of the monsoons. From October to April the weather is moderately fine.

In the Moluccas, which occupy a space between 5° North of the equator, and 1° South latitude, the winds are much less regular, because there is a great difference between the monsoons which exist in the two hemispheres at the same time.

In that part of the *Arafura Sea* between New Guinea and Australia, during the month of January and the commencement of the western monsoon, the winds are generally from the N.E. to North, occasionally drawing to the westward. Near the N.E. coast of Australia, as far as the parallel of 14° S., winds which vary from N.E. to W.N.W. prevail, and more to the South they come from East and E.S.E.

Between these two monsoons there are frequent calms of long duration, and the time of the change from the S.E. to the N.W. monsoon is the period

when these long calms mostly prevail. When the monsoon is about to be established, westerly winds blow for five or six days; then they cease, and are sometimes succeeded by light variable winds for a month. Then, at the following syzygy, the monsoon becomes established, accompanied by gloomy rainy weather, and sometimes squalls, for two or three days. The weather then clears, and there is a moderate breeze for some time, producing clearer and finer weather than is felt during the S.E. monsoon. Two or three days wet weather is to be expected at the time of the syzygies, although sometimes for five or six weeks continual fine weather may have prevailed. Near the land the weather is always more stormy and rainy than it is farther out at sea, although at the limit of the monsoon in the parallel of 15° S. latitude the weather is generally wet and stormy. The mean direction of the wind is nearly W.N.W., varying to N.W. and S.W. at the time of the syzygies; during these periods it is often W.S.W.

In the *Timor Sea*, and that part of the sea situated between the Arru Isles and the North coast of Australia, as well as in the vicinity of Torres Strait, the S.E. monsoon blows with much regularity. Towards the middle of it, from May to August, it varies from E.S.E. to S.E., and is then very strong. The Malays call this the white season. In the beginning and near the end of this monsoon the wind is due East, sometimes veering to E.N.E. During this monsoon the breeze is generally fresh and steady when the moon quarters, and we find calms and unsettled weather at the time of the syzygies. This fact has also been remarked in the trade wind of the eastern coast of Australia. In Torres Strait easterly winds prevail. The westerly monsoon does not blow steadily, but is often modified by the East wind, which is then light and variable, lasting several days, till it strengthens to a fresh breeze.

On the *North-west Coast of Timor*, in September and March, the N.W. monsoon, varying to N.N.W., is in force. In April or May it is followed by that from S.E., varying to S.S.E., which ends in October. The N.W. monsoon, as before stated, is the bad weather season, and the winds in December are very violent. This monsoon is only well established at the end of November or December, and heavy winds, accompanied by rain, blowing between West and North, continue till February. At the end of April, or beginning of May, the wind returns to East, varying to South; they are very strong on the North coast of the island, where it is then the fine season. The strongest winds vary West by South and N.N.E. On the opposite coast of this island there is a great difference between the winds. The S.E. monsoon is very feeble on the South coast, and strong on the North. On the South coast there are storms during the first part of October; while on the North these are only felt in December. During the fine season the land and sea breezes are strong on both coasts. On the South the land breeze varies from N.E. to North, the sea breeze from S.S.E. to S.S.W.

The *Island of Celebes*, like that of Borneo, is divided into two parts by the equator, and the same remarks given previously for the monsoons at Borneo, are applicable here. On the South coast the S.E. monsoon is established from May to October, and the S.W. monsoon prevails on that part of the island which is North of the equator at the same time. The S.E. monsoon, which lasts from May to October, on the coast of Celebes, situated South of the equator, brings the driest season. The N.W. monsoon replaces the S.E. towards October, and continues till April, when rain is almost perpetual, and the wind strong. During the two months when the sun is vertical over the island, and near to the syzygies, there are invariably northerly winds and rain. On that part of the island situated North of the equator, the N.E. monsoon in October replaces the S.W., making the fine season. In the North part of the Strait of Macassar, from May to October, a S.E. monsoon is found on the East coast of Borneo; also between Celebes and Gilolo, it is succeeded by the N.W. monsoon, continuing from November to April. In the South part of the Strait the wind is N.E. in April, May, and June; but there is less in August and September. During October, November, December, and following months, fresh breezes prevail from W.S.W. to W.N.W. in these latitudes. Near the West coast of Celebes, from May to October, we find land and sea breezes, while on the opposite coast of Borneo the wind is steady from the South. From November to April, on the western coast of Celebes, the wind varies from W.S.W. to W.N.W.; in April, May, and June, it is from N.E., but is light during the month of August. It has been remarked that when the S.W. wind prevails on the Celebes coast, about 6 leagues off the coast it becomes W.N.W. and N.W. on the coast of Borneo. During the S.E. monsoon, from May to October, a vessel cannot contend against it on the low coast of Borneo; and on this coast, in this season, light land breezes are found, while on the corresponding coast of Celebes, which is elevated, a fresh land wind blows during the night, followed during the day by a sea breeze. In December we generally find alternate winds near Celebes. In August and September the winds are light; but sometimes off this coast storms from the S.W. occur, and long calms.

In the *Celebes Sea and Sooloo Archipelago* easterly winds prevail in October, but are not regularly established till November. In May they are replaced by westerly winds, and in a month become established to terminate in October; the climate is then made up of rain, squalls, and tempests, which take place generally in July and August. In September a heavy mist hangs about the coast of Mindanao. At the commencement of the westerly monsoon the winds are light for some time, with heavy rain, during which the wind blows in an opposite direction, sometimes lasting from the eastward more than a week. Occasionally heavy storms happen until the westerly wind becomes established. During this monsoon the weather is cloudy, rainy, and sometimes stormy; and in this season we find between Mindanao

and Celebes that heavy storms take place from N.W.; the westerly winds sometimes last till November.

In the *Sooloo Sea* the East and N.E. monsoon is not a steady fresh breeze, but often varies. In the neighbourhood of Mindanao the northerly winds never blow fresh, but are often displaced for several days by light changeable winds, which again occurs at the end of January, and it is considered that the same winds prevail from the Sooloo Archipelago to Manila.

The *Island of Borneo* forms the N.W. and western boundary of the China Sea, and is intersected by the equator, and the result is as in Sumatra, that the monsoons of the N.W. coast do not take place at the same time as those on the West coast. The S.W. monsoon prevailing on the N.W. coast from May to October, at the same time as the S.E. monsoon is on the West coast, and the N.E. monsoon blows on the N.W. coast, while the N.W. monsoon prevails on the West coast. On the northern part of Borneo the S.W. monsoon is not established till between the 15th and 30th of May, when there is continual rain. The weather is not so bad in September, and the dry season sets in with the N.E. winds, varying to the East. However, this can hardly be called the dry season; for, in consequence of its position under the equator, the island is incessantly inundated with rain. On the West coast the S.E. monsoon prevails towards the end of May, and fine weather then sets in. From September to April the West or N.W. monsoon occurs, with continual rain and heavy gales.

The weather at *Labuan*, on the N.W. coast of Borneo, is generally very fine; the land and sea breezes are seldom interrupted. A large quantity of rain falls annually, but this generally comes off the coast of Borneo in squalls, which most frequently occur between 8 p.m. and midnight, and blow heavily, especially in June and July. In the S.W. monsoon the land breeze, which usually commences with these squalls, lasts until 7 or 8 a.m., and is a steady, fresh breeze, whilst in the N.E. monsoon it is light and variable, and, if blowing hard in the China Sea, it is not felt at Labuan.

The sea breeze in the S.W. monsoon usually commences at noon, and lasts until 4 or 5 p.m., seldom exceeding a royal breeze; but in the N.E. monsoon it commences earlier, and lasts until 7 or 8 p.m., hanging well to the northward, and blowing fresh. January, February, and March, are the dry months; only 2.2 inches of rain fell in those months in 1865.

The monsoons on the coast of *Palawan* are so subject to interruption, being influenced by local circumstances and other causes, that it is difficult to say at what period either fairly sets in. The barometer is of little use in prognosticating the changes; the difference in the column of mercury for the whole year, seldom exceeding two-tenths of an inch. In general the mercury rises to N.E. and easterly winds, and falls to S.W. and westerly.

In January to April moderate N.E. and easterly winds prevail on the coast of Palawan, and on the coast of Luzon land and sea breezes have been

experienced with considerable regularity. May, and the early part of June, appear to be the finest period of the year on the coast of Palawan, when land and sea breezes prevail with tolerable regularity, the former coming fresh from the South and S.E. in the morning, and the latter from the North and N.W. in the afternoon.

Towards the end of June, and throughout July, unsettled weather, generally commencing about the change of moon, may be expected. A slight depression of the mercury, after a succession of fine weather, frequently indicates the approach of strong W.S.W. squalls, which are usually accompanied by dark cloudy weather and much rain, lasting for a week or ten days. These are generally succeeded by a period of fine weather, with N.W. and S.W. winds, which draw to the southward and eastward in the mornings. If June or July have been unsettled, it may be expected that August generally will be fine, with moderate S.W., but more frequently westerly winds, particularly in the afternoon. If, on the contrary, June or July has been tolerably fine, very unsettled weather may be expected in August.

In September and October the wind generally blows strong from the W.S.W., with dark, cloudy weather; and off the S.W. end of Palawan squalls, which veer to W.N.W. and N.W., sometimes blowing with great violence, succeed each other rapidly, and are accompanied by rain. Between the squalls the wind very often shifts to S.E. In November and December the weather is variable; N.E. and easterly winds, changing at times to S.E., more frequently prevail.

Among the *Philippine Islands* the two regular monsoons prevail, which are met with in the China Sea. These monsoons sometimes extend as far South as the Mariana Islands in the Pacific Ocean, and as far North as the coast of Japan. The Philippine Islands, lying North and South, their high lands naturally intercept the course of the wind; and the result is that at forty or fifty leagues from them much bad weather is encountered, which becomes much worse as the islands are approached. The N.E. monsoon commences about October, with fine weather, lasting till April, with winds varying from North to N.E. If it should occasionally veer to N.W. it blows hard. The S.W. monsoon is not observed here till between the commencement and end of May, and does not become regular till June. During this monsoon the weather is gloomy, cloudy, and very wet. About this period severe storms sometimes occur, called "collas tempestados," which are generally accompanied by thunder and rain, the wind changing about and blowing from all points of the compass with the same force. These collas and bad weather take place at the end of July, or middle of August, and sometimes in October. They are not unlike the typhoons. In September the wind loses strength, the rain is less, and the sky is fine; but in the morning there is a thick fog, which lasts till noon. At the change of the monsoons bad weather is sometimes felt, as in the China Sea. During

February and March, about the end of the N.E. monsoon, on the coast of Luçon, the wind varies, often with a tendency to follow the course of the alternate land and sea or solar breezes. The alternate winds are well established in April; and from June to October, the period of the S.W. monsoon, the wind brings rain, which blows on the coast at right angles.

II.—CURRENTS AND TIDES.

It will be manifest that if it be difficult to define exactly the direction and seasons of the monsoons which blow over the Indian Archipelago, it will be still more difficult to describe the currents. Ocean currents are induced, in a great degree, by the prevalent direction of the wind, which having free scope over both land and sea, has a much more persistent character than that of the surface water, driven through tortuous channels, often lying transverse to the normal direction of the wind.

Again there are anomalies arising from the tidal streams, the flood tide from the Pacific, and that from the Indian Ocean, both being directed to the same quarters, produces many apparent complications.

As a general rule, the *true* current sets to leeward, impelled by the trade wind or monsoon prevailing at the period, and when the waters have to pass through the narrow straits between the islands it often rushes past with great velocity.

But then this true current is frequently overcome or accelerated by the tidal streams reaching it in opposite directions; and, therefore, each strait requires special exemplification, and this will generally be found in the description of the coasts which follow these preliminary chapters.

One general remark may be made. A large portion of the archipelago lies between the two great tropical drifts to westward; in other parts of the world, as on the Guinea Coast, and in the Gulf of Panama, a *counter* current is found near the equator running to *eastward*, between these westward drifts. It cannot be said that such a counter current is found in the Indian Archipelago; but the same causes, difficult to define, which produce this equatorial counter current, will help to make the movements of the waters here more complicated and difficult of comprehension. North and South of this central belt on the eastern coasts of Asia and Australia, the equatorial streams recurve and form streams analagous to the Gulf Stream in the Atlantic; and this is especially the case in the stream flowing through the Formosa Channel past the Japan Islands. This was first defined by the Editor in his Pacific Directory as the Japanese Current.

The temperature of the ocean in the Archipelago is high, as might be expected; and, from its peculiar condition, it may be looked on as the head waters of that great circulatory system, which reaches every portion of the ocean in its course, and gives one universal character to the waters of the ocean. Sea water, as is well known, possesses the same characteristics in every known part of the world, and from the surface to its bed. This can only have arisen from the entire circulation and intermingling of the whole mass of the waters of the ocean, which has passed over every portion of its bed. A few brief remarks on each locality will suffice to give a more particular notion of the movement of the waters in its vicinity.

MALACCA and SINGAPORE STRAITS.—The great island of Sumatra, from its lying directly across the line of direction of the two monsoons, causes the currents which enter, or run out of the China Sea by the Malacca Strait, to be much modified by tidal influences. As a broad rule, it may be stated that the waters flow to West and N.W. during the N.E. monsoon, between November and March, and set in the opposite direction with a lesser velocity during the S.W. monsoon, which blows the water into the Bay of Bengal. In September, while the S.W. monsoon still lasts, a strong current sets eastward around the South part of Ceylon, and thence directly for Acheen Head in Sumatra, where it is divided, a portion running down the West Coast of Sumatra to S.W., and the other as a weak current down the Strait of Malacca. In October this drift is weak and uncertain, but in November, when the N.E. monsoon is in full force, the current to N.W. and along the North Coast of Sumatra runs at the mean rate of a mile an hour. From December to February this current still moves to leeward, and in March and April is sometimes very strong. When the S.W. monsoon sets in, in May or June, the reverse current commences, and in July and August attains considerable strength, and thus continues, with some fluctuations, until September or October.

But all these movements of the waters are much mixed up with the tidal streams. The flood tide enters the Strait of Malacca from the N.W., and is met somewhere in the Strait of Singapore by the flood stream coming from the China Sea.

In the Strait of Singapore the true current streams become still more marked by the tides. During the construction of the Horsburg Lighthouse at its eastern entrance, and therefore open to the influences directly coming from the China Sea, Mr. Thompson made the following observations:—The tidal currents set through the Middle Channel, that is, to the North of Pedra Branca, in a N.E. and S.W. direction, through the South Channel, between

Pedra Branca and the Bintang shore, in an E.N.E. and W.S.W. direction, and through the North Channel between Romania shoal and islands, in a N.N.E. and S.S.W. direction. The currents are much affected by the prevailing winds; they set strongly into the straits during the continuance of the N.E. monsoon, and in a contrary direction during the S.W. monsoon. This is particularly the case during neap tides. It is high water at full and change at Pedra Branca at 10^h 35^m a.m. The flood runs into the Straits and the ebb outwards, but the current does not generally turn till half ebb or half flood, that is, if low water be at 6 a.m. the current will run ebb till 9 a.m., although the water be rising on the rock. At 12^h noon it would be high water, after which the tide would fall, but notwithstanding this the current would run flood till 3^h p.m. before turning; but there are frequent exceptions to this rule, for I observed during the months of May, June, and July, when the morning ebb tides fall strong out till three hours after the tide began to rise on the rocks, and then continued slack water all day; while in the months of October and November, when the evening ebb falls much lower than the morning one, the tidal current would set strong out all night and continue slack inwards during the next day. At full moon, in August, 1851, I found the perpendicular rise and fall of tide was only 2 ft. 9 in., but three days afterwards it was 6 ft. 7 in., which was the greatest during three springs. In July the greatest rise was 7 ft. 9 in. The neap tides only rise and fall 1 ft. 7 in.

Again he says:—The current at times is not less than 4 miles an hour, and probably nearer 5, though this is unusual, and 2 to 4 knots may be taken as the usual strength, though much variation was observed during different months. Strong ebbs prevailed during the mornings of May, June, and July, and on the evenings of October and November strong ebbs also prevail. During the S.W. monsoon the floods do not run so strong as the ebbs.

STRAIT OF SUNDA.—The currents in this Strait are more of the nature of tides, although very much affected by the winds. During the S.E. monsoon the ebb tide on the South side of the Strait frequently sets to westward at from 1 to 2 knots, and lasting for fourteen hours, succeeded by a slack water or weak flood for six hours. In the middle of the Strait the velocity is greater, from 2 to 3½ miles per hour. When the winds are light, the flood to N.E. and the ebb to S.W. succeed each other regularly, and their rate is about equal, but at spring tides and in the middle of the Strait they attain a rate of 3 or 3½ miles an hour. In the opposite season of the westerly monsoon the ebb and flood are generally regular, but during strong gales the flood lasts longest. In February and March a strong set to the W.S.W. is sometimes met with on the North side, reaching a velocity at times of 4 to 4½ miles an hour. In the description of the Strait in a subsequent page, this topic will be again alluded to.

IN BANKA STRAIT and the adjacent passages there is much complication in the movements of the waters, arising from two causes, the one is the meeting of the flood tides from the China Sea and from the Indian Ocean, and the other is from the peculiarity of the monsoons, which, as explained in our Indian Ocean Directory (pages 29—36), are here an intermediate belt between the northerly and southerly monsoons on either side of the equator. Occurring during the southern summer months, November to March, and coming from the N.W. is called the middle or cross monsoon. During its greatest strength, January to March, the current or ebb tide sets to southward for fourteen to eighteen hours at a time, with a rate of 2 to $3\frac{1}{2}$ knots, and the flood from South is then scarcely perceptible. The reverse occurs during the S.E. monsoon, the flood stream setting with great velocity to the northward, while sometimes the ebb runs out weakly for eight or ten hours. To the northward the N.W. monsoon has more effect than the S.E. monsoon, and the reverse is the case in the opposite season. Between the monsoons the tidal streams are regular, but when the monsoons are blowing strongly, a constant surface drift is found setting to leeward on the Sumatra shore.

GULF OF SIAM.—The following is by Lieutenant Richards, who surveyed the Gulf:—

The currents in the Gulf of Siam, near the middle, are generally weak and variable, but near the land, in the strength of the monsoons, strong sets may be expected. In the S.W. monsoon a strong northerly current was found, from Lem Chong P'ra to Sam-roi-yot Point. In the N.E. monsoon there is frequently a strong set across the head of the Gulf to the westward.

In the neighbourhood of the Redang Islands and Pulo Obi, the strong currents prevalent in the China Sea may be expected. The China Sea current does not appear to enter the Gulf further than a few miles, but is said to set across its mouth in both monsoons.

The flood tide from the China Sea appears to meet the western shore of the Gulf, and divides somewhere near Cape Patani; for at the Redang Islands the flood sets to the southward, and at Singora and Koh Krah it was found setting to the northward.

CHINA SEA in the SOUTH-WEST MONSOON.—The currents in the China Sea are very changeable, their direction and velocity depending much upon local circumstances. Late in April, or early in May, they generally begin to set to the northward, in the southern and middle parts of the sea, and continue to run in a north-easterly direction until September, while the S.W. monsoon is strong; but they are not constant in this monsoon, for at times, when the wind is moderate or light, they are liable to change and set in various directions. After the strength of the monsoon has abated, there is often little or no current in the open sea, running to the north-eastward; but sometimes its direction is to the southward.

Along the coast of Cochin China, from Pulo Obi to Cape Pandaran, the current sets mostly to the E.N.E., parallel to the shore, from April to the middle of October; and during the same period its direction is generally to the northward along the East coast of the Malay peninsula, from the entrance of Singapore Strait to the Gulf of Siam. To the northward of Cape Padaran there is but little current in the S.W. monsoon, near the Cochin China coast; for, from thence to the Gulf of Tong King, a small drain is sometimes found setting northward, at other times southward. When a gale happens to blow out of the latter gulf from the N.W. and westward, the current at the same time sets generally to the S.W. or southward, in the vicinity of the Paracel islands and reefs, or where these gales are experienced; and this current running obliquely, or contrary to the wind, a turbulent and high sea is thereby produced.

On the Southern Coast of China the current is much governed by the wind; when strong S.W. winds prevail, it runs along shore to the eastward, but seldom strong. Near and amongst the islands, westward of Macao, there is generally a westerly current, occasioned by the freshes from Canton River, which set in that direction; frequently sweeping along the islands from Macao to St. John between W.S.W. and W.N.W., about 1 or 2 knots per hour. This westerly current is, however, not always constant in the S.W. monsoon, for it slacks at times; then a weak tide may sometimes be experienced running eastward.

On the coasts of Luzon and Palawan, the current generally sets northward in the S.W. monsoon, but frequently there is no current, and near these coasts it seldom runs strong. Near the Bashi Islands it sometimes sets eastward when strong westerly winds prevail; but generally strong to the northward, or between N.N.W. and N.E.

In the NORTH-EAST MONSOON.—The current in the China Sea during the N.E. monsoon generally runs south-westward, with a velocity depending on the strength of the wind. When the force of the monsoon is abated, or during moderate and light breezes, there is often little or no current.

In the western parts of the sea, along the coasts of Cochin China and the Malay Peninsula, the current generally begins to run to the southward about the middle of October (sometimes sooner on the former coast), and continues until April. During the month of March its direction is constantly to the southward about Pulo Aor, with light easterly winds and calms at times. On the coast of Cochin China, and adjacent to Hainan Island, a current varying from South to S.W., commences sometimes about the middle of September; near the land, from lat. 15° N. to 11° or $11\frac{1}{2}^{\circ}$ N., it increases in strength; but its rate decreases in proportion as it flows southward. During the prevalence of the N.E. monsoon, from about lat. 14° N. to Cape Padaran, the current near the coast frequently runs 40 or 50, and sometimes 60 miles to the southward in 24 hours; the rate, however, is variable, and it is only

in the limits above mentioned that it is occasionally so strong, for its strength abates at Cape Padaran, and runs with less velocity to the S.W., towards the entrance of the Gulf of Siam.

On the Southern Coast of China the current, during the N.E. monsoon, runs almost constantly to the W.S.W., nearly parallel to the land; and sometimes with inconceivable rapidity, when a typhoon or a storm happens. At the distance of 70 or 80 miles from the coast, it seldom runs so strong as near it; and in 30 or 40 fathoms soundings there is much less current than in shoal water, near the shore and amongst the islands. The westerly current sometimes slacks, and, contiguous to the land, is succeeded by a kind of tide.

Between Formosa and the China coast the current runs to the southward during the N.E. monsoon. When strong N.E. winds prevail, its direction is generally to the S.W. or southward, between the South end of Formosa and the North end of Luzon; but here, in light variable winds, it often sets to the northward. On the West coast of Luzon the current is changeable, sometimes setting southward along the coast, at other times northward. On the coast of Palawan it is also mutable, governed by the prevailing winds, but seldom runs strong in any direction, unless impelled by severe gales. To the eastward of Formosa, about Boteltobago Island, it frequently runs strong to the northward and north-eastward, so early as the 1st of March; and although changeable at times, it sets mostly in that direction during the S.W. monsoon; and in the opposite direction during the N.E. monsoon.—(*China Sea Directory.*)

EASTERN PASSAGES.—The currents in the passages East of Java are very various, and, like the monsoons, do not seem to be reducible to any fixed laws, a feature doubtless due to their geographic relations, lying as they do between the wind systems of the northern and southern hemispheres. But as their action is frequently of importance in endeavouring to make a passage against an adverse wind, they require much attention. The following imperfect notes, derived frequently from the Dutch, are given as a guide to their general character.

SOUTH COAST OF JAVA.—The monsoons here are liable to great deviations, although they frequently shift about the middle of April and November. This is owing in some degree to the mountainous character of the island; and there are some remarkable reverse currents experienced when within a degree or two of the coast. The Dutch officers, Lieutenants Rietveld, Eschauzier, &c., say that during the easterly monsoon, April to November, a constant *easterly* current is encountered, or running against the monsoon at times so strong as to ripple, but on an average of 10 to 12 miles per day. The drift is frequently to S.E. two-thirds of a mile an hour. Captain M. H. Jansen has stated that in the eastern monsoon the current sets to the westward from full to change of the moon, and either to the eastward from the

change, or that there was no current. It is also certain that there is a considerable set to the westward in this monsoon, especially near the shore. In the westerly monsoon the current is sometimes to the S.S.E. and South, decreasing in force to between 11° and 15° , and then ceases, and a strong westerly current is encountered increasing in velocity as the Strait of Sunda is approached, amounting at times to 42 miles per day.

BALI STRAIT.—The currents or tides run through the Narrows of Bali Strait with great velocity, some say 6 knots, and cause great rippings, eddies, and a boisterous sea, particularly near the Bali shore during the eastern monsoon, when the S.S.W. winds blow so strongly that it is often impossible to manœuvre a ship. The flood runs to the northward and the ebb to the southward, and at full and change of the moon it is high water there between 12 and 1 o'clock. About quadrature of the moon, and particularly near the last quarter, the tides are very irregular; they change first on the Java side of the strait, and only $1\frac{3}{4}$ or 2 hours later on the Bali shore. During the eastern monsoon the flood is often found only near the Java shore, and even there not to the northward of Batu Dodol, but during the western monsoon the northerly currents prevail. A tide lasts often for 7 or 8 hours.

TIMOR, ETC.—The currents are strong, with great rippings, in the Ombay passage, and the Straits to the northward of Timor, generally setting to the N.E. during the western monsoon, and during the opposite to the south-westward; but in some places, close in-shore, a kind of weak tide has been experienced. Near the entrance of the Straits of Alloo and Pantar the current takes a northerly direction during the eastern monsoon, but during the western monsoon it sets out S.S.W. The strong current in the Ombay Passage seems to cause a strong easterly current along the North coast of Ombay during the eastern monsoon.

In June the S.W. or westerly currents in the Ombay Passage seem to have attained their greatest strength, amounting to 72 or 82 miles in twenty-four hours.

Near the end of the eastern monsoon (in August and September) strong easterly currents take place in the Ombay Passage, though in October they often run with great velocity to the south-westward.

Ships from Java or Macassar, bound to Amboina, during the eastern monsoon, work along the North coasts of Sombawa, Flores, &c., till they have reached the N.W. or North point of Wetter; or further to the eastward, if bound to Banda; and the voyage is often much accelerated by favourable currents.

NEW GUINEA, ETC.—During the easterly monsoon, the current sets to the N.W. along the western coast of New Guinea and between the Ki and Arru Islands, and thence eastward along the South coast of Ceram, at the rate of a mile or a mile and a half an hour, according to the strength of the wind,

the velocity being greatest along the coast of New Guinea. At this period an easterly current prevails on the North side of the islands, extending from Timor to Timor-Laut, so that a moderately fast vessel would experience no difficulty there in beating up against that monsoon. In the westerly monsoon the current in these seas usually sets with the wind, but its velocity is not so great as during the other season.

Of the currents on the North coast of New Guinea we have but few particulars, and these chiefly from D'Urville, who sailed along it in August, 1827, where he found strong westerly and N.W. currents of more than a mile an hour. It is probable that this westerly drift is constant, and that, arriving at the Moluccas and Philippine Islands, it is diverted more to the northward, and finally assumes the N.E. direction along the coast of China, which has been previously adverted to.

III.—TIDES.

But little can be said here to give a general view of the tides in the Indian Archipelago. Each particular locality and strait would require a special exemplification, which as far as we have the means, is given in the local descriptions in a subsequent part of the work.

The flood tidal wave from the Indian Ocean, proceeding in a N.E. direction, is mainly obstructed by the line of islands which it encounters in its whole breadth. It passes through the various channels with considerable rapidity when favoured by the monsoon, or is almost annihilated by the contrary season. In the former case it passes on till it meets that which comes from the Pacific and China Sea, thus neutralizing each other, and occasioning much complication, and the phenomena of double tides. In the different seasons the tides from this cause are in some cases quite reversed, the high water hour corresponding in one case with the low water period of the other.

Free from the entanglements of the Archipelago, the great tidal wave pursues a normal course in the Pacific, and, according to the China Pilot, it strikes upon the eastern coast of China, from Hong Kong to the Yang-tse kiang, nearly at the same period; it being high water on full and change days in the neighbourhood of the Lema Islands, at about 8^h 30^m, and at the outer islands of the Chusan Archipelago it is an hour later. The rise and fall, however, increases considerably to the northward; probably owing to the obstruction which the wave receives from the Philippine Islands; and in some instances the diurnal inequality is great. By the Tide Table it will be perceived that to the eastward of Hong Kong, and as far as Breaker

point, the tides are irregular and weak, the current occasioned by the monsoon overcoming them.

After passing Breaker Point, the coast trends more northerly, and the flood stream will be found useful to vessels bound to the northward. The rise and fall increases, passing from 7 ft. at Namoa Island to 12 ft. at Tongsang, and 20 ft. at Amoy. Between Amoy and the River Min, the rise of the tide varies from 16 to 18 ft. at springs, and the flood enters on the North as well as on the South side of Hai-tan Strait.

To the northward of the Min, the flood sets more determinately to the North; it seldom, however (unless off headlands or in narrow channels), overcomes the current caused by the monsoon, but has the effect of slackening it.

Throughout the Chusan Archipelago and the estuaries to the North, great care and attention to the tides is necessary. Particular instructions for this purpose will be found in the body of the work; and it only remains here to caution the navigator that, as his vessel approaches the coast to the northward at Chusan, the tides increase in rapidity, and unless precaution is taken, she will be set among the small islets of this rugged archipelago.

The following Tide Table, extracted from that published by the Admiralty, and drawn up by Commander Burdwood, R.N., will give the times of high water and the ranges of the tides.

TIDE TABLE.

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
	h.	m.	Sps.	Nps.		h.	m.	Sps.	Nps.
<i>Malacca Strait, Malay Coast.</i>			ft.	ft.	Off Mount Formosa ..	8	30	11	8½
					Tanjong Bolus	9	30	10½	6-7
Junkseylon Island (E. side)	10	0	11½		SINGAPORE, New Harbour*	9	45	10	7½
Pulo Tubah	noon		12		Rhio Strait.....	9	50	7	5
Queda	noon		5½						
Penang (Georgetown)	noon		9	7½					
North Sands	5	30	15	12	<i>Malacca Strait, Sumatra Coast.</i>				
Lightvessel (One Fathom Bank)	6	0	15	12	Diamond Point	noon		9	
Arroa			14	9	Balawan River	3	0	7	10
Cape Rachada	5	30	13		Mattie Point	3	0	7	10
Sambilangs			12	10½	Siak River (entrance)	9	0	12	
Dinding River	2	30	6f		„ off the town			11	
Malacca Road	7	30	11	8½					

* The low water at Singapore is affected by a large diurnal inequality, amounting at times to 6 feet.

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
			Sps.	Nps.				Sps.	Nps.
<i>Sumatra, N.E. Coast.</i>	h.	m.	ft.	ft.		h.	m.	ft.	ft.
Pulo Aor.....			5		Patytan Bay	3	0	7	
St. Barbe	6	0	6		Tylatiap Harbour (S. Coast)	8	45	3 $\frac{1}{2}$	
Badas Island, Linga Bay*	6	0	12		Tytando Inlet	6	30	5	3 $\frac{1}{2}$
Batoo Barra	2	50	7-10		Wynkoops Bay (S.W. Coast)	5	0	5 $\frac{1}{2}$	4
Dheli River	3	0	8		Zand Bay	5	0	4 $\frac{3}{4}$	
					Bantam			5	
<i>Sumatra, West Coast.</i>					BATAVIA	10	0	2	
Bencoolen	6	0	3-5		Kalang Bayang Harb.			2	
Sillebar River (Bar) ..	6	0	4 $\frac{1}{4}$		Krakatoa	7	0	4	
Mensular Island (S.E. end)	6	0	4						
Padang Road			4 $\frac{1}{4}$		<i>Baly.</i>				
Tappanoely Harbour ..	6	10	6		Baly Strait	0	30	9	
Acheen Head	8	45	8		Badong Bay (S. Coast) ..	11	0	9 $\frac{1}{2}$	
Diamond Point	noon		9 $\frac{1}{2}$		Tebunkos Road (North Coast)	5	0	6 $\frac{1}{2}$	
<i>Durian Strait.</i>					<i>Lombok, West Coast.</i>				
Sabon Island			10		Ampanam Bay	8	0	6	
Deep Point	5	0	10		Peejow Bay			10-12	
Red Island	5	0	10 $\frac{1}{2}$						
					<i>Sumbawa.</i>				
<i>Banka Strait.</i>					Ragged Island	8	10	3	
Toboe Ali Point {	8	30 \dagger	10-10		Sapie Bay	1	0	10	
Laboh Point	11	0 \dagger	10		Britannia Bay	1	0	11-12	
Lucipara Pass	irr.		10	7 $\frac{1}{2}$	Bima Bay	noon		6	
Nangka Island	7	0	9 $\frac{3}{4}$						
Kalian Point	8	0	12		<i>Sumba or Sandelhout, North Coast.</i>				
Bersiap Point	6	30	12		Nangamessie Harbour ..	11	30	17	13 $\frac{1}{2}$
Cape Oelar	6	30	12		Palmedo Road			15	
<i>Gaspar Strait.</i> §					<i>Timor.</i>				
Pulo Mendanao	2	30	4		Koepang	11	0	9	6 $\frac{1}{2}$
Pulo Leat	2	30	4		Dilhi	1	0	6	
<i>Java Sea.</i>					<i>Flores Sea.</i>				
Crimon Islands	8	0	6	5	Adenara, Flores			8	
Sourabaya Strait (Zee Bank)	irr.		4-6		Alligator Bay, ,, ..			6	
„ Strait,					MACASSAR	4	40	5 $\frac{1}{2}$	
Jansen Channel	irr.		8 $\frac{1}{3}$						
Banjoewangie	1	0	9						
Segoro Wedie Bay ..	9	0	8-10						

* From observations made in the month of September by W. Stanton, Commanding H.M. Surveying brig *Saracen*.

† In S.E. monsoon.

‡ In N.W. monsoon.

§ Only one high water in 24 hours, and very irregular.

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
	Sps.	Nps.	Sps.	Nps.		Sps.	Nps.		
<i>Moluccas.</i>									
	h.	m.	ft.	ft.		h.	m.	ft.	ft.
Batchian, Gilolo	1	0	6		Tay-bay-oo-bay	10	15	6	
Sanguir Island			6		Ooloogan Bay	9	30	5 $\frac{1}{2}$	
Géby, Fohou Island ..			5		Mayday Bay	9	55	3 $\frac{1}{2}$	
Manganitoe Bay	5	0			Port Barton? (Bubon Point)	10	55	6	
Limbé Strait			5		Pancol	9	40	6	
Sannana Bay			9		Bacuit Bay	10	0	6	
Koelwatte Bay			7		Cavern Island	9	30	5 $\frac{1}{2}$	
Wahaay and Hatiling Bays	6	0	3-4		Millman Island	10	27	2 $\frac{1}{2}$	
Bouro, Cajili Bay	1	32	4 $\frac{1}{2}$		Observatory Island ..	11	0	5 $\frac{1}{4}$	
AMBOINA	0	33 irr.	7		<i>Palawan, East Coast.</i>				
Saparooa Island			6		Ursula Island	11	0	7 $\frac{1}{2}$	
Cambing or Passage Island	noon		6		Port Royalist	11	0?	6 $\frac{1}{2}$	
Banda, Banda Islands	noon		14		Casuarina Point	9	30	6 $\frac{3}{4}$	
Dampier Strait			11		Barren Island	9	30	5 $\frac{3}{4}$	
<i>Borneo, China Sea.</i>					Calandagan Islands, Bird Island	9	30	6	
St. Pierre, Island			4		Tai-Tai Bay	9	30	5 $\frac{3}{4}$	
Rendezvous or Kum-pal Island			8		Busuanga	0	30	6	
Tanjong Api			7		<i>Philippine Islands.</i>				
SARAWAK River (Moratabas entrance)* ..	4	0	9	5 $\frac{1}{2}$	Port Zebu	noon		7	
„ Santubong ..	4	0	10	6	Port Buluagan, O'sta Ana	noon		5 $\frac{1}{2}$	
„ Sarawak Junction	5	0	15-18	9	Port Iloilo	noon		5 $\frac{1}{2}$	
„ „ City	5	20	15-18	9	Port San Jacinto, Ticao Island	6	30	6	
Burong Island	4	45	7		Paluan Bay (Mindoro)			5	
Rajang River	4	45	13	9	MANILA (Luzon)	10	40	3 $\frac{1}{2}$ -6	
Bruit River	3	0	11		Port Sual „			6	
Bintula River	5	45	6		Port Laguimanoc „	1	30	5 $\frac{1}{2}$	
Bruni River	11	0	12		Alabat Harbour „	10	0	9	
Labuan Island, Victoria Harbour	9	45	6		Busainga (Burias Id.)	0	30	6	
Mungalum Island	11	0	5		Sarangani Point, Mindanao	7	0	6	
Malludu Bay	10	30	6-8		Scarborough Shoal ..	11	0	5	
Balambangan Island, South Harbour	10	0	6-8?		<i>Sulu Sea.</i>				
Unsang	8	0	3 $\frac{1}{2}$		Ubian Island (Keenapoussan Group) † ..	6	15	5	
Ragged Point			7		Cagayan Sulu †	6	10	6	
Pamarung Islands	7	0	6-7		Doc-ean	6	0	5	
<i>Balabac Island.</i>					Pearl Bank	6	5	5	
Dalawan Bay	11	0	5		Sibutu	6	50	5	
Calandorang	11	0	6		Bongala	6	40	6	
North Balabac Strait ..	10	50	5		Tanj Unsang	8	0	3 $\frac{1}{2}$	
<i>Palawan, West Coast.</i>					Dalrymple Harbour, Sulu Island	7	50	4	
Eran Bay	10	10	6 $\frac{1}{2}$						

* At Sarawak River the highest tides occur at the change of the monsoons, viz., May and November. In the N.E. monsoon the higher tides occur at the new moon, and those of the day are higher and more regular than those of the night; while during the S.W. monsoon the contrary takes place, and the higher tides are then at full moon.

† In the N.E. monsoon.

TIDE TABLE.

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
	h. m.	ft.	Sps.	Nps.		h. m.	ft.	Sps.	Nps.
<i>Babuyan Islands.</i>					Nhatrang Bay	h. m.	ft.		ft.
Port Pio Quinto, Camiguin Island	6 0	6			Hon-cohe Bay	8 30	6		
Port Musa, Fuga or New Babuyan		5			Touron Bay	11 30	5		
Pratas Shoal	4 0	5			<i>China Sea, S.E. Coast.</i>	3 0	4		
Batanes, Bashee Ids.		4			Gaulong Bay, Hainan Island		4-5		
<i>Formosa.</i>					Yu-lin-kan Bay	9 5	2 $\frac{1}{4}$		
Takau Harbour	8 30	4			Quan-chow-wan		9-10		
Port Kok-si-kon	11 30	3			Tien-pak Harbour ..	noon	8 $\frac{1}{2}$		
Wanckan Banks	10 0	10	5		Hui-ling-san	8 30	7 $\frac{1}{2}$		
Tongsiu	10 0	8-10			Namoa Harbour	10 0	7 $\frac{1}{2}$		
Tam-Sui Harbour....	11 45	7-10			Boddam Cove, Ladrone Islands	9 40	4 $\frac{1}{2}$		
Kelung Harbour	10 30	3			CANTON River (entr.)..	10 0	8		
Sau-o Bay	5 50	6	4 $\frac{1}{2}$		Broadway River (ent.)	11 0	7 $\frac{1}{2}$		
<i>Meiaco Sima Group</i>					Typha Anchorage	10 0	7		
Port Haddington	6 45	7			Macao	10 0	6 $\frac{1}{2}$		
<i>Loo Choo Islands.</i>					Cumsingmun Harbour, Canton River.....	0 6	6 $\frac{1}{2}$	5 $\frac{1}{2}$	
Nafa Kiang	6 28	7			Urnstone Bay	10 30	7		
Port Oonting.....	6 35	8			Junk Fleet entrance, Canton River	11 50	6 $\frac{1}{2}$		
Oho Sima, Vincennes Bay	7 30	5 $\frac{1}{2}$			Tailung Channel ..	1 50	6 $\frac{1}{2}$	5 $\frac{1}{2}$	
„ Wild Wave Bay	8 0	8			Wang-nun Channel..	11 50	6 $\frac{1}{2}$	5 $\frac{1}{2}$	
<i>China Sea, West Coast (Malay Peninsula).</i>					Junction Channel	2 0	6 $\frac{1}{2}$		
Romania Point	10 30	12	9		Lankeet Island, Canton River	11 20	6 $\frac{1}{2}$	5 $\frac{1}{2}$	
Sidili River	9 44	7			Lintin Island ..	noon	7 $\frac{1}{2}$		
Blair Harbour	8 50	9			Fan-si-ak Channel ..	1 0	7 $\frac{1}{2}$	5	
<i>Gulf of Siam.</i>					Chuen-pee Point ..	noon	7 $\frac{3}{4}$		
Tringano River.....	8 0	7			† Whampoa { March 1 40				
Menam Riv., Paknam	5 7	9 $\frac{1}{2}$			„ { April 1 15	7-8			
Bangkok River	Irr.	7 $\frac{1}{2}$ -11	8 $\frac{1}{2}$ -9		„ { May & June } 0 30				
Cape Liant	5 7	6 $\frac{1}{2}$			Kuper Island, { March 2 40	5 $\frac{1}{2}$			
Chentabun River	10 0	5 $\frac{1}{2}$			„ off Canton { May & June } 1 40	5 $\frac{1}{2}$			
Pulo Panjang.....	7 0	2			City ..				
Rocky Island.....	4 0	4			Sham-shui, Si Kiang or W. River ..		5-6		
<i>Cochin China.</i>					Shao-king ..		3		
Pulo Condore*	2 30	6 $\frac{1}{2}$			Wu-chu ..		1-1 $\frac{1}{2}$		
Mitho Road	3 50	11	7		Hong Kong Road....	10 15	4 $\frac{3}{4}$		
Cape St. James	2 30	12 $\frac{1}{2}$			Ninepin Group	10 0	5		
Saigon City	4 30	12			Tide Cove, Mirs Bay	10 0	6 $\frac{1}{2}$		
					Tooni-ang Island, Bias Bay	8 0			
					Tsang-chow Id., Bias Bay	8 30			
					Hong-hai Bay	10 0	6 $\frac{1}{2}$		
					Kin-siang Point, Hiechchin Bay	7 0	6 $\frac{1}{2}$		
					Chino Bay	7 0	6-7		
					Haimun Ray	9 0	6-7		

* From a French Survey, 1862.

† At Whampoa Docks—In March, the day and night tides rise to the same level. From April to October, the day tides are the higher, and from November to February the lower. In May and June the level of spring tides is 4 feet and the neaps 2 feet higher than in March.

TIDE TABLE.

37

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
	h.	m.	Spa.	Nps.		h.	m.	Sps.	Nps.
Cape of Good Hope ..	9	0	6 $\frac{1}{2}$	ft.	Hang-chu Bay, Chapu Road	noon	25		
Cupchi Point	8	0	6-7		" (off Can-pu)		32		
Swatow (Double Id.)..	9	15	9		Gutzlaff Island	11	30	15	
Clipper Road, Namoa Island	11	15	7		Yang-tse Kiang (light ship at entrance) ..	noon	16	11	
Chauan Bay	11	0	6 $\frac{1}{2}$		" entrance to Wusung River	0	40	12-15	8-10
Tongsang Harbour ..	11	30	12		*SHANGHAI	1	30	10	7
Chimney Island, Rees Pass	11	30	12		†Langshan Crossing..	1	40	12	8
Mikung Harbour (Pescadores)	10	30	9 $\frac{1}{2}$	7	Kiu-kiang		24		
					Hankau		44		
<i>China, East Coast.</i>					<i>Yellow Sea.</i>				
Amoy, Inner Harbour	noon		18 $\frac{1}{2}$	14 $\frac{1}{2}$	Wang-kia-tai Bay....	6	0	12	9
" Chiang Chin, West River.....	3	40			Wei-hai or Kyau-chau Bay	5	0	12	9
Hu-i-tau Bay.....	0	15	16		Ching-tau Bay	6	0	12	9
Chimmo Bay	10	20	16		Lo-shan-kau	4	30	11	9
Chinchu Harbour	0	25	17		Tau-tsu Head	3	20	12 $\frac{1}{2}$	
Meichen Sound	0	30	17		Tsing-hai Bay	3	0	9	7
Haitan Strait	noon		18-22	14	Staunton Island.....	1	30	8	5 $\frac{1}{2}$
White Dog Islands ..	9	0	18		Wang-kia Bay	2	30	9	7
Min River, Temple Pt.	10	45	19	14 $\frac{1}{2}$	Shihtau Bay	1	30	9	7
" Losing Id.	noon		17	14 $\frac{1}{2}$	Sang-tau Bay.....	0	55	7	4 $\frac{1}{2}$
Chang-chi Island	9	30	17		Aylen Bay	2	30	6	4
Spider Island.....	10	0	17		Litau Bay	3	0	6	4
Lishan Bay	10	15	16		Shantung Promontory	4	0		
Namquan Harbour ..	10	0	17		Wei-hai-wei Harbour	9	30	9	
Namki Islands	8	30	17		Lung-mun Harbour..	10	0	7	
Pih-ki-shan Islands ..	8	30	17		Chifu	10	34	8	6 $\frac{1}{2}$
Fong-whang Group, Bullock Harbour ..	8	30	17		Hope Sound (Mi-ai-tau Group).....	10	24	6 $\frac{1}{4}$	
Wan-chu River (entr.)	9	0	15 $\frac{1}{2}$		Miau-tau (Depot Bay)	10	35	6	
" City ..	9	30	15 $\frac{1}{2}$		Ta-tsing ho or Yellow River	4	10	10 $\frac{1}{2}$	8
Chin-ki Island	9	20	13		Chi-Ho	4	0	10 $\frac{1}{2}$	8
Tai-chow Islands	9	0	14		Peiho or Peking River (entrance)†.....	3	30	10	7 $\frac{1}{2}$
St. George Island, Sanmoon Bay	10	20	15		Tien-tsin, Peiho Riv.	7	0	4 $\frac{1}{2}$	
Kweshan Islands	9	30	14		Peh tang ho	3	0	9	7 $\frac{1}{2}$
Nimrod Sound	10	30	20		Sha-lui-tien Banks (W. part)	2	50	10	8
Vernon Channel, Chusan Archipelago ..	9	40	14		Liau-tung, Ching ho..	1	20	6 $\frac{1}{2}$	
Ting hae Harbour ..	11	0	12	9	Lau-mu ho.....	1	30	5	
Poo-too Island	8	15	12		Tai-cho ho	0	15	6	
Lansew Bay	10	0	13		Yang ho	0	15	6	
Volcano Islands.....	11	30	15		Ning-hai.....	noon	6		
East Saddle Island ..	11	0	14		Sand Point, Gulf of Liau-tung	4	50	7	5 $\frac{3}{4}$
Yung River, Chinbae	11	20	12 $\frac{1}{2}$		N.W. Head of Gulf of Liau-tung	5	30	10	8 $\frac{3}{4}$
" Ning-po-fu	1	0	9		Liau Ho (Bar)	4	0	11 $\frac{1}{2}$	7 $\frac{1}{2}$
Hang-chu Bay, Seshan Islands	11	45	14						
" Fog Islands	11	45	17						

* From tidal observations made at Shanghai by the engineer to the Customs for the last six months of 1872, the night tides in July and in the following three months average considerably higher than the day ones. The reverse occurs in the months of November and December.—*The North China Herald.*

† At the Langshan Crossing the tide rises for 3 hours only, and falls for 9 hours.—H.M.S. *Actæon*, 1861.

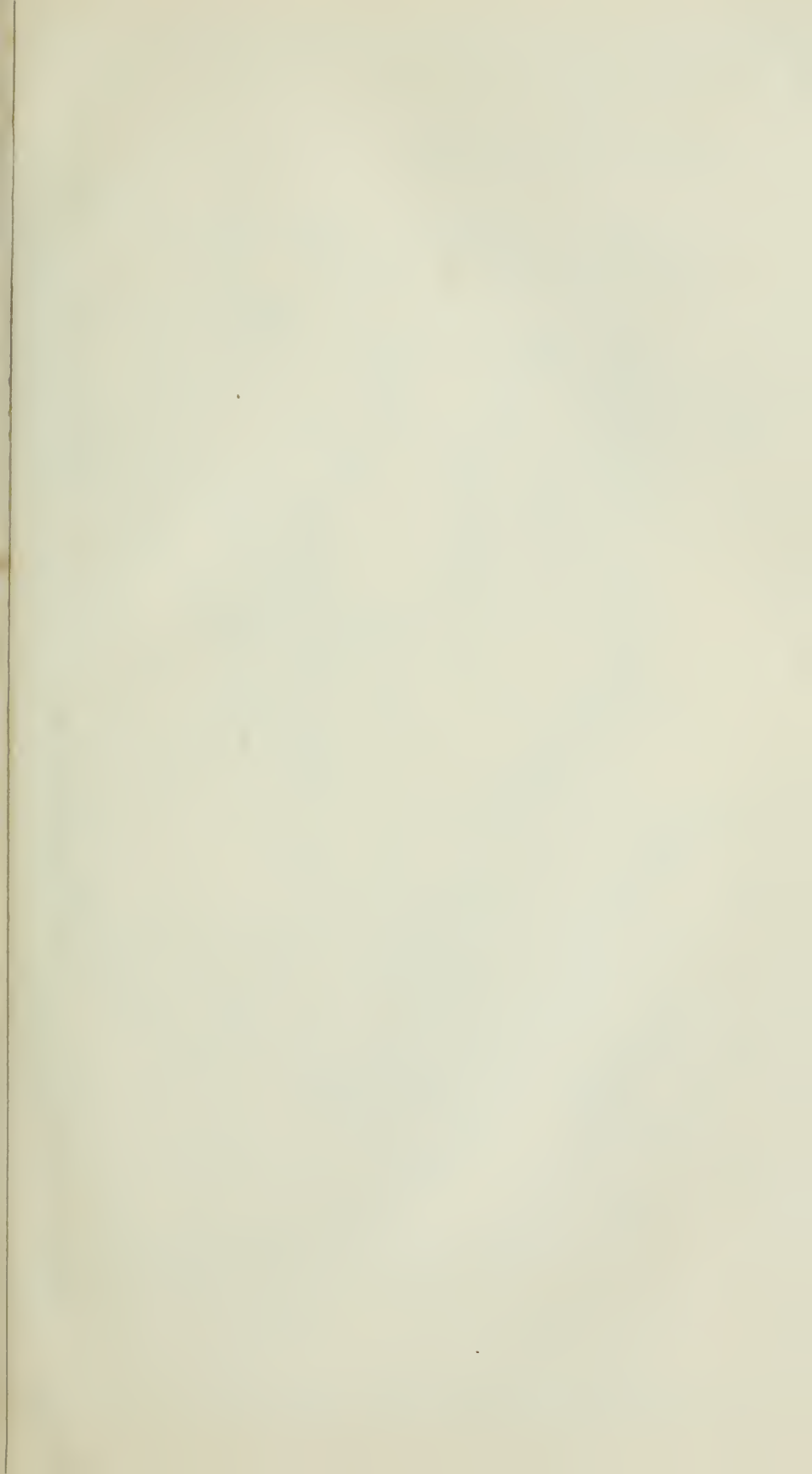
‡ Time and rise much affected by winds.

TIDE TABLE.

Place.	High Water, Full and Change.		Rise.		Place.	High Water, Full and Change.		Rise.	
	Sps.	Nps.	Sps.	Nps.		Sps.	Nps.		
	h. m.	ft.	ft.			h. m.	ft.	ft.	
Liau Ho (Yin-koa) ..	5 0	12			Tsuruga	1 30	2		
Vansittarts Saddle....	4 20	10	8½		Sado (Yebisu)	5 0	2		
Hulu Shan Bay.....	2 30	8	6		Tsugar Strait.....	5 0	5		
Society Bay, Sulivan Bay	0 15	8			La Perouse Strait	10 30	6		
Port Adams, Mary Id.	2 0	10			Yezo Id., Notske Bay	4 50	4½	1½	
Pigeon Bay	11 45	8			„ Nemorro Anchorage	5 0	4	2½	
Ta-lien-whan Bay	10 47	10¾	8		„ Akishi Bay..	4 30	5		
Encounter Rock.....	10 44	11	8		„ Endermo H.	4 35	5		
Haiyun-tau, Thornton Haven	9 30	12	8		Oterranai	variable	2 0		
Chang-zu-do Island ..	9 30	12	8		Malo Yama	variable	3 0		
Kwang-lo	9 55	12	8		„ Hakodadi Harb.	5 0	4		
					Yamada Harbour	4 30	4		
<i>Korea.</i>					YOKO-HAMA, Yedo B.†	6 0	6½	4¾	
Ping-Yang Inlet	7 45	21	14		Yokoska Harbour ..	5 15	8	4	
Chodo Island	6 20	12			Uruga	5 55	4½	½-1	
Ta-Tong River	6 30	13			Tatiyama Bay	5 50	5		
Salée River, Kapkot-i	6 40	21½	11½		Fatsizio	6 0	5		
„ Boisee Id.	5 20	36¾	16-27		Port Simoda	5 0	3-5		
Séoul River, Poteu-mai*	7 20				Heda Bay		5½		
„ Kampa-oui	7 50				Enora Bay		4		
„ Seukkol ..	8 45				Simidsu	7 30	7		
„ Séoul ..	9 30	6½			Matoya Harbour	6 50	6	1¾	
Marjoribanks Harbour	3 30	29			Hamagema-ura	6 15	6	1½	
Basil Bay	4 15	18	10		Owasi (Rodney Bay)..	7 0	5	2	
Ko-kon-tau Group ..	2 25	18	10		Urakami	7 30	6	4	
Kuper Harbour.....	9 28	11½	8¼		Oösima	6 50	5	4	
Crichton Harbour....	9 50	11½	8¼		Tanabe, Kii Channel	6 0	6	5½	
Tracy Island	8 58	11½	8¼		Yura-no-uchi.....	6 0	5½	4½	
Hooper Island	9 10	11½	8¼		Osaki	5 55	6½		
Port Hamilton	8 30	11	6		Hachken River	6 4	6½		
Tsu-sima Sound	8 30	8	6		Kata Channel	6 4	6½		
Tsau-jiang-hai or Chosan Harbour	7 45	7	5		Susuki and Nomi Harbours	6 0	6½		
Yung-hing Bay.....	5 20	2½			Uwajima.....	noon	8-9		
Port Lazaref, Broughton Bay	5 20	2½			<i>Inland Sea.</i>				
Expedition Bay.....	2 30	2½			Hiogo and Kobe Bays	7 15	5¾	4¼	
Novogrod Bay	2 30	2½			Oösaka River (entr.)..	7 30	5¾	4¼	
					„ City	8 17	2½	½	
<i>Japan.</i>					Yura Harbour	6 5	6½		
Sagitsu-no-ura Harb.	8 0	9			Naruto (Fukura) ...	6 14	6¼	4½	
Yama Gawa Harbour,					Benten Sima	11 20	6		
Kagosima Gulf	7 15	8½	3		Nisi Sima	10 15	6P		
Nagasaki Bay	7 15	9	7½		Sakoshi Bay	19 10	5¾	4¼	
Taské	9 44	8¼	5		Ananga	11 27	2-4	4¼	
Oösuka	9 16	8½	5		Maiko Fort	6 27	3½	1	
Tama-no-ura Harbour,					Hid-idé	11 25	2-4	4½	
Goto Island	8 40	6-8	4-6		Awa-sima Island	0 7	10½	6P	
Iki		8			Siyako Island.....	0 16	9½	4	
Yobuko	9 16	9	6½		Yugisima	11 25	11½	6¾	
Simonoseki.....	8 30	8	6		Miwaru	10 37	11	5	
Whitsea Bay.....	8 30	8¾			Hangata	10 36	11½	5	
Mikuni Roads		2			Tomoto	11 0P		5	
					Hime Sima Road	8 45	8	3½	

* In the River Seoul, spring tides rise from 16½ feet at the entrance, to 6½ feet at Séoul.

† With southerly winds the tide rises about 2 feet higher.



I V.—T E M P E R A T U R E.

*Remarks on the Temperatures of the China, Sulu, Celebes, and Banda Seas, by Staff-Commander T. H. Tizard.**

The temperatures obtained in the seas partially enclosed by the Indian Archipelago, prove that they have, each of them, deep basins cut off from the general oceanic circulation by ridges connecting the islands which surround them; for although in each sea soundings of over 2,000 fathoms were obtained, in no case did the temperature decrease in a regular curve from the surface to the bottom, as is usual in the open ocean; in every case, after attaining a certain depth, the temperature below that depth remained the same: thus, in the Banda and China Seas the temperature remained the same from 900 fathoms to the bottom, in the Celebes Sea from 700 fathoms to the bottom, and in the Sulu Sea from 400 fathoms to the bottom.

In the China Sea three temperature soundings have been obtained, one by Commander Chimmo in H.M.S. *Nassau*, in lat. $12^{\circ} 53' N.$, long. $110^{\circ} 31' E.$, the depth being 1,546 fathoms; and two in the *Challenger*, one of which is in lat. $17^{\circ} 54' N.$, long. $117^{\circ} 14' E.$, the depth being 2,150 fathoms, and the other in lat. $16^{\circ} 42' N.$, long. $119^{\circ} 22' E.$, the depth being 1,050 fathoms. In these three soundings the minimum temperature, which varied from $36^{\circ}.1$ to 37° , was found at a depth ranging between 600 and 1,050 fathoms.

In the Sulu Sea three temperature soundings have been obtained, one in lat. $8^{\circ} 5' N.$, long. $119^{\circ} 45' E.$ of the depth of 1,778 fathoms, by Commander Chimmo; one of 2,550 fathoms in lat. $8^{\circ} 32' N.$, long. $121^{\circ} 55' E.$; and one of 2,225 fathoms in lat. $8^{\circ} 0' N.$, long. $121^{\circ} 42' E.$ The latter soundings were obtained by the *Challenger* in October 1874 and in January 1875.

In each of these three soundings the minimum temperature of $50^{\circ}.5$ was reached at the depth of 400 fathoms. From that depth to the bottom the temperature remained unchanged.

In the Celebes Sea three temperature soundings were obtained in the *Challenger*, one in lat. $2^{\circ} 55' N.$, long. $124^{\circ} 53' E.$, in October 1874, the depth being 2,150 fathoms; a second in lat. $5^{\circ} 44' N.$, long. $123^{\circ} 34' E.$, also in October 1874, the depth being 2,600 fathoms; and the third in lat. $5^{\circ} 47' N.$, long. $124^{\circ} 1' E.$, in February 1875, the depth being 2,050 fathoms. In each of these three soundings the minimum temperature of $38^{\circ}.5$ was reached, at a depth of from 700 to 800 fathoms, from which depth to the bottom the water remained unchanged.

In the Banda Sea three temperature soundings were obtained in September 1874, one in lat. $5^{\circ} 41' S.$, long. $134^{\circ} 4' E.$, the depth being 800 fathoms; a second in lat. $5^{\circ} 26' S.$, long. $133^{\circ} 19' E.$, depth 580 fathoms; and the third in lat. $5^{\circ} 24' S.$, long. $130^{\circ} 37' E.$, depth 2,800 fathoms.

* Extracted from the "Geographical Magazine" for March 1876.

In the last sounding, 2,800 fathoms, the minimum temperature of 37°.5 was reached at the depth of 900 fathoms; from thence to the bottom no alteration in the temperature of the water was detected.

In the Molucca Passage, which connects the Banda Sea with the Pacific Ocean, one temperature sounding of 1,200 fathoms was obtained in lat. 0° 41' N., long. 126° 37' E., in October 1874, and the temperature was found to decrease regularly from the surface to the bottom, the minimum temperature at the bottom being 35°.2.

Two soundings and temperatures were also obtained in January 1875 in the waters of the Philippine Islands, which separates the water of the Sulu Sea from that of the Pacific Ocean. One of these soundings (700 fathoms) is in lat. 12° 21' N., long. 122° 15' E., in the basin formed by the islands of Panay, Tablas, Romblon, Sibuyan, and Masbate; and the other (375 fathoms) in lat. 9° 26' N., long. 123° 45' E., South of Bohol Island, in the channel leading from Suriago Strait to the Sulu Sea. In the first sounding the minimum temperature of 51°.5 was reached at the depth of 220 fathoms; and in the second, the minimum temperature of 54° was reached at the depth of 230 fathoms.

A temperature sounding of 2,550 fathoms was obtained, in February 1875, in lat. 4° 19' N., long. 130° 15' E., in that part of the Pacific Ocean adjacent to the Celebes Sea and Molucca Passage. Here a minimum temperature of 34°.6 was reached at 1,300 fathoms.

An examination of the chart of these regions will show that the deep basins of the China and Celebes Seas are alone in communication with the Pacific Ocean, and that consequently their temperature must be greatly dependent on the temperature of that part of the Pacific immediately adjacent to their openings into that ocean, for although both seas are in communication indirectly with the Indian Ocean, they are cut off from the deep basin of that ocean by a large tract of shallow water, which, in the China Sea, exceeds a breadth of 600 miles, and in the Celebes Sea is apparently about half the length of the Macassar Strait.

The Sulu Sea receives its waters from the China and Celebes Seas and Pacific Ocean; its temperature depends, therefore, to a great extent on the temperatures of those seas.

The isotherm of 80° is found at a depth of 20 fathoms in the Sulu Sea; at 40 fathoms in the Celebes Sea; and at 22 fathoms in the Banda Sea. In winter the China Sea has a large range of surface temperature from 64° at Hong Kong to 84° at Singapore, while the surface temperature of the other three seas varies only slightly all the year round. The specific gravity of the water in the Celebes, Sulu, and Banda Seas, was found to be less than in the Pacific Ocean: this may be accounted for by the excess of rainfall over evaporation in the area occupied by them.

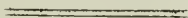
V.—MAGNETIC VARIATION.

In the older works which described the navigation of this Archipelago, the important element of the compass variation was disregarded, because the magnetic meridians so nearly coincide with the geographic meridians, that they are in most parts practically the same.

The isogonic lines, as shown on the illustrative chart, have a great peculiarity in the eastern seas. A line of no variation passes across the Coast of China and down through the Philippine Islands, while another, traversing the Bay of Bengal, passes southward of, and parallel to, the Island of Java. Between these lines the amount of easterly variation does not exceed 2° in the western, and 4° in the eastern parts of the area. The chart will best explain this.

But there are other considerations respecting the compass, apart from the amount of its deviation from the true meridian. This is the amount of the different terrestrial and local magnetic forces which act on the compass needle. The lines of equal dip will give one of these elements, but the works specially devoted to the subject will show how important it is that the commander should be aware of the effects of those varying magnetic changes he will have to pass through in his long voyage to the field of the present work.

The epoch assumed in the chart is 1878, but there has been no appreciable change in the amount shown since magnetic observations have been conducted with accuracy, so that, for the present at least, it may be taken as correct for a long period, sufficiently so to draw attention to any unsuspected change in the magnetism of the ship, should the compass show a different amount to that given on the chart.



CHAPTER II.

PASSAGES.

ONE general principle may be laid down for ships traversing the Indian Archipelago, and that is that during the S.W. monsoon, April to September, ships approaching China must go by the channels *westward* of Borneo, and in the opposite season they will take one of the passages to the eastward of Sunda and of Borneo; the return voyage being also reversed in these particulars.

Therefore the passages through the Archipelago, which lie westward of the great island of Borneo, are termed generally the *Western Passages*, being the Straits of Sunda and Malacca; and those which pass eastward of Java and Borneo are called the *Eastern Passages*. To these may be added what was termed the *Great Eastern Passage*, or that to the southward and eastward of Australia and Van Diemen's Land, and which was first followed by Capt. Butler, in the *Walpole*, in the northern monsoon of 1794. Of this route Captain Maury says—This now is never or very seldom used, and should never be attempted except for very special reasons.

An exception may be made to this absolute conclusion in favour of clipper or well handled ships, which sometimes have successfully attempted to beat up the China Sea against the N.E. monsoon. Of this more will be said hereafter.

The Strait of Sunda is then the great portal of the Archipelago and China Sea, and is used in all seasons for the ports South of China, and frequently in all seasons as an entrance to the Eastern Passages. In the remarks as to the most advisable routes, which will follow, the passages from the Atlantic through the Strait of Sunda will be first considered.

1.—THE ATLANTIC TO THE STRAIT OF SUNDA.

In the volume on the navigation of the Indian Ocean, to which this is a continuation, full descriptions of the winds and currents of that ocean are given, so that by reference to that work an insight will be gained into those influences which affect a vessel's course in crossing it. On pages 158, 159, of that work, too, some brief remarks on the best track for approaching the

Strait of Sunda, or the passages eastward of it, are given: but as this topic has more especial reference to the scope of this book, some further observations will be given.

Notwithstanding all the long discussions which have ensued since the vast extension of Oriental commerce, and the consequent accumulation of experience, it is still a disputed point as to which is the best parallel for crossing the Indian ocean in sailing eastward round the Cape of Good Hope. On the one hand it is contended that by not going too far southward, better weather, and as much advantage otherwise, is gained. On the other hand, it is said that by keeping more approximatively to the great circle course, that is in higher latitudes, the "brave West winds" are more constant and of greater force, and that the distance to be sailed over is proportionately shortened. The following will illustrate this. The first remarks are taken from the Admiralty Sailing Directions, advocating a comparatively low parallel.

On leaving the cape, steer boldly to the southward, so as to run down the easting in lat. 39° or 40° S., where the wind blows almost constantly from some western point, and seldom with more strength than will admit of carrying sail; whereas in a higher latitude the weather is frequently boisterous and stormy, with sudden changes of wind.

Some navigators prefer making their easting in a higher latitude than 39° or 40° S., whilst others steer a more direct course for Java Head than is here recommended; but the above directions are those usually followed in H.M. ships, and are generally believed to be the best.

Now, respecting this choice of the parallel of about 39° , on which to run eastward, the distance to be traversed, or the approximate 75° of longitude from the offing of the cape to the point where you must bear off to the northward, is about 3,508 miles, a distance of nearly 600 miles would be saved if the latitude of 50° were taken.

On this point Captain Maury, who differs from the Admiralty, says as follows:—

A vessel bound through the Straits of Sunda, after crossing the equator, usually holds her wind, hauling up to the eastward as the S.E. trades of the Atlantic will allow, until she gets into the calm belt of Capricorn. Here, though she may not find long continued calms, she finds, nevertheless, those light winds which are always found to prevail in that sort of debateable ground which is always between any two systems of winds. This calm belt is between the S.E. trades on one side, and the variables, or "brave West winds," of the southern hemisphere, on the other.

Having cleared the trades, the present practice of mariners is to edge off a little to the East of South until they gain the parallel of 35° — 37° ; crossing this, they haul up due East, between the parallels of 37° and 39° , and run between them—the place of all others where the southern edge of the cy-

clones which traverse those parallels is most apt to be felt adversely—from the prime meridian to longitude 80° — 85° E. Now, if any one were seeking to find a route that passes through the regions most beset with light and baffling winds, this is the route to which I should point. The idea of sailing 5,000 miles along the borders of the calm belt of Capricorn, as many East Indiamen do, when there is sea room for the Great Circle route, with the “brave West winds” “following fast,” is simply absurd.

Having run along this “debateable ground,” and reached the meridian of 80° or 85° E., another mistake is committed by crossing this calm belt in the Indian Ocean again obliquely, which should never be done. These calm belts should always, whenever the land and dangers will admit, be crossed as directly on a meridian as the winds will allow; for the sooner you cross them, the sooner you will get winds that will drive you along.

Such is the course of the present route, as the Dutch crossings abundantly show, and has been shortened for the Dutch, and may be shortened for the Americans and all others, ten days or more, by all vessels that will follow this course.

(1) After crossing the parallel of St. Roque, stand through the S.E. trades with a rap full and topmast studding sail, as if you were bound to Australia. not caring to make better than a S.S.E. course good, until you lose the trades, clear the calms of Capricorn, and get the “brave West winds” on the polar side of them. Vessels that do this will generally clear the calms, and get the “brave West winds” by the time they reach latitude 35° — 40° , finding themselves at this juncture somewhere between the meridians of 20° and 30° W. Now shape your course per Great Circle for the intersection of parallel of 40° , with the meridian of 80° — 85° E., or any other near which it may be deemed advisable, with the changing seasons, to enter the region of the S.E. trades of the Indian Ocean.

The following route, from 30° W. 35° S. to the intersection of this parallel, with 85° E., differs so little from the Great Circle, that the difference becomes practically of no moment.

(2) Suppose you clear the calms of Capricorn in latitude 35° , longitude 30° W., now steer for the meridian of 10° E., at its intersection with the parallel of 48° or 50° S.; then run on between these parallels to longitude 50° . From this point steer for the intersection of 85° E. and 35° S. The total distance to be run South of the parallel of 35° being 5,000 miles, the distance by the present route being 5,500 miles; so here is one day’s sail gained by the “short cut,” and certainly better winds.

(3) But suppose you have good luck in the South Atlantic, and can clear the calms of Capricorn in 20° W. instead of 30° W., but in the same latitude, your course then is to aim to strike the parallel of 50° in 20° E., and then run along it as before to 50° E., the distance South of 35° by this route being 4,900 miles.

But suppose the winds favour you still more, and you be in 10° W. before you reach the parallel of 35° ; in this case you should run between the parallels of 45° — 46° till you come to the meridian of 50° E. You should so shape your course from 10° W. as to get between these parallels, near the meridian of 20° E. The distance South of 35° , by this route, is 4,400 miles; in other words, the distance from the usual place of crossing the parallel of St. Roque to Java Head is—

By present route, 9,200 miles; by (1), 8,940 miles; by (2), 8,730 miles; by (3), 8,520 miles.

There is no part of the world where the master of a sailing vessel can turn his knowledge of the principles of Great Circle sailing to more advantage than he can when his course is East in that great expanse of ocean on the polar side of the calm belt by Capricorn. Here, when his course has easting in it, the famous westerly winds of that region will drive him ahead with the force and velocity of steam power.

Suppose, therefore, a navigator, bound for the Straits of Sunda, should, instead of heading up East on crossing 35° S., near 30° W., after having crossed the equator near this meridian, proceed to 40° S. before heading up East, how much would his distance from the equator in the Atlantic to the crossing of 40° S. in longitude 85° E. be increased? Answer, 100 miles. His gain in time to off-set this increase of distance would be a quicker run through the calms of Capricorn by reason of going straight across them, and the further advantage of strong winds along the more southern route.

The best course, under all circumstances, is as a rule, to do thus:—Run from the equator in the Atlantic to the South as fast as you can, caring little for easting until you have cleared the calms of Capricorn, and caught the “brave West winds” on the polar side of that belt; then shape your course so as to cross 20° E. between 47° and 52° S.; leave these parallels about the meridian of 60° E., and then steer thence for the parallel of 40° S., near its intersection with 85° E.

This description of the course to be run, and the points of intersection to be gained, is given only for those navigators who may be unable to get out of the true Great Circle routes and courses.

It is well to remark that most ice has been seen along this route, between 20° and 40° E., and that much is to be gained by running down your easting as near to the South as ice and safety will permit. So impressed have I been with the gain to be made by running well to the South in this part of the ocean, that I formerly said, with regard to the route to Australia—

“In further proof that the route recommended in the Sailing Directions of the Admiralty is too far to the North, and as an illustration of the advantage of the route which I advise, I have prepared some tables, and it appears from them that there is no longer room for difference of opinion as to the advantages of going farther South than 39° — 40° ; how much farther, though,

still remains to be decided. But so far as the facts before us go, they justify the assertion that for every degree you go South of the Admiralty route to Australia, you gain three days on the average, until you reach the parallel of 45° — 6° , for the averages of the table are not below this parallel; and I believe it will turn out that the best streak of wind, in the long run, is to be found between 45° and 50° S. It seems to be almost as steady, between these parallels, from the westward, as it is anywhere to the East, between the trade wind parallels of 15° and 20° . The average "vertex" of those that go South of 41° is $53^{\circ} 33'$; the average "vertex" of those that go North of that parallel is $39^{\circ} 7'$ S. The mean parallels upon which the latter run down their longitude is $38^{\circ} 52'$, and the former $43^{\circ} 59'$; for this difference of 5° , the average gain of those who take the more southern parallels is 14 days, which comes very near to an average of 3 days' gain on the voyage to Australia for every degree you go South of the Admiralty route. As far as 80° E., the Admiralty route to Australia and the old route to Sunda are the same. The average speed to Australia by the Admiralty route is 134 miles a day against 154 by the new route; so that the route well to the South has in its favour not only better winds, but shorter degrees and longer daily runs.

If the winds were fair all the way, the nearest route to Java Head from the fairway off St. Roque would be via the Cape of Good Hope; indeed, the Great Circle from St. Roque to Java runs through the unexplored regions of Africa. But both the winds and the land render such a route in navigation impracticable; for the former generally compel the outward Indiaman, in spite of herself, to cross the meridian of 25° W. as far South as the parallel of 30° — 33° S.; and the Great Circle thence to Java Head passes some 8° or 10° South of the Cape of Good Hope. Moreover, the winds in the Indian Ocean render a departure from the Great Circle again necessary. The winds, however, are such as to admit all four of the routes on pages 42, 43, ante.

The route No. 3 is 600 miles shorter, and has better winds than the present route. But, after clearing the S.E. trades of the Atlantic, the present route runs about 1,000 miles obliquely across the calms of Capricorn, where the average rate of sailing is not over 100 miles a day. Now, by going straight across these calms as by route (1), you will clear them generally in two days, and then get those "brave West winds," which will waft you along at the rate of 200 or 300 miles a day, according to the heels of the ship.

The navigator, therefore, will act most wisely who will wait, and let things as he may find them govern him as to where, after clearing the S.E. trades, he will begin to shape his course for the Great Circle to the meridian of 85° East, or for the meridian near which he proposes to cross the calms of Capricorn in the Indian Ocean. Suffice it to say, he may begin to do it any-

where South of 30° , and between the meridians of 30° and 10° W., and reach Java Head several days sooner, on the average, than he would by continuing to follow the present route.

In attempting to follow these Great Circle routes, navigators should recollect that the greatest saving of distance, as compared with the rhumb-line route, is always along those arcs that lie nearly East and West, and are farthest from the equator; and that, so far as distance is concerned, he might as well be out of his way on one side of these arcs as the other. As illustrative of this route, I may refer to the track of a ship whose log I have, and with regard to which I only say that, if she had stood on from lat. 28° to 35° S., at that season, in long. 20° W., and then shaped her course per Great Circle route, she would probably have done better; as it is, she crossed the meridians as follows:— 0° in $36^{\circ} 20'$ S.; 20° E. in $38^{\circ} 20'$ S.; 40° E. in $38^{\circ} 35'$ S.; 60° E. in 38° S.; 70° E. in $38^{\circ} 20'$ S.; 80° E. in 36° S.; 90° E. in $33^{\circ} 0'$ S.; which is a fair representation of the average June route of the Dutch.

“Arriving in lat. $28^{\circ} 0'$ S., long 22° W., I projected,” says her master, “on my chart, the Great Circle course thence to Java Head, the vertex being in lat. 44° S., and long. about 25° E. I adhered to this course as far as practicable, having in view the favourable sailing points of the vessel, and being compelled to run her before some of the heavy seas of the high latitudes until reaching the parallel of 30° in long. about 69° E., when I deemed it prudent to keep to the eastward of the Great Circle course, and approach the meridian of Java Head farther South, to forelay for the chance of there being considerable easting in the trades. I crossed the tropic in about $94^{\circ} 30'$ E. long., and fetched Java Head, sailing upon an easy bow-line (which is a good sailing point of the vessel, and, I believe, of most sharp vessels). I will remark here that I could find nothing explicit in ‘Horsburgh’ regarding the direction of the wind in the S.E. trades; but, after many unsatisfactory remarks, the whole is summed up on page 161, vol. i., 5th edition, thus:—When the sun has great North declination, it may not be absolutely requisite for ships which sail well to reach the meridian of their port so far southward, the trade wind then blowing more from S.E. and E.S.E. in general than from East and E.N.E.

Accompanying my abstract is an abstract of the log of the ship *Minstrel*, of Boston, which vessel (commanded by my brother) pursued the Admiralty route in running up her easting; and, although he crossed the equator in the Atlantic 12 days before me, yet I made Java Head the day before him, and there was not much difference in the sailing of the vessels. Where I gained on him most was in high latitudes. Although I made a fair passage by pursuing the circle course so far as the latitude of 33° , yet I would not again adhere to it farther than the vertex; thence, I would sail East on, or near, that parallel until reaching the longitude of 90° , or thereabouts; then

hauling North across the belt of variables to the southward of the trades, at right angles, and be upon the safe side, after reaching the trades, at any season of the year.

A good passage could, perhaps, be made by sailing on a circle course from the Atlantic to a good position relative with Java Head, in the Indian Ocean, say 95° E. and 33° S.; but the vertex should be far South of 53° , or thereabout. And I should not feel justified in attempting to pursue such a route, until we have some definite information relative to the existence of danger from ice, against which Horsburgh cautions navigators.

Navigators, by taking the old route, are liable to meet with another difficulty, especially when they attempt to run down their longitude near the parallel of 35° — 6° S. About this parallel is a famous place for circular storms—cyclones. They revolve with the sun, and the parallel of 35° — 6° is frequently traversed by the southern edge of them; consequently, as these storms travel East or West, the wind on the southern edge of them is generally from the eastward."

Thus far Captain Maury, to which two remarks may be appended, the one on the dangers from ice in high southern latitudes, the other on the occurrence of cyclones in the lower parallels.

The frequency of ice and its peculiarities in the Southern Indian Ocean is dwelt upon in our Directory for the Indian Ocean, pages 86—91, and it is there shown that the drifts attain a lower latitude in the southern winter than at other seasons, nearly approaching the Cape of Good Hope in July to September, but then it is considered that they leave a clear space to the southward. In January to March they are not frequently encountered northward of 55° S.

In the same work the question of the occurrence of cyclones on the parallels indicated is discussed, and to those pages the reader is referred.

There can be no doubt but these revolving storms do sometimes attain these latitudes after recurring from the northward, and passing to the eastward. Should the well-known indications of these meteors be clearly ascertained, of course it behoves the commander to seek that edge of the disk (the northern edge), which will help him forward on his voyage, rather than be opposed by the contrary gales on its southern margin.

But it is argued by some that these gales are generally not revolving, but are right lined winds, or so slightly curved in their paths that they cannot be classed as cyclones. Upon this topic see pages 12, 13, of the Indian Ocean Directory—the whole subject and its application being given in pages 3 to 17, and 151 to 159.

To the two opinions given above, as to the best parallel for running down the easting after passing round the Cape of Good Hope, we may add that of Mr. Towson, whose labours on this subject are well known. It is true that his object was to shorten the road to Australia, and therefore the tracks lie

to the southward of that great continent; but they will hold good equally for that which diverges to the northward before reaching this eastern extension. He chooses the parallel of 51° S. for passing across the Southern Indian Ocean to the southward of Kerguelen Land.

With all deference to these great authorities, may it not be that all are right, if their views are followed in different seasons. It would seem to be quite natural that a lower latitude would carry all the advantages during the winter season that a high parallel does in the summer. The limits between the trade winds and the westerly anti-trades certainly vibrates in latitude with the progress of the sun in the ecliptic; and therefore, during the inclement winter, the Admiralty parallel of 39° — 40° may be quite as advantageous (except as regards the distance to be run) as the probably more boisterous but shorter course in higher latitude. Again, in the summer months the parallels advocated by Maury and Towson may certainly be safely followed; but in this, also, some other considerations may enter. The sailing powers of the ship, the nature of her cargo, and the health of the crew and passengers (especially if the latter be an important item in the account) would lead the commander to hesitate before he would carry his vessel into climates very much colder than that he has recently left, and which he will soon enter again, and where he will probably meet with heavy winds and turbulent seas.

As has been said above, the point does not appear to be entirely decided, nor can it be so when each ship may, from motives of expediency, require different handling. The above facts and opinions are given, and the commander must make his own choice of them. For pursuing the voyage to the northward, the following is given in the Admiralty Directions.

In the South-east Monsoon, i.e., from the middle of April to the middle of September, vessels, having passed the island of St. Paul, should not edge away too quickly to the northward, but should endeavour to reach first as far to the eastward into the S.E. trade wind as the meridian of Java Head, crossing the southern tropic in about 102° E. In this season a westerly current runs along the South coast of Java, and in the months of June, July, and August, when it is at its greatest strength, it will be indispensable to be well to the eastward, or otherwise the ship will be liable to fall to leeward of Java Head. In the vicinity of Java the S.E. monsoon also veers sometimes to East or E.N.E.

In the North-west Monsoon, i.e., from the middle of October to the middle of March, but especially in December and January, the southern tropic should be crossed several degrees to the westward of the meridian of Java Head, when a direct course can be steered for Sunda Strait, or to make Engano Island, or the land about Flat Point, the southern extreme of Sumatra. Great care must be taken during this monsoon not to fall to leeward of Java Head, for the westerly winds blow with great violence along the South coast

of Java, and their strength, united with the strong current setting to the eastward, make it impracticable to beat up along this coast; a vessel may thus have to steer to the southward, and re-enter the S.E. trade, in order to make sufficient westing to fetch Flat Point. When nearly on the parallel of Java Head, and one or two degrees to the westward of it, a direct course may be steered for the Strait, with an allowance for a probable current setting to the southward.

If contrary winds are met with shortly after leaving St. Paul Island, in November, December, or January, a vessel may steer at once to the northward, and cross the tropic in 80° or 90° E., when she will meet with westerly winds to carry her to the strait.

Shifting of the Monsoons.—During the period when these changes occur, i.e., from about the middle of September to the end of October, and from about the middle of March to the end of April, the winds are variable and uncertain. It is advisable at those times to make sufficient easting in the S.E. trade to bring Java Head nearly North, and then to steer direct for it, borrowing a little to the eastward or westward, when it is approached, as may be required by the prevailing wind or other circumstances.

2.—SOUTHERN INDIA TO THE STRAITS OF MALACCA.

IN THE S.W. MONSOON.—In this, the fair wind season, there is no great difficulty in making a passage around the South end of Ceylon, or from Madras, or any of the Coromandel ports. Having passed Ceylon, steer so as to pass, in lat. $6^{\circ} 20'$ N., through the channel between Pulo Rondo and the South end of the Great Nicobar. If the monsoon be strong from southern quarters, and the weather overcast, so that there may be some uncertainty in the latitude for want of observations, keep southward towards Acheen Head, to guard against the chance of a northerly current. But great caution is necessary in such weather, because, should the wind have had much westing in it, it may have caused a south-westerly current down the West coast of Sumatra. Such a contingency must be guarded against when it is neared in dark, stormy weather. Acheen is generally best made from the southward at this season, passing with great precaution either through the Surat Passage within the islands, or, which is better, northward of Pulo Brasse, by the Bengal Passage.

Bound through the strait, and having passed the islands off Acheen Head, which is then best to be avoided, stand on towards Pulo Bouton, on the eastern side of the Strait of Malacca, because, as has been before explained, the high land of the Pedir Coast, intercepting the monsoon, causes light baffling winds all along the Sumatra side. When Pulo Bouton is made bearing to eastward, you may be able to carry brisk westerly winds up to Pulo Penang. Should the winds be light, a northerly current may be

encountered setting out of the entrance to the strait, and this may set the ship to northward of Pulo Bouton; but when once the islands on the Malay coast are made, there will be no difficulty in getting along that coast to the S.E. Keep within a moderate distance of the coast, in 35 to 20 fathoms, making for the Sambilangs, carefully avoiding the mud bank off the coast between Penang and Pulo Dinding, in lat. $4^{\circ} 14' N$. The outer edge of this, as is shown in the subsequent descriptions, is steep-to, shoaling suddenly from 10 and 8 fathoms to 9 ft. in some parts, and it must therefore not be neared into less than 12 to 15 fathoms. Passing between the steep, rocky Sambilangs and the isolated Pulo Jarra, in the middle of the strait, which is perfectly clean with the deepest water in the strait around it, you make for the West end of the North Sands, those dangerous shoals which run parallel with the coast, but which danger is much diminished by the lightship on the One-fathom Bank, between the North and South sands. Should you meet with an adverse wind when up with the Sambilangs, keep along the Perak coast in moderate depths, not less than 10 or 11 fathoms, as there may be a useful counter-tide and good anchorage in doing so. Having arrived at the One-fathom Bank and its lightship, and sighted the Arroa Islands, there will be no difficulty in getting up to Singapore, as shown in the subsequent descriptions.

IN THE N.E. MONSOON.—The passage to the eastward against this fine weather monsoon is tedious and lingering. Having passed Ceylon, it is best to keep to the northward, passing between the Nicobar Islands and the Little Andaman; or, if from Madras, through the Sombreiro Channel. Those from Ceylon should keep well in with the South end of the Great Nicobar, if the wind will permit, in entering the strait. But should you get drifted to leeward of Pulo Brasse, enter it by the Surat Passage, around Acheen Head. When past Acheen Head, a westerly current will be encountered running along the coast between that and Diamond Point; but in the offing and on the Malay side it sets more or less to the northward throughout the year. Therefore, when within the strait, get away from the Sumatra coast, and try to gain the Malay side, where there are more favourable winds, tidal streams, and the alternating land and sea breezes by which you may work to the S.E.

3.—STRAITS OF MALACCA TO SOUTHERN INDIA.

IN THE S.W. MONSOON.—It is best to keep on the Sumatra side of the Malacca Strait in going westward during this monsoon, because there is an eddy current at its entrance on that side, especially along the Pedir Coast. Having, by means of every shift of wind and this favouring drift got up to Acheen Head, pass between Pulo Way and Pulo Brasse by the Bengal Passage, keeping close to the latter island and around the islets at its North

end. If bound to Madras the passage will be very tedious, and every slant of wind must be zealously taken advantage of.

If bound for Ceylon or the western ports, and having cleared Acheen Head, make for the southward, keeping off the islands along the West coast of Sumatra as far as possible. Having crossed the equator, and got into the S.E. trades, run down your westing till up with the meridian of the port of destination. Then bear up northward, and if bound to Point de Galle, make the land of Ceylon to the westward; or, if to Trincomalee or the East coast, make the S.E. part of the island, for strong westerly winds and very violent easterly currents prevail about the South part of Ceylon at this season.

This passage to the eastward, during the adverse monsoon, is seldom attempted if it can be avoided, and unless a vessel can keep well on the wind it may be very difficult.

IN THE N.E. MONSOON.—There is do difficulty in this passage. Keep on the Malay coast until up with Junkseylon, and then steer so as to pass between Car Nicobar and the South end of the Little Andaman, if early in the season. If bound northward of Madras, either the above or the Sombreiro Passage may be chosen, taking care to make the coast to the northward of the destined port.

4.—SUNDA STRAIT TO BANKA STRAIT.

Having passed through Sunda Strait, for which directions will be given in the subsequent pages, and bound to Banka Strait, it is usual to steer a direct course for the Two Brothers. With a working wind, it will be prudent to keep within a moderate distance of the Sumatra coast; 11 or 12 fathoms is a good depth. A good mark in daylight is, when standing in-shore, to tack when North Island is just on with the highest Zutphen Island; the soundings will then be generally 7 or 8 fathoms, and a large ship should not risk a less depth when working between North Island and the Swallow Rock, which she will pass eastward of, if the South Brother is not brought eastward of N. by E.

Although the space between the Thousand Islands and the Two Brothers can be navigated with more confidence since its partial examination by Commander Bullock, in H.M.S. *Serpent*, in 1865, yet, as no complete survey has been made, the mariner is recommended to proceed with caution. The Brothers may be passed at a prudent distance on either side. On passing to the eastward, take care to avoid the Lynn and Brouwers Reefs; and when passing between the islands and the Shahbundar Banks, a vessel should not keep farther from the islands than 3 miles, and not nearer the coast of Sumatra than the depth of 9 fathoms.

Having passed the Brothers, steer to the northward towards Lucipara,

keeping the Brothers to the westward of South, to avoid the reported position of the Clifton shoal, and endeavouring to keep in soundings from 9 to 12 fathoms, as a direct course cannot be depended upon, on account of irregular currents or tides setting out from the rivers. Neither can the soundings in this track be implicitly trusted to, being irregular, from $8\frac{1}{2}$ to 11 or 12 fathoms in some places, particularly contiguous to Tree Island bank, and the edges of the other banks projecting from the coast of Sumatra, also in the vicinity of the Arend and Boreas banks in the offing. It will be, however, prudent to borrow towards the main if the depths increase to 12 or 13 fathoms; and to haul off from it if they decrease to $8\frac{1}{2}$ or 9 fathoms towards the banks that line the coast. Near these the soundings are generally hard and more irregular than farther out from the land, in 12 or 13 fathoms; but, in the latter depths, a ship will be too far off the coast with a westerly wind.

When the weather is clear, during the day, it may be proper to get a sight of the coast from the poop of a large ship at times, edging out occasionally in the night, or when the depths decrease to $8\frac{1}{2}$ or 9 fathoms. Having passed the bank off Tree Island, the coast may be approached with greater safety, and the depth will decrease, regularly steering northward for Lucipara, to $5\frac{1}{2}$ fathoms, when it bears N. $\frac{1}{2}$ E. about 10 miles.

If at night a vessel should come into shallow water between the Two Brothers and Lucipara, and not being certain whether she is on either the Arend or Boreas banks, or the bank off the coast of Sumatra, it is advisable to anchor immediately, and to wait for daylight, for the depths are moderate, and the bottom throughout this track generally favourable for that purpose.

5.—BANKA STRAIT TO SUNDA STRAIT.

When bound from Banka Strait to that of Sunda, the proper course will be about S. by E., keeping in from 9 to 13 fathoms; but the currents are too variable to trust implicitly to any course, and the depths also are too irregular to depend on them alone, for the 5 and $4\frac{1}{2}$ fathoms Boreas and Arend banks may be easily mistaken for those south-eastward of Tree Island, which are very dangerous. It will therefore be advisable in day-time to keep on the Sumatra side in 8 or 9 fathoms, from which depths that shore is generally visible from the deck, and at night to keep off shore when the water shoals to less than 9 fathoms, and to approach it when it deepens to more than 13 fathoms, as that depth with westerly winds would be too far off.

Having arrived in about $3^{\circ} 40'$ S., or about 30 miles distant from the Two Brothers, keep as nearly as possible in 9 or 10 fathoms, so as to get sight of these islands bearing South, but not to the eastward of that bearing in order to avoid the Clifton Shoal; otherwise, if made when in 11 fathoms, it would

be difficult to weather them with a westerly wind, especially as the current runs to the south-eastward during the western monsoon. When passing to the eastward of the Two Brothers, recollect the Brouwers and Lynn Reefs.

Coming from the northward the Two Brothers appear like one island, and hence some vessels have been led into danger by mistaking Mound Imbong, or Knob-hill, in Sumatra, when seen in the twilight, for these islands. Sailing past these islands at night, the vessel's position should be well ascertained before dark, or else it would be better to anchor.

Having passed on either side of the Brothers, the safest bearing to bring them upon appears to be N. $\frac{1}{2}$ E. After losing sight of them upon that bearing, a course about S. by W. may be steered for the entrance of Sunda Strait.

Captain Stephens, of the ship *Harkaway*, says:—"In May, approaching Sunda Strait from the eastward the Java side should be steered for, and kept aboard, as then the winds are light, those from S.E. prevailing at night, and from N.E. during the day; this precaution will prevent the vessel being carried by the current to the westward of the Button Islet; this current runs constantly to the S.W. in the middle of the strait, it is checked by the short flood, but runs strong with a long ebb."

6.—BANKA STRAIT TO SINGAPORE.

Vessels bound from Banka Strait to Singapore seldom adopt the Outer route to the eastward of the islands of Linga and Bintang, most vessels preferring to proceed by Rhio Strait; it, however, forms part of the main route into the China Sea, and is therefore of great importance.

OUTER ROUTE.—The ordinary route for vessels bound northward is between the Toejoe Islands and Pulo Taya; they may, however, pass on either side of Pulo Taya, which, being high and bold, is very convenient to make in thick weather or at night.

At night, or in thick weather, the lead will be very useful in detecting the drift caused by cross currents between the Toejoe Islands and Sumatra, for the depth decreases generally towards Sumatra, and increases towards those islands; but care should be taken in approaching them, as the remarkable irregularities of the currents have brought many vessels into the danger of being entangled among them. Near Sumatra a mud bottom mixed with sand prevails, and near the islands mud only.

The Castor Bank, lying to the N.E. of Pulo Taya, carries not less than 5 fathoms water, but a vessel will pass eastward of it by not bringing Pulo Taya South of S.W. $\frac{1}{2}$ W., and westward of it by keeping that island South of S.S.W. $\frac{1}{2}$ W. The East point of Linga (which, with a point to the westward of it, appears at a distance like two islands) bearing N.N.W. will lead from 4 to 5 miles to the N.E. both of the Castor Bank and the Ilchester Shoal. But in order to avoid the last-named danger, if the channel between

the Castor Bank and Linga is used, take care not to bring the East point of Linga to the East of North.

Having passed eastward of Pulo Taya, a course may be steered to cross the equator in 20 or 21 fathoms, or in long. 105° 30' E. From the equator steer about North until past the Frederick and Geldria shoals, observing in the night not to come under 23 or 24 fathoms between lat. 0° 30' and 0° 50' N. to avoid those dangers; if it be day when Pulo Ruig or Ragged Island is seen, keep it westward of N.W., and it will lead eastward of these shoals. When abreast of Pulo Panjang, and in soundings of 24 or 25 fathoms water, a N.W. or N.W. by W. course, according to tide, will lead to the entrance of Singapore Strait.

The INNER ROUTE, by the Strait of Rhio, will be noticed in connection with the description of the coast of the strait hereafter given, as the various marks, &c., will be best understood by referring to those descriptions.

Vessels bound from Banka Strait to Singapore during the strength of the N.E. monsoon frequently adopt the Inner Route by the Varella and Durian Straits. During the prevalence of strong northerly winds in the months of December and January, sailing vessels will save much time by doing so, for here they will have smooth water, good anchorage, and but little tide, whereas on the eastern side of Linga, at this season of the year, there is generally a heavy sea, and a southerly current sometimes running at the rate of 3 knots an hour. In Varella Strait they will also be greatly assisted by the squalls from the Sumatra coast.

Varella, or Brahalla Strait, is situated at the southern part of this route, and Durian Strait at its northern part; the intermediate portion has not received a specific denomination. The entire route is about 120 miles in length from Pulo Varella to the Carimon Islands, and is bounded on the western side by the coast of Sumatra, False Durian, Sabon, and the contiguous islands; and on the eastern side by Sinkep and the other islands off the South and West coasts of Linga, and by Great and Little Durian, and the adjacent islands.

The STRAIT OF MALACCA and STRAIT OF SINGAPORE, and their navigation, will be also described in subsequent pages.

7.—SINGAPORE TO HONG KONG.

IN SOUTH-WEST MONSOON.—When June approaches, and the S.W. monsoon is set regularly in, the track from Singapore to China by the main route, eastward of Pulo Sapatu and over Macclesfield Bank, is preferable, the winds being more steady in the open sea than near the coast. About full and change of the moon, and as early as April, a westerly breeze will sometimes be found blowing out of the Gulf of Siam to carry a vessel to Macclesfield Bank, and afterwards easterly winds to run her to Hong Kong.

This route becomes precarious if a sailing vessel is not up with Pulo Sapatu early in October; for near this island, about the middle of that month, strong southerly currents begin to prevail with light northerly winds, variable airs, and calms, by which many vessels have been delayed for several days, and have made no progress to the northward. Fresh winds from the southward have been met with, even so late as 1st of November, but these instances are rare.

Some vessels proceeding by the main route have carried strong S.W. and southerly winds, when others taking the inner route have at the same time experienced N.W. and westerly gales blowing out of the Gulf of Tong King, with dark weather and rain, and have been in danger of being driven among the Paracel Reefs; the inner route ought, however, to be chosen in the strength of the S.W. monsoon if the vessel is weak and making much water, for the sea will be smooth, and being near the land she may reach an anchorage if required. The gales out of the gulf are not frequent, and the land may be kept in sight nearly all the time.

Taking the inner route, steer from Pulo Aor along the coast to the Redang Islands, thence across the Gulf of Siam, and along the coasts of Cambodia and Cochin China, keeping the latter aboard to Cape Touron. From thence steer for the S.W. part of Hainan, coasting along this island, and passing between it and the Taya Islands; then cross over to make the coast of China about Tien-pak, or Hailing Island. The islands from thence to Hong Kong may be coasted along at discretion, or shelter may be found amongst them on an emergency. If this route is taken before the middle of March or 1st of April, the passage will be tedious unless the vessel is a good sailer.

Bound to Hong Kong in the strength of the S.W. monsoon, with the wind steady between S.E. and S.W., endeavour to make the Great Ladrone Island bearing about North, then steer between it and the Kypong Islands, and between Lingting and the Lema Islands, for the West Lamma Channel. After the middle of August, when easterly winds are likely to prevail several days together, as they are more or less at all seasons, it will be necessary to make the N.E. head of the Lema Islands, and proceed in by the Lema Channel, towards the West Lamma Channel. The East Lamma Channel is also safe in both monsoons, for although the water is deep, if the wind falls light it is safe to anchor in, and there is little or no tide.

IN NORTH-EAST MONSOON.—Sailing vessels leaving Singapore for China in February, March, and part of April, may expect a tedious beating passage, if they adopt the main route. In March, April, or May, they can proceed by the inner route along the Coast of Cochin China, which is generally the most expeditious route in these months.

The passage to China by the coasts of Palawan and Luzon may be followed late in the S.W. monsoon; without much difficulty in October and

November; and it is now often made in December, January, and at every period of the N.E. monsoon.*

In December, January, and February,† sailing vessels should not leave the entrance of Singapore Strait, in strong N.E. winds, but anchor on the northern shore, under the Water Islands, in 9 or 10 fathoms. In those months gales often occur at new and full moon; the weather is then thick, the rain lasting two or three days, and the current outside accelerates to the S.S.E. $\frac{1}{2}$ E. from $2\frac{1}{2}$ to 3 knots an hour. A vessel leaving the strait then, instead of fetching St. Barbe Island, would fall bodily to leeward, and have to work up the West coast of Borneo. Fine weather follows, the wind backing round to North and N.W.; the current in the offing decreasing in strength to about $1\frac{1}{4}$ knot.

Leave the Water Islands with the first of the ebb, and keep clean full. Stand to the north-eastward to go through the channel between Subi Island and the Great Natuna; a passage that may without much difficulty be made, in these months especially, at full and change, when the wind, after

* It was formerly the general custom for the clipper vessels employed in the opium trade between India and China to beat up the middle of the China Sea in the strength of the N.E. monsoon, keeping as close to the western edges of the reefs as possible, where the current was found to be generally in their favour. Many commanders who have been accustomed to make their passages in that way are strongly of opinion that it is the best route for vessels later in the season than the month of November, whilst others who have been accustomed to proceed by the Palawan have just as strong opinions in favour of that route. The following remarks of Mr. T. B. White, who was for many years in command of clipper vessels engaged in the opium trade, appear to be exceedingly valuable, inasmuch as they furnish a balanced opinion on the respective advantages of these routes. He says: "I am sorry I cannot say much from experience in beating up the Palawan in a sailing vessel, for during the entire period of my command of the *Laurick* I never once went that way, but always along the western edges of the shoals. I am, however, now quite certain that I should have often made much quicker passages, and saved much wear and tear, by going up the Palawan. In the *Fiery Cross*, although a powerful steamer, I found it preferable to take the Palawan, and always did so during the strength of the N.E. monsoon (November to February), saving fuel and wear and tear; and, though a longer route, made better passages by getting smooth water and often favourable currents. I believe nearly all heavily laden ships now take the Palawan from October until the end of February in preference to the outer passage, and a current to the north-eastward is generally felt the nearer the Borneo coast is kept aboard, and usually the weather is moderate, with a rolling beam swell on; at least that has been my experience when going up in the steamer. Mr. Reynell, in the clipper *Waterwitch*, usually took the Palawan in the N.E. monsoon, and made some very good passages. Now that it is so thoroughly well surveyed, I consider it quite as safe as the outer passage."

† These directions (as far eastward as the Natuna Islands) apply with equal force to vessels bound either to the Gulf of Siam or the River Saigon. They have been compiled chiefly from "Sailing Directions between Singapore and the River Saigon, by Mr. A. J. Loftus, commanding the ship *Kensington*," by Commander J. W. King, R.N.

a few hours' calm, frequently hauls to the westward with squalls and rain, and then veers round to S.W. and South, blowing moderately for 24 hours.

By taking advantage of these slants, Subi may be easily weathered, and the intricate channels between it and the N.W. coast of Borneo avoided. After fetching Low Island, in long. $107^{\circ} 48' E.$, if the wind continues easterly, take the starboard tack to the northward, passing westward of Low Island, keeping not less than 3 miles from the south-western side, to avoid the shoal water as far as 2 miles from its shore. Give Haycock a berth of 3 or 4 miles in passing, as the coral shoal about that island extends fully 3 miles from its S.W. side. Large ships should not pass eastward of Haycock at night, as this locality is said to have hidden danger.

After passing Haycock there will be no difficulty in working up to the S.E. point of the Great Natuna, as that island, when approaching it from the S.W., shelters against the strong N.E. current of the monsoon. Off its southern shore at night, in fine weather, the wind is off the land, which should not be approached nearer than 2 or 3 miles without a good breeze, as the water is deep close in-shore, and no good anchorage.

Vessels fetching to leeward of Subi with a northerly wind should take the Koti Passage, between Pulo Panjung and Sirhassen Island. The Sirhassen Passage is also a good channel, and quite safe when the South side of Sirhassen Island is kept aboard. The currents among these islands are more regular; but not so in the Api Passage, where they set in various directions, and with great velocity to the S.W. from 16 to 19 hours at a time; for large ships any of the other passages are preferable to this, for great caution and perseverance are requisite in working through, as the Borneo coast in from 10 to 11 fathoms water must be kept aboard to avoid the current and profit by the land winds.*

In taking the Koti Passage, give Pulo Panjung a good berth to avoid the

* For steam vessels (especially those of small power) proceeding to China by the Palawan passage against the N.E. monsoon, the route by the Api Passage and the coast of Borneo presents the following advantages: first, light, variable winds and smooth water will often be found close to the Borneo coast, when a strong monsoon is blowing a hundred miles off it; and next the Api passage route affords convenient landmarks to lead a vessel safely and expeditiously to the entrance of the Palawan; whereas by the ordinary route much difficulty and delay frequently occurs in making Low Island, and in passing between the Royal Charlotte and Louisa Shoals.

Steamers leaving Singapore should pass southward of Victory Island, then steer to sight the small island of St. Pierre (carefully observing and allowing for the set of the current), and afterwards for the Api Passage, keeping over towards Marundum Island rather than Api Point. Having passed Marundum and Data Point, the course is clear up to the entrance of the Palawan, passing between the South Luconia shoals and Barram Point, and keeping as close to the Borneo coast until abreast of that point as circumstances may make convenient.—Navigating-Lieutenant J. W. Reed, commanding Her Majesty's surveying vessel *Rifleman*, 1866.

dangerous reef which surrounds it. The winds amongst these islands, and as far eastward as the meridian of Cape Sirik, are generally from North to N.N.W. The passage cleared, proceed to the north-eastward; endeavouring, if not certain of the longitude, to make the Royal Charlotte or Louisa Shoal, whichever is the weathermost, by running on its parallel of latitude; and as the currents appear to be influenced by the prevailing winds, vessels should be prepared to anticipate a set in the direction in which it is blowing, the velocity of the current being proportionate to the force of the wind.

Having made either the Royal Charlotte or Louisa Shoals, on passing mid-channel between them, steer E. by N. 100 miles, and then about N.E. for lat. 8° N., long. $116^{\circ} 15'$ E., when Balabac Peak will probably be seen bearing about east-southerly, and making like a rather flat-topped island, with a small peak rising in the centre; when about 40 miles distant from the island, the low hills may be seen on either side of the peak, having at first the appearance of detached islands.

Having brought Balabac Peak to bear about E.S.E. at the above distance, a N.N.E. $\frac{3}{4}$ E. course should be steered, when the high land of Bulanhow will soon be discernible, bearing about N.E. by E. $\frac{3}{4}$ E. This course should lead about 6 miles eastward of the reported Roger Breakers, 10 miles westward of the elbow of the bank of soundings fronting Palawan Island, and midway between the Royal Captain Shoal and the edge of the bank (the most dangerous part of the channel). When Bulanhow Mountain bears S.E. by E. $\frac{1}{4}$ E. the vessel will be in line with it and the Royal Captain Shoal, and in the narrowest part of the channel, which is $27\frac{3}{4}$ miles wide, and the high land of Mantaleengahan will then bear E. $\frac{1}{4}$ S.

If the wind be well to the southward, and the weather thick, Balabac Island may be approached nearer, in order to get well hold of the land, but extreme caution should be taken not to go within 12 miles of it, as soundings of 26 and 20 fathoms extend that distance off, in a westerly direction from the peak, having shoal patches immediately inside them.

If the wind be to the westward, with thick cloudy weather, Balabac Island should not be approached nearer than 36 miles, for these winds usually force a strong current through the straits to the eastward, and when off the S.W. end of Palawan, it is not unusual for them, particularly in squalls, to veer to W.N.W., and sometimes N.W., blowing with great violence, and placing the vessel on a lee shore with respect to the shoals inside the edge of the bank. It generally so happens, that about the time, September and October, when vessels adopt the Palawan route, this weather prevails off the S.W. end of Palawan, rendering it uncertain and difficult to hit the narrowest part of the channel, owing to the land being obscured, especially if neither the Royal Charlotte nor the Louisa Shoal has been made, and the longitude corrected.

Under these circumstances, it is advisable to advance with caution, regu-

lating the speed of the vessel so as to be in the fairway, viz., lat. 8° N., long. $116^{\circ} 15'$ E., for making the channel at daylight. Horsburgh recommends lat. $8^{\circ} 30'$ N., and long. $116^{\circ} 30'$ E., but this may be running too close at night, unless confident of the accuracy of the reckoning.

If not certain of the vessel's position, endeavour to get soundings on the edge of the bank to the north-westward of Balabac Island, and the safest part to approach for this purpose is that about the elbow, on the parallel of $8^{\circ} 30'$ N., or immediately to the southward of it, for it is believed the portion of the bank which is embraced by the bearings of Balabac Peak, S.E. by E. $\frac{1}{2}$ E. and S.S.E., comprising a distance of 25 miles, is free from danger. If the peak be obscured, the same bearings of the body of the island will, if taken with care, answer. Or should the North extreme of the island be discernible (showing like a hillock, with a low double hill to the southward), the part of no danger will be included within the lines of bearing of it, East and S.S.E. $\frac{3}{4}$ E.

During the period in which the *Royalist* was engaged upon this survey, experience led to the belief that in the thickest weather the land is seldom totally obscured for any length of time.

Having obtained soundings, which will be about 90 fathoms, if close to the edge of the bank, and from 45 to 55 fathoms, sand, if inside, haul off to the north-westward, to give the edge a berth of about 10 miles, then steer the channel course N.N.E. $\frac{3}{4}$ E. When Bulanhow Mountain bears eastward of E. by N. $\frac{1}{2}$ N., the elbow has been passed, and the bank then trends N.E. by N. It is between the elbow and the parallel of $9^{\circ} 15'$ N. (a distance of 60 miles) on the East, and the Half Moon, Royal Captain, and Bombay Shoals on the West, that the most dangerous part of the Passage lies.

When Montaleengahan Mountain bears S.E. $\frac{1}{2}$ E., or the Pagoda Cliff, (generally seen when the more elevated land is obscured), S.E. $\frac{1}{2}$ S., the vessel will be on the line of the Bombay Shoal, where the channel is 28 miles broad.

Having passed the Bombay Shoal, abreast of which the bank trends N.E. $\frac{1}{2}$ N., steer a course parallel with its edge, preserving a distance of 8 or 12 miles from it, and 27 or 30 miles from the land, or nearer, if convenient, and the peaks on Palawan are sufficiently distinct to get good cross bearings. It is, however, not desirable to get too close, as the edge of the bank in about the parallels of $9^{\circ} 30'$ and 10° N., is not uniform in its outline, and several rocky patches lie within a mile, and in some places only 3 cables' lengths from the 100 fathoms line.

This N.E. $\frac{1}{2}$ N. course, edging a little more to the northward when abreast of Ulugan Bay, where the bank extends 28 miles from the shore, will take a vessel through the passage clear of every known danger.

Vessels working through the Palawan Passage, having conformed to the directions given for making the S.W. end of Palawan, should, in fine weather, endeavour to make their inshore boards in the afternoon, for the

sun then being astern of the vessel, the patches lying near the edge of the bank will generally be distinguished from the mast-head in ample time to tack off. In squally weather, also, during heavy rains, these patches have been observed imparting a yellowish hue to the surface of the water.

It is almost needless to remind the seaman (when the land is obscured) of the desirableness of getting hold of the edge of the bank before dark, in order that he may have a good departure for the night; and on making his inshore board, it must also be borne in mind, that the probability of coming *suddenly* into soundings is great, as the approach on this tack will generally be at right angles to the edge of the bank. He should therefore be prepared to go round immediately on getting indication of soundings.

Proceeding northerly from the Palawan Passage, it is customary to beat up the West coast of Luzon to Piedra Point, and thence direct for Macao or Hong Kong, passing leeward of the Pratas. But if bound to any of the ports northward, much time might be saved by passing along the eastern coast of Formosa, thereby avoiding the heavy labour, wear, and loss of time, by the attempt to work against the monsoon along the coast of China, which even a clipper sometimes fails in effecting.

In working along the Luzon coast, particularly about dawn or sunset, less sea, and much lighter winds, and at times even land breezes will be experienced by hugging the coast by short boards; but great caution should be observed, particularly between Piedra Point and Cape Bojeador, as several coastline dangers do not find a place in the charts.

The first strong gust of the monsoon will be experienced on clearing Cape Bojeador, but this should not induce the navigator to stand further westward than will enable him to make his eastern stretch to weather it, when he will at once experience less wind. This generally is the case on all lee shores backed by mountains, either resulting from obstruction, reaction, or the effect probably, after sunset, of counteracting land winds. Among the groups northward of Luzon there are no dangers which are not easily avoided, and no continuous strong breezes will be experienced, at all comparable in force, or attended by high sea, similar to those which prevail between Piedra Point and Hong Kong. On the contrary, good working breezes, and at times light winds prevail, enabling a sailing vessel of moderate speed to make the range of 6 degrees northing in 8 days. Typhoons are likely to happen in both monsoons between the North coast of Luzon and Formosa.

8.—HONG KONG TO SINGAPORE, ETC.

IN NORTH-EAST MONSOON.—Ships bound from China to Singapore, or to the Straits of Gaspar and Banka, should in March and April adopt the main route by the Macclesfield Bank, which is the most expeditious in these

months, keeping to the eastward on leaving the China Coast; and also in passing Pulo Sapatu they ought to borrow to the eastward towards the shoals, where the winds are more favourable in these months than farther to the westward. In April, the *Vansittart*, by keeping about 3 degrees more to the eastward than the *Herefordshire*, made as much progress in one day as the latter did in ten.* At all other times, the inner route by the coast of Cochin China seems preferable; for it is the shorter, and the ease afforded to ships by steering from the Grand Ladrone immediately before the wind, when blowing strong at N.E., is a great advantage; whereas, by the main route, a S.S.E. course is shaped for the Macclesfield Bank, often bringing the wind and sea before the beam, which strains a deeply-laden ship. Many have strained so much, that, in order to gain upon the pumps, they were forced to bear away for the inner route; others, by persevering in the main route, have laboured excessively, and some of them at last foundered with their crews. Some of the ships which, after leaving China, have been missing, have probably suffered from the same cause. Had those ships, on leaving Canton River, steered S.S.W. $\frac{1}{2}$ W. or S.S.W. $\frac{1}{4}$ W., the direct course for the inner route, they probably would not have strained in the least, but have reached their ports of destination in safety.

Vessels may, according to circumstances, pass either to the eastward or westward of the Catwick Islands and Pulo Ceicer de Mer, or through any of the channels between them; but since the Rawson Shoal is known to have no existence, it would seem advisable, in thick weather, to pass 20 or 30 miles eastward of Pulo Sapatu, especially at night: from thence, passing westward of the Charlotte Bank and the Anamba Islands, steer to make Pulo Aor.

Should the weather be thick, and a fresh breeze blowing, when near Pulo Aor, round to under its lee, and wait a convenient time to bear up for the

* Captain Stephens says:—"Vessels leaving the coast of China or Manilla, and bound towards Sunda Strait, in March, April, or in the early part of May, may expect a tedious passage down the China Sea if proceeding by the old route which passes Pulo Sapatu, particularly if they do not sail before the 5th or 10th of April. Whereas, if the track be taken along the coast of Luzon, down the Palawan Passage, along the coast of Borneo, past Direction Island, round Soruetou, and through the Carimata Strait, passing close round the North Watcher, and on for St. Nicholas Point on Java, they are likely to carry easterly winds, with fine weather and a smooth sea, the whole distance, thus making a direct course, and will avoid calms. The current will also be more favourable than otherwise until May is well advanced. To prove the advantages of the eastern route, it may be stated, that in April, 1861, two American ships sailed from Fu-chau-fu; one proceeded by Pulo Sapatu on the West side of the China Sea, the other by the Palawan Passage and Carimata Strait; the latter ship passed Anjer twenty days before the other. The *Harkaway*, on her passage in April and May, 1862, carried an easterly wind the whole way down, and had no occasion to anchor."

strait.* The current between this island and the East point of Bintang sets about S.S.E., by which it often happens that vessels leaving Pulo Aor steer too much southerly, and are swept with the current and the ebb tide coming out of the strait, so far to leeward of Bintang, that they have been obliged to proceed round it, and come up through Rhio Strait.

In March, during the latter part of this monsoon, the winds are steady from the eastward, the weather settled, and the current weak. In April the prevailing winds are also from the eastward, and are much lighter and accompanied with calms and squally weather; from the latter end of this month to about the middle of May the monsoon gradually breaks up.

In SOUTH-WEST MONSOON.—Captain Blake, of H.M.S. *Larne*, remarks:—

Although formerly considered impracticable, it is now a common practice for ships to work down the China Sea at all periods of the S.W. monsoon. After leaving Hong Kong, the usual course is to stand towards Hainan, which will be often fetched without tacking, as the wind frequently blows for days together from the S.E. or eastward in that part of the China Sea; from thence across the Gulf of Tong King to the Cochin China coast. Land and sea breezes and smooth water generally prevail close to that coast, for which reason it is usual to work down as close to the shore as possible, taking advantage of every slant of wind, but being careful not to get too far off the land. It is sometimes possible to get as far to the southward as Cape Padaran in this way, but generally after passing Cape Varela the monsoon is found blowing very fresh, with frequent hard squalls out of the Gulf of Siam, rendering it impossible for a ship to do much to windward. From Cape Varela, or from Cape Padaran, if a vessel has been able to fetch it, stretch away to the southward—making a tack, if necessary, to weather the West London or other shoals—till the coast of Borneo is reached, along which work, and pass out through any of the South Natuna channels. Stand across to Singapore, keeping well to the southward before closing Bintang, to be sure of your landfall, as the currents run very strong, sometimes 2 miles an hour to the northward.

9.—SINGAPORE TO GULF OF SIAM AND TO SAIGON.

In NORTH-EAST MONSOON.—Sailing vessels bound from Singapore to the Gulf of Siam in the N.E. monsoon generally pass eastward of the Natuna Islands. Smart sailing vessels proceed between the Anamba and Natuna Islands, and endeavour to make Pulo Obi; they then steer for Pulo Dama, if bound to Kamput, in the Gulf of Siam; or outside Pulo Panjang and Pulo Way, direct for Cape Liant, if bound to Bangkok. In February and March it frequently happens that vessels fall in with an easterly wind off Pulo Aor, that takes them right up to Pulo Obi.—*Captain Loftus*.

* Since the establishment of the Horsburg light on Pedra Branca, there is really now no difficulty in making Singapore Strait at any time, with proper attention.

The directions given on page 55 for proceeding from Singapore to Hong Kong apply also to vessels bound to the Gulf of Siam or to Saigon, until they have arrived to the eastward of the Natuna Islands, either by passing between the Great and South Natuna, or by the Koti Passage, when—

If bound to the Gulf of Siam, proceed to the north-eastward to about long. 111° or 112° E., which can easily be done, as the wind here is invariably from North to N.N.W. as far as the meridian of Cape Sirik, when it generally hauls to the north-eastward; then with a full sail stand on the starboard tack towards Pulo Obi. Little or no current will be experienced until lat. 6° or 7° N. is gained; when it will be found setting strong to the S.W., governed considerably by the prevailing winds.

In April and May the best passages to the gulf are made by keeping the Malay coast aboard; but expect squalls, calms, and rain. The current will also begin to set weakly to the N.E.—*Lieut. J. Richards, R.N.*

If bound to Saigon, proceed to the north-eastward to about 112° E., when stand over with a full sail on the starboard tack, to make Cape Tiwane. From lat. 7° N. until the mouths of the Cambodia Rivers bear West, distant about 70 miles, strong currents will be found setting to the S.W., governed considerably by the prevailing winds, for when strong gales blow in the early part of this monsoon, the south-westerly current is stronger, and often runs 3 knots an hour. The tides are regular, and set pretty strong in-shore on the Cochin China coast during both monsoons.

In the latter part of March and April an easterly wind is often found to the eastward of the Anamba Islands, that will take a ship to the Brothers, W. by S., about 24 miles from Pulo Condore; and afterwards she may work up to Cape St. James inside that island, keeping close to the Cambodia coast, which is very low, and can seldom be seen at night.

After opening out the mouths of the Cambodia Rivers, strong ebbs will be found setting to windward, greatly assisting ships on the in-shore tack; but they should not stand near these mouths during the flood tide, and on no account shoal the water to less than 12 fathoms in the night. The lead should never be neglected when standing towards this low land, which may be seen about 10 miles off on a fine clear day.

N.E. and N.N.E. gales often blow in the latitude of Pulo Sapatu, and between it and the Cochin China coast, in December, January, February, and sometimes March. They continue for two or three days with a heavy sea and strong current. A gradual rise in the barometer is a sure indication of one of these gales; while at their height the mercury fluctuates about $\frac{1}{100}$ of an inch during the twenty-four hours, and commences falling before the gale is over, the sky being generally thick and hazy throughout.

After sighting the land, the vessel should gain the meridian of Cape St. James in one of these gales, bear up for Pulo Condore, and anchor either in

the Great Bay, or in Pulo Condore Harbour, where good shelter will be found; otherwise the vessel will be drifted to leeward of that island, and require several days to beat back to regain her former position.

IN SOUTH-WEST MONSOON.—In this monsoon the winds prevail between S.E. and West in Singapore Strait, and vessels will have no difficulty in sailing through to the eastward.

If bound to the Gulf of Siam, having cleared Singapore Strait, shape a course to make the Redang Islands; and from thence keep the western shore of the gulf aboard, passing inside Puly Lozin and Koh Krah.

If bound to Saigon, steer to pass to the westward of Pulo Condore, making allowance for a current setting out of the Gulf of Siam, whilst crossing the entrance of that gulf. When the body of Pulo Condore bears about South, steer North, or N. $\frac{1}{2}$ W., if an easterly current prevail; which will soon bring the vessel on the edge of the bank that fronts the mouths of the Cambodia Rivers, and extends to the entrance of Saigon River. Steer then northward along the edge of the bank, keeping in 8 to 12 fathoms; if the water shoalens under 7 or 8 fathoms, haul to the eastward, and it will immediately deepen, the soundings being regular on the edge of the bank.

Directions for making the land about Cape St. James, and for proceeding up the Donnai River to Saigon, are given hereafter.

10.—GULF OF SIAM TO SINGAPORE.

IN NORTH-EAST MONSOON.—From Bangkok the passage down the gulf will frequently be shortened in the N.E. monsoon, by sighting the Kusrovie Rock, and passing between the Tanqualah group and Koh Tron. Keep well to the westward of Pulo Panjang, and if bound to Singapore, the passage will be made quicker by hauling well out into the China Sea; passing about 20 miles outside Pulo Brala, outside Pulo Aor, and then steering for Barbukit Hill, so as to allow for the southerly current setting across the strait.

Approaching Pulo Timoan at night or in thick weather, a good lookout should be kept, and allowance made for the current setting to the south-westward, as vessels have several times found themselves close to the North end of that island when their reckoning has placed them well to the eastward of it.

IN SOUTH-WEST MONSOON.—From Bangkok to Singapore keep the western shore of the gulf aboard, passing inside the Redang Islands, Pulo Kapas, and Pulo Brala. Below Pulo Kapas, everything depends on keeping in shore out of the current, and taking advantage of the land and sea breezes. (*Lieut. J. Richards, R.N., 1858.*)

11.—SAIGON TO SINGAPORE.

IN NORTH-EAST MONSOON.—From Cape St. James shape a course to pass to the eastward of Pulo Condore, and from thence direct to make Pulo Aor. From Pulo Aor to Singapore proceed according to directions previously given.

IN SOUTH-WEST MONSOON.—Many good passages have been made by keeping the Cambodia coast aboard as far as the Brothers or Pulo Obi, and then crossing the Gulf of Siam with a strong north-westerly wind until the Malay coast is reached, and afterwards working with the tides, keeping close inshore, by passing inside of Timoan group, Siribuat, and Pulo Sibū,* and thence to the Strait of Singapore, taking advantage of the regular tides and the land and sea breezes which prevail during settled weather in this monsoon.

This route is generally adopted by ships from Siam, and sometimes from Saigon; but the passage to the eastward of the Great Natuna is considered the best, particularly for large vessels.

Vessels leaving Cape St. James should take every advantage of the North and N.E. winds, which frequently blow at night, and in some parts of the day, within a short distance of the coast, by running to the south-westward, until the regular monsoon breaks them off to the S.E. These local winds often carry ships 40 or 50 miles to the south-westward of Pulo Condore without any interruption.

While standing over to the S.E. the full strength of the north-easterly current will be met with about the Charlotte Bank; it gradually decreases and becomes slightly favourable when the Great Natuna is brought to bear S.W. Hereabouts S.E. and easterly winds will generally be met with, and smart sailing ships frequently pass through the channel between Subi and Low Island, and fetch direct into Singapore Strait.

Strong westerly winds with rain frequently happen during the early part of this monsoon, and from this cause or by fetching 2° or 3° to the eastward of the Great Natuna with scant southerly winds after leaving the Cambodia coast, dull sailing vessels have often made the northern part of Borneo about the meridian of Cape Sirik. When this is the case, make for the Api passage, keeping the N.W. coast of Borneo aboard from Tanjong Datu until the Boerong Islands are reached.† This will be accomplished without

* The inside channel, extending from Pulo Sibū to Siribuat, and formed by a chain of islands and rocks parallel to the main, is a good and safe one, having but few hidden dangers, and good anchorage all the way through.

† Many vessels, through leaving the coast of Borneo too soon, have fetched no higher than Pulo Aor or Pulo Timoan.

difficulty, for strong land and sea breezes prevail, and the current is weaker near the coast.

The current in the offing runs strong to the northward and through the Api passage. Ships coming through this passage should never shoal their water to less than 12 or 14 fathoms between Tanjong Datu and Tanjong Api, and never pass them nearer than 2 or 3 miles, but should be ready to anchor in it off any other part of the coast, as the tides are greatly influenced by the currents, which often change without warning.

Leaving the Boerong Islands, pass either northward or southward of the Tambelan group. Should the wind be scant from the S.W. after leaving these islands, steer as high as possible, and endeavour to make Pulo Pantang, off the East side of Bintang Island. (*Captain Loftus.*)

EASTERN PASSAGES.

12.—EASTERN ROUTE TO SINGAPORE.

Captain Mc Kenzie gives the following remarks on this passage:—The passage to Singapore, &c., through Balli and Lombok, and the Eastern Straits, late in the S.E. monsoon is often tedious, as the S.E. currents begin to prevail in October, and light winds, which frequently haul to West and N.W. after passing Pulo Mancap. After leaving the Straits of Lombok or Balli, easterly winds will carry you past Pulo Mancap. The best track thus far will be between Pondy and Galion (safe in the night time), and then to the southward of Lubeck, going well to the westward of the Mancap Shoal, and just giving the Discovery Bank, and other dangers on the West side of the passage, a fair berth. Steer for the Eastern Montaran Island, passing between it and the next westerly one, the passage is quite clear; steer then to the W.N.W. along the coast of Billiton. It is best not to go inside the Montaran Shoals, as the wind there at that time of year is seldom more westerly than S.W., consequently a vessel will lie up high enough, from the East Montaran, to pass South of Pulo Dogan, Taya, and Sinkep (if possible to weather the last), if not the Straits of Dasse are quite safe, and quickly passed through with the tide.

After passing through either of these straits, run for Singapore by Durion Straits.

As to beating down the Carimata against the S.E. monsoon, I believe the best plan is to go through Rhio Strait, then stretch over to the Borneo coast, and work down it close in, anchoring for the tides. From Rendezvous Island make for the Java shore, and if bound easterly work along it. This passage is easily made to Sourabaya in fifteen to twenty days. But it is beating up

from Balli, Lombok, or the East end of Java, in the West monsoon, that requires some remarks ; and for vessels usually deeply loaded with rice, it is a difficult thing to beat up against a strong monsoon and lee current. Two routes have been generally adopted, one to the southward of Java, and the other by beating up the Carimata. By both these routes I have known some vessels get to Singapore in forty days, and some have been fifty, sixty, and eighty days. I should say sixty was an average passage from Balli or Lombok ; and the vessel much strained, sails worn, and cargo probably more or less damaged. I should, therefore, confidently recommend an eastern route, which I have no doubt has been by this time followed by the commanders of Balli vessels, at my suggestion. This is, to go through the Molucca, or even Gillolo passage, and then with the North and N.E. winds through the straits of Balabac into the China Sea, and thence to Singapore. A fair wind would be secured all the way, and the passage made in twenty-five or thirty days, with ease and comfort to the vessel. This may seem a very circuitous track, yet I am certain that it is the quickest way to Singapore. And any one who had once tried either of the other routes would find the difference, when comparing with the eastern route, the harassing work from Pulo to Singapore, and the strong rush of current from the China Sea that begins so early as October before the N.E. monsoon has set in.

13.—EASTERN ROUTES TO CHINA, ETC.

The passages hitherto described are those which are entered by the Straits of Malacca or Sunda, the two principal highways into the China Sea. But during the adverse N.E. monsoon it may be thought preferable to take one of the channels *eastward* of Borneo, and thus avoid the wear and tear of beating up the China Sea in the teeth of the monsoon. In this case, the former universal practice was to follow one of the eastern straits, passing to the East of Borneo, and taking the Strait of Macassar, which leads into the Celebes Sea, from thence, according to circumstances, from this sea proceeding North, and passing East or West of the Philippines. A vessel can also, in this season, take Pitts passage to the East of the Celebes, crossing the Moluccas, and entering the Pacific Ocean by Pitts Strait, Dampier Passage, or that of Gilolo, then keep to the eastward of the Philippines, entering the China Sea by the Strait of Formosa.

Thus, in a general way, it may be taken as a rule, that when the monsoon is favourable in the China Sea, ships must pass to the West of Borneo, but with a contrary monsoon must pass to the East of that island.

October and November are considered the two most favourable months in which to pass the Strait of Macassar quickly. This is the first of the eastern routes. In the other months it is more advantageous to take Pitts Passage, especially from the middle of December to February.

On arriving at the eastern straits in the latter part of January or in February, the Strait of Lombok is generally taken, and generally in passing it, cross the channel East of Banditti Island. You can also round this island to the West, but the channel is very narrow. The channel between Lombok and Banditti Island is generally preferred, and then the East coast of this strait is soon reached. From there ships pass to the strait of Macassar, by passing to the East of Hastings Island and Little Pulo Laut, then the coast of Celebes must be passed in order to enter the strait of Macassar. If instead of taking Lombok Strait that of Balli is chosen, with the intention of passing in the Macassar Strait, ships return to the North by passing by the channel between Pundy and Galion Islands; then round to the West at a good distance from the islands and banks of Kalkoon, and pass the little island of Pulo Laut on whichever side seems best.

On coming from Allas Strait a vessel would steer for Hastings Island, and pass East of it, the same as if coming from Lombok Strait. On arriving from Sapy Strait during the months of September and October, a ship would, according to the prevailing winds, pass to the East or West of the Postillions, and proceed to the North between Tanakeke and the Tongu Islands; then pass at a good distance the isles and banks of Spermonde, which are N.W. of Macassar Bay, and enter the strait and keep on the Celebes coast to pass through. A vessel going out of the strait in March or April off Cape Donda must cross the sea of Celebes, and steer for the extreme East of Bassilan.

A vessel making for the channel between Basilan and the West point of Mindanao, must take care to keep well to the East, if the winds will permit, so that she may not be drifted among the Sooloo Islands by the westerly currents. If she gets to leeward of them, she will find good channels between the isles situated to the West of Sooloo; and then crossing the sea of Mindoro, keep near the coast of the Philippines (Mindanao, Negros, Panay, Mindoro, and Luzon). At the opening of the channel between Mindanao and Negros, and also between Panay and Mindoro, strong winds from the N.E. and westerly currents are generally encountered. A ship must guard against these currents in passing from one island to another, so as not to be set to leeward.

If a ship leaves Basilan Strait with steady winds from S.W. and South, she may steer directly for Point Naso, or keep rather to the East of its meridian; but if the winds are variable or uncertain, she should keep close to Mindanao till Point Galera is reached, and then cross to Naso Point, taking care to keep near Negro Point in crossing from one point to another.

From Naso Point steer North along the coast West of the island of Panay, taking every precaution against the dangers which lie to the West of this coast. Then passing the islands lying near the S.W. point of Mindoro, she will enter the channel either East or West of them and the Apo Bank.

With easterly winds in entering the eastern channel, keep 2 or 3 leagues from the coast of Mindoro ; but with a westerly wind, take care not to go more than 9 or 10 miles from the coast until you are North of the Apo Banks, thus clearing the Strait of Mindoro ; and after having doubled the promontory of Calavite, and passed Luban and Goat Island, you must follow the coast of Luzon as far as Cape Bolinao. Having reached this cape, you may be pretty sure of passing East of the Pratas and reaching Macao. However, it is more prudent to steer North as far as Cape Bojeador before crossing for the coast of China. Also, at this season, a vessel may enter the Pacific Ocean by passing South of Mindanao, when the sea of Celebes has been reached. For which, if the wind permit, steer direct for the Serangani Islands, passing between them and Mindanao, or else South of the former. From thence pass between the Meangis and Tulour Isles, in order to double the North cape of Morty Island with the wind at N.E. If any difficulty arise in taking this route, the channel between the Tulour and Sangir Islands may be adopted.

But after having proceeded from the Strait of Macassar, and passed between Siao and Tagolanda, or one of the neighbouring Sangir Channels, steer to the East, so as to double the North cape of Morty. For the same reason, ships that have passed South of Siao must run N.E. if the wind will permit. When she has entered the Pacific Ocean from the Philippine Islands, passing to the West of the Pelew Islands, afterwards sail towards the North, so as to enter the China Sea by the Formosa Channel.

Pitt Channel, which leads, as has been already stated, into the Pacific Ocean by either Pitt, Gilolo, or Dampier Channels, is preferable to the Macassar Strait during the months of December, January, and February. On arriving, at this season, at the Strait of Sunda, on the way from Bengal, or at the eastern straits on the way from the Cape of Good Hope, I would adopt this channel when bound to China. This is the *Second Eastern Route*.

If, as often happens, a ship, in coming from the Bay of Bengal, passes through the Strait of Sunda instead of along the South coast of Java, in going out of this strait she should pass North of the Thousand Isles, and then steer to the East, leaving the Watcher Isle to the North, on her way to the Strait of Salayer. In case of touching at Batavia, after having passed Edam Island on leaving this port, she would steer so as to leave Burakin Island to the North, and after having passed it, would steer for Salayer Strait. With a N.W. wind the best course through this strait is to pass South of Mansfield Shoal. At night, or when the wind is not steady, it is better to keep to the North of it, along the coast of Celebes. From the Strait of Salayer make for Bouton Strait ; or, if the wind is West, it would be better to pass South of this island, keeping the S.W. point well on board, with the view of avoiding the rocks off it to the southward of Tonkan Bessy. You then pass along the eastern coast of Bouton Island, and having reached the N.E. end

of it, if the wind is fresh from N.W., steer North from the island of Waigiou, and from thence for the Xulla Bessy Island. This is an indispensable precaution for slow sailing vessels in December and the early part of January, because about this period the wind becomes variable, and veers to N.N.W., causing strong southern currents. The winds and currents in Pitt Channel are very variable, and it may be crossed almost anywhere. It is prudent, however, when northerly winds prevail, to keep the weather shore.

In the case of a vessel falling to leeward of the N.W. point of Bouro Island, every exertion should be made to pass it quickly. Instead of working to windward to do this, it is better to run southward of the island, and pass into Pitt Strait to the eastward of it. During the N.W. monsoon vessels which leave Amboyna make to the northward along the East coast of Bouro, where the wind is variable, and squalls come from off the land. Strong currents are rare, and are sometimes favourable for the run northwards; while beyond Manipa and the channel which separates it from Ceram, southerly currents prevail in this season. Having reached Pitt Passage by the foregoing routes, a vessel will be guided by the directions hereafter given.

A vessel wishing to pass through Pitt Strait should take either the strait of Bally, Lombok, Allass, or Sapy, and make for that of Salayer on leaving them; crossing the eastern part of the Java Sea, afterwards steer for Pitt Channel. In coming from the Cape of Good Hope the Ombay Strait is preferable, it being the most direct and more open than those farther West, and the winds being generally less variable there.

In making for Ombay Strait, pass either North or South of Sandalwood Island; but it is better to pass South of it, and then between Ombay and Timor, and after having steered to the eastern extremity of the first of these islands, then steer North, keeping to windward, so as to pass West of Bouro Island; but if this is impracticable, pass to eastward of this island, between it and Manipa, and then take the Pitt Channel. After having entered Pitt Channel steer East, passing between Xulla Bessy and Bouro; but in case you should pass to the West of this island, if no current be found, then steer direct through Pitt Strait; if the current sets northward, keep off the islands which border the northern side of this strait.

When near the meridian of the East point of Oby Major, and wishing to take Dampier Strait, keep on to eastward. This strait seems favourable for good sailing vessels, especially in January and February, when N.E. winds are getting more easterly. In March, when the N.E. winds become weaker, the Strait of Gilolo is preferable for entering the Pacific Ocean.

This last strait is wider, and a ship can work both night and day in it, and the currents are seldom very strong. On leaving Pitt Strait, and also that of Dampier, you must take great care not to be drifted on the North coast of New Guinea, and should therefore contrive to round Point Pigot

close, looking out sharply for Buccleugh Bank, which lies to the East of the East coast of Waigiou.

Pitt Strait should only be taken when it cannot be avoided. In this case, a ship should keep in the middle of the channel to avoid being set to either side by the tides, and should therefore make short boards, not approaching either shore, and should try to make Jackson Isle, and pass 5 miles to northward of it. When a ship has passed the reef, which lies to the northern extremity of Batanta Island, she must steer northward for Point Pigot.

To enter Dampier Strait on passing the meridian of the East point of Oby Major, steer East, to pass between the Canary Isles and Pulo Popo. Sometimes vessels pass between the Bou Islands and Pulo Popo. This last channel is advantageous with the winds from the N.W., and then run for Fisher Island and Mabo Cape, and from thence pass between Pigeon Island and Foul Island, always keeping a good lookout for the dangers which exist on the North shore of Dampier Strait. In coming out keep nearer Pigeon Isle than Foul Island, and steer so as to sight Pigot Point, so as not to be horsed on to the coast of New Guinea by the northerly swell which prevails in the offing. Vessels should always carefully avoid the Buccleugh Bank. The tides are very strong in Dampier Strait, and the currents very irregular, their rate varying from 1 to 5 miles an hour. In the height of the N.W. monsoon, in the narrow part of the strait between Pigeon Isle and Foul Isle, the ebb at the time of the spring tides runs 4 or 5 knots to the E.N.E. for six or eight hours, and between 1 and 3 miles in neaps. The flood sets S.W. for three or four hours, but is weak. During the height of the S.E. monsoon in this part, the flood runs to the West for eight or ten hours at a time, and turns successively to W.S.W., S.W., and S.W. by S.; it then attains its greatest velocity, which at springs sometimes exceeds 5 miles an hour, and is reduced to 4 miles an hour in neaps. The ebb at this season runs to E.N.E. or N.E.; it is not strong or of long duration.

On leaving Dampier Strait, when a ship is in the Pacific Ocean, she should run down her easting quickly, keeping in a low latitude, or between the parallels of $1^{\circ} 30'$ and 3° N., which she can easily do. Sometimes even in December and January easterly currents are frequently found in that track, being that eastward counter current on the equator which has been spoken of in the chapter on this subject. She will thus be enabled conveniently to pass either East or West of the Pelew Isles, but this depends upon the sailing powers of the ship, and the strength of the N.E. monsoon. A vessel must not go too far to eastward, for fear of falling in with the islands of Goulou and Guap, near which, in November and December, heavy squalls from the westward are encountered. From the Pelew Islands, steer for the Bashee Islands, allowing for the westerly currents, which run at a rate of 12 or 15 miles a day. From December to the middle of February it is most prudent to pass to the East of the Pelew Islands.

Should a vessel leave Dampier Strait towards the end of the N.E. monsoon, she should not run far East into the Pacific Ocean. At the end of February and in March ships can pass to the West of the Pelew Islands, as the winds at this time often vary and shift to E.N.E. When the North part of Luzon is reached the China Sea can be entered by either of the great routes, or the channel of Balingtang, or any of the good channels formed by the Bashee Islands and the Babuyanes. However, with the winds from the N.E., and at the commencement of the monsoon, it is necessary to pass to the North of the Bashee Islands, and either North or South of the Cambrian and Gadd Rocks. The South point of Formosa is thus approached, and it is best with daylight and the weather fine to pass between this point and the Vele Rete Rock. During the night, or in bad weather, if prevented from taking this route, a vessel should pass to the North of the Bashee Islands, keeping close to them. Whichever may be the channel by which she enters the China sea, a course should be adopted to sight, if possible, Ty-Sing-Cham, or Pedro Blanco, and enter the Canton River by the Lema Channel.

The Strait of Gilolo, the *third* which connects Pitt Passage with the Pacific Ocean, is divided into two parts by the island of Geby, and the part between this island and that of Gilolo takes the name of Gilolo Strait. That part between Geby and Waigiou has been called the Bougainville Strait, as that officer passed through it in 1772. All the channels leading from Pitt Channel to the Strait of Gilolo are free from danger; but during the N.W. monsoon that between Pulo Gass and Kakik Island is preferable, as being the widest; for the other broad channel between Pulo Pisang and the Bou Islands is too much to leeward at this season. To enter the Gilolo Strait, passing, as we have already said, between Pulo Gass and Kakik, sail closely round the southern point of the first of these islands, so as not to get to the eastward of the channel by the current which often prevails there. After having passed Pulo Gass to eastward or westward, according to the channel taken, continue on between Cape Tabo and Geby Island; and if at night, give a good berth to the Fairway Bank and Widda Island; however, it is prudent, if the wind is light, to keep as close as possible to the islands on the West coast of the strait, on account of the N.E. and easterly currents. Should the winds be contrary, no time should be lost in trying to pass North of Geby; afterwards, passing South between this island and Gagy, and entering the Pacific by one of the channels near Syang. However, when it can be done, the West channel between the coast of Gilolo and the Shampi Isles, or one of those comprised between these islands and Syang is preferable, as with a northerly wind a ship would be able to pass to windward of the Aiou and Asia Islands. Should there be any difficulty in passing to the West of Asia Isles, the channel, which is formed by them and Aiou, can be

adopted, or even between this latter and the North coast of Waigiou. Having gained the Pacific Ocean, a vessel should endeavour, as soon as possible, to make her easting in the zone comprised between the parallels of $1^{\circ} 30'$ and 3° N., as southerly and S.E. currents are found there, and she must not pass North of the parallel 3° N., and she will thus attain the latter part of the route which we have previously indicated from Dampier Strait to the China Sea.

14.—CHINA TO THE BAY OF BENGAL, ETC.

The foregoing remarks refer chiefly to those routes through the Archipelago which lead to the different ports for vessels bound from Europe or India. The reverse, or homeward voyage, is generally subject to the same influences, and requires the same consideration, in reference to the seasons, that is called for in the outward voyage.

As a first principle it may be stated that a vessel bound to an Atlantic port should endeavour to gain the S.E. trade wind as soon as possible, by which she may gain the coast of Africa, Mauritius, or Madagascar, and thence proceed round the Cape of Good Hope. This portion of the subject and that relating to the passage from the Strait of Sunda to Aden is detailed in our Indian Ocean Directory, pages 162—166 and 201—202.

A vessel bound to the Bay of Bengal should take the readiest course for the straits of Singapore and Malacca, and thence as directed in the Indian Ocean Directory, pages 179, 184, &c.

These remarks refer to both monsoons. The best way of reaching the Strait of Malacca, or the Southern Indian Ocean, necessarily requires a different route in the opposite seasons. For the China Sea and the Strait of Sunda this reverse voyage has been considered in former pages; but a few remarks from Capt. Kerhallet may be here appended.

When a ship leaves China during the N.E. monsoon for Europe or India, she should make for the Straits of Banka and Gaspar, or for that of Singapore. In March and April the outer route is the quickest by the Macclesfield Bank. She ought, during these two months, to keep out to sea as far as the latitude of Pulo Sapata, or take the route proposed by Capt. Stephens down the West coast of Luzon, Palawan, and Borneo, as described in a foot-note on p. 62. Some useful remarks by Capt. Polack will also be found on p. 86.

On the contrary, during the other months than March and April, a vessel should take the inner channel, which is comprised between Hainan and the Paracel Islands, when she would without difficulty reach the Straits of Singapore, Banka, and Gaspar. From these two latter a course should be steered for the strait of Sunda. On leaving this strait the parallel of 10° N. should be crossed in 100° E. longitude, and then shape a direct course for the South point of Madagascar, as is described in the Directions for the Indian Ocean. This route crosses the area of the course of hurricanes; consequently they are often encountered by vessels from the eastern seas.

The INNER ROUTE is the most direct for reaching the straits leading from the China Sea ; it has also this advantage, that vessels have the wind aft as soon as the Great Ladrone has been passed. A ship taking this route should steer from the Great Ladrone, so as to pass near the islands of Taya and Paracels at a convenient distance to the West. It is estimated that the current sets westward at the rate of 15 or 20 miles a day, for the currents are strong near the coast of China, although it may not be the case out at sea. If it should be observed that the ship is drifted much towards the West, she must shape her course to allow for it, until she has reached the parallel of 17° W., and entered the channel between the Paracels and Cochin China. Having reached the parallel indicated, and the meridian of 106° , a course should be steered so as to sight Cape Varela, or the Pagoda. With clear weather and an E.N.E. or N.E. wind, a ship may sight Pulo Canton (also called Callao Kay) or the coast situated South of this island, and then keep a moderate distance from the shore ; if the weather be cloudy, and the wind has a tendency to become easterly, it would be more prudent not to approach the coast till she is in the latitude of Cape Varela, nor enter the Bay of Phouyin to the North of this cape.

In case the conical mountain be visible on the North shore of this bay, it will indicate the position of the cape, for as night approaches, the pagoda on the height, which commands it, is obscured by clouds. Having passed to the South of the parallel of 15° N., it will be found that the current sets southward near the land ; for between $14^{\circ} 30'$ and $11^{\circ} 30'$ it often sets at the rate of 40, 50, and even 60 miles a day ; but it is very variable. It is indispensable to make for Cape Varela when land has not been seen to the North of this point, from whence the coast may be kept at a distance of 12 or 15 miles. When a ship is East of Cape Varela, distant about 4 or 5 miles, she can steer along the shore by day ; but at night must be careful to avoid Pyramid Isle, and those near to it. If the night be fine, she can sight these islands, as they may be made out at a few miles distant. Water Islands should then be steered for, which are 21 miles to the southward, and can also be seen. When these islands are reached, if the land is more than 12 miles off, it will be necessary to approach it, to sight the mountain of False Cape Varela, which can be distinguished among the high lands of the coast by its elevation and gentle slope towards the sea.

In order to keep inshore and pass to the West of the Dutchman Bank, a vessel should cross Padaran Bay as soon as she is abreast of the high lands of Cape Varela. This is necessary, because the currents in this part take a S.S.E. direction, and it is very difficult for ships out at sea to approach this coast. When a vessel is in a good position for crossing the bay, the soundings will be found to be 40 and 50 fathoms. Then, during the night, Cape Padaran should be made on the starboard bow. On recognizing this cape, great care should be taken, as it is difficult to distinguish it from the high

lands in the bay. On having sighted Cape Padaran, it may be passed at about 3 or 6 miles; and Pulo Ceicir may be doubled at the same distance on keeping this island to the West. In case ships are only 1 or 2 miles from the cape, a course should be steered to pass at a convenient distance from Pulo Ceicir. When this island is doubled in the day, at 4, 5, or 6 miles to seaward, it should be brought to bear N.N.E. $\frac{1}{2}$ N. before being lost sight of from the deck, and then steering 18 or 21 miles between W.S.W. and S.W. by W., as most convenient, will pass West of Dutchman Bank, when a South course may be steered for Pulo Aor.

This route is not dangerous when the night is clear enough to admit of distinguishing the cavern of Padaran. In this case, when a ship is 3, 4, or 5 miles from the cape, she must take the most convenient route till she sights the Cavern; and when it bears N. by E., she will be off Pulo Ceicir. If in this case soundings are found at 11 or 20 fathoms, she should stand off from it a little, because the island is too low to be seen at night, and in this part of the channel the soundings are too irregular to serve as a guide. The Cavern bearing N. 16° E., Pulo Ceicir is in the same direction; and by running 18 or 20 miles nearer between W.S.W. and S.W. by W., Dutchman Bank may be passed on the West, and then steer for Pulo Aor. If the night should be dark when near Padaran, and the Cavern not to be distinguished, the vessel must be kept between South and West till she is about 12 or 13 leagues from the cape, and in this case it is best not to approach the coast or Pulo Ceicir with less than 6 fathoms of water, and Dutchman Bank should not be approached in less than 18 or 20 fathoms. Between the western edge of this bank and the eastern edge of Britto Shoal, which is nearest to it, there is a distance of 14 or 15 leagues, between which there is a large channel, which may be taken in the night. A ship should keep in soundings of 15 or 16 fathoms, until she is 5 or 6 leagues more to the South of Pulo Ceicir; and when she is 13 leagues to the S.W. of Cape Padaran it will be best to run again between the South and West to the distance of 2 or 3 leagues, so as to give a wide berth to the Holland Bank. A vessel should not take more than 20 fathoms depth, till she has passed this bank, nor less than 16 fathoms when she is near Britto Bank, if she is a little to the West.

In taking the route between these two banks the soundings will be found to vary between 10 and 11 fathoms; and when the western part of the Holland Bank is passed a vessel should keep in 10 or 11 fathoms, and steer towards Pulo Aor. The route between Pulo Ceicir and Holland Bank cannot be taken in the night, except by captains who are well acquainted with these parts, consequently, often while waiting for days, a vessel is obliged to lay off Cape Varela. Besides the loss of time which is thus occasioned, a ship has to contend with a heavy sea, when the breeze is strong; and for this reason mariners generally prefer passing through the passage outside

Pulo Ceicir and Pulo Sapata. When a vessel finds herself near False Cape Varela at nightfall, with a wind too strong to haul up to, or bad weather, and not wishing on account of the darkness to pass between Holland Bank and Pulo Cecir de Mer, she should steer a course to the East of Pulo Cecir de Mer, and then outside Pulo Sapata the next morning. She may run far enough out to sea if the weather is gloomy, after passing a good distance from these isles. When the wind is strong the currents run to the S.W. and W.S.W. with great rapidity, and sometimes towards Pulo Sapata. A ship would then be obliged to pass the night in the narrow channel between this island and the Little Catwik.

In the day, in fine weather, a ship may keep as near as she likes to Pulo Cecir de Mer, and pass between Pulo Sapata and the Large Catwik; she can also pass between the two Catwicks, only it must be remembered that the Paix Rock is in the channel formed by these two islands; from there she may steer direct for Pulo Aor. On arriving at Pulo Timoan during a fog, you must keep in soundings of 28 or 30 fathoms, afterwards passing East of this island for Pulo Aor. As these islands are often concealed in the fog, great care must be taken to avoid them, and attend to the reckoning, especially during the night. Near the Anambas, and to the North of them, a vessel generally has 36 to 44 fathoms. When she is between $5^{\circ} 30'$ and 5° N., these depths decrease in the western part of the channel, and 26 to 28 fathoms on the meridian of Pulo Timoan. Having passed East of Pulo Aor at a distance of 2, 3, or 4 leagues, bound to the Strait of Banca, steer to the eastward of South, according to the wind and prevailing currents, and pass outside the Geldria Bank, which she may avoid by keeping in a depth of not less than 10 or 11 fathoms when between the parallels of $0^{\circ} 56'$ and $0^{\circ} 40'$ N. When this bank has been passed, a course should be steered so as to cross the equator, and pass 4 or 5 leagues from the East point of Lingin, if the current will admit. In all cases a vessel should guard against westerly currents, which are sometimes encountered in these parts.

OUTER ROUTE.—When the outer channel is adopted in coming from China towards Pulo Aor, a vessel ought to pass at a short distance West of the Ladrone and neighbouring islands. In general, strong winds and a heavy sea with strong currents are found on leaving Great Ladrone, and a vessel should steer to eastward of South for the Macclesfield Bank; and when the winds are moderate she should endeavour to reach the East part of it. When 20 leagues East of the meridian of the Great Ladrone, and a vessel has difficulty in obtaining soundings, she may consider herself East of the Macclesfield Bank. When a vessel has adopted the outer route in November and December, with strong winds and no observations for several days, she should endeavour to strike soundings on the Macclesfield Bank; but if she is certain of her position, these may be neglected, because from East to West on the

bank being very wide, and the soundings being very irregular, the depth can only be an uncertain guide as to her real position. On leaving the Macclesfield Bank, she should steer for Pulo Sapata, and should have soundings on that bank, and it being on the same parallel it would be well for her to shape her course for that of Pulo Sapata. If she should not sight this island, she should steer West, so as to obtain soundings in 32 or 37 fathoms. With thick weather, when ships are uncertain of their position, it would be dangerous to run straight for Pulo Sapata and round the island in the night, as it is difficult to distinguish. As a general rule, they should keep well to the East of Pulo Sapata until on the parallel of 10° N., and by standing West by South to obtain soundings. Some captains, on leaving the Macclesfield Bank, run as far as the parallel of Pulo Sapata, keeping well off to the eastward of the island; this can be done in March, April, or May. However, in adopting this route care must be taken to allow for the S.E. currents which might set a ship on the banks to the E.N.E. and East of Pulo Sapata. When a vessel has reached the parallel of 10° N., she would steer between West and South until soundings are found in 30 fathoms; then steer a course for Pulo Aor or Pulo Timoan. If she is bound for the Strait of Singapore, to avoid the Charlotte Bank, the soundings should not be more than 26 or 28 fathoms when in latitude $7^{\circ} 6'$ N. In March and April vessels returning to Europe should keep well to the eastward, so as to pass between the Natunas and Anambas Islands, and take the Strait of Gaspar.

Further remarks on these passages have been given on pp. 62 and 85, as has been alluded to.

15.—PASSAGES BETWEEN AUSTRALIA AND CHINA.

A more full description of the passages between Australia and China will be found in our Directory for the South Pacific Ocean. As described by Captain Allen, harbour-master at Newcastle, N.S.W., there were four principal routes in use by vessels between the years 1869—1873:—1. The Eastern Route, passing eastward of New Caledonia, the New Hebrides, and Santa Cruz Groups, and crossing the equator in 166° E. 2. The Middle Route, westward of New Caledonia, and between the Santa Cruz and Solomon Islands, crossing the equator in 159° E. 3. The Western Route, N.E. from Newcastle to the 157° meridian, thence North on that meridian to the Pocklington Reef in 11° S., crossing the equator in 153° E. 4. The Torres Strait Route, also from Newcastle, N.E. to the 157^{th} meridian, then North on that meridian to the latitude of the Mellish Reef, and N.W. for Bligh's entrance to Torres Strait. When through Torres Strait the route is between the Tenimber and Arrou Islands, and by the passage between Ceram and Bouro into the Molucca Channel, then round the N.E. end of

Celebes Island into the Celebes Sea, through the Basilan Channel into the Sulu Sea, and through Mindoro Strait into the China Sea. The distance from Newcastle to Hong Kong by this route is 5,300 miles, and it has been taken by one ship, between the years 1869 and 1873, the *England*, which made the passage in 41 days, in the month of July. Some further remarks as to the best route through the Archipelago will be found below.

Much depends on the sailing qualities of the vessel, but as a general rule, ships leaving Australia in the months of January, February, or March, for China or Japan, should adopt the Middle Route, and may expect to make the passage in about 40 days; leaving in April, May, or June, they should adopt the Western Route, and may expect to make the passage in about 36 days; leaving in July, August, or September, they should, if they can reach Torres Strait before the end of August, take that route; and if not, either the Western or Middle Route, and may expect to make the passage *via* Torres Strait in 40 days, and by the other routes in 55 days; and, finally, ships leaving in October, November, and December, should adopt the Middle Route, and may expect to make the passage in about 44 days.

FROM SYDNEY TO YEDO.—Vessels bound from Sydney to Japan during the S.W. monsoon should pursue, as far as lat. 8° N. and long. 160° E., the same course as those bound for Hong Kong; from that position a course should be shaped to pass to the northward of the Mariana Islands and to the south-westward of the Volcano Islands, after passing which, steer to make O Sima lights, remembering that the ship must pass the strength of the Kuro Siwo, and will, when in its stream, be set to the north-eastward from 2 to 3 knots an hour.

NORTH COAST OF AUSTRALIA TO CHINA.—The following remarks are by Mr. George Windsor Earl:—

A ship proceeding from the North coast of Australia to China, from April to September, when the S.E. monsoon prevails to the southward, and the S.W. monsoon to the northward of the equator, should pass to the southward of Timor and Sandalwood Island, and through the straits of Allas or Lombok into the Java Sea; and from thence through the Carimata Passage, and up the China Sea to Canton, by which course she will have a stronger monsoon and a clearer sea than by passing to the northward of Timor, and through the Flores Sea; or than by running at once to the northward, through the Molucca Passages. By this latter route, instead of a fair and steady wind all the voyage, difficulty would be experienced in passing between Borneo and Palawan into the China Sea, from the variable winds, and from the numerous shoals which lie to the westward of the Balabak Passage. The passage by the North of Palawan to China is also often attended with difficulty during the S.W. monsoon; and an additional inconvenience of these routes is, that the navigation of the Molucca Sea will be performed during the bad monsoon.

Ships returning from China to the North coast of Australia during this season should pursue the track frequently adopted by ships bound to Europe, namely, by standing to the eastward, round the North end of the Philippines into the Pacific, and so to the southward towards New Guinea. When past the parallel of 5° N., S.E. and S.S.E. winds, with a strong current to the westward, will probably be felt, by which she may easily pass through Dampier Strait, or the Gilolo Passage, into the Molucca Sea. She may then pass between Ceram and Bouro, and across the Banda Sea to Wetta, when no difficulty will be found in getting to the eastward along the North side of the Serwatty Islands, as the current there sets to the eastward during the S.E. monsoon. When off Baba, she may stand to the southward for the coast of Australia, and if she should fall to leeward of her port, she may easily gain her easting by taking advantage of the land and sea breezes.

Again, if a vessel is bound from the North coast of Australia to China from October to March, when the western monsoon prevails to the southward of the equator, and the N.E. monsoon in the China Sea, she should, on leaving the coast, keep close to the wind, and as the monsoon often blows S.W. and even S.S.W. between Australia and Timor, she may be enabled to pass between Timor and the Serwatty Islands and through Pitt Passage into the Pacific, and thus pursue the eastern route to China adopted by ships at this season. If unable to get far enough to windward to pass between Ceram and Bouro, she may run at once to the northward, between Ceram and Ceram Laut, and from thence into the Pacific by Pitt or Dampier Straits. The only difficulty that an indifferent ship would be likely to encounter in this route would be on the passage between Ceram Laut and the N.W. end of New Guinea, where the winds would probably be from the N.W.; but even then she would have the advantage of fine weather. The route from the North coast of Australia, through the Flores and Java Seas, and up the China Sea to Canton, would be impracticable at this season, even for a fast sailing vessel, as she would have a dead beat and a lee current the whole way.

A ship returning from China during this season may steer a direct course through the Mindoro Sea, and thence by the Molucca Passage, and past the N.E. end of Timor to the North coast of Australia.

16.—BETWEEN THE NORTH COAST OF AUSTRALIA AND SINGAPORE.

A vessel bound to Singapore from April to September may pursue the route recommended above for ships bound to China at this season, namely to the southward of Timor, through the Straits of Allas and Carimata, and thence through Rhio Strait to Singapore. The return voyage at that season, through the Java Sea, against the S.E. monsoon, would be tedious and diffi-

cult, even for a smart ship; it would, therefore, be most advisable to run across the China Sea, and round the North end of Borneo, where she would probably have the advantage of S.W. and S.S.W. winds, to traverse the Sooloo Archipelago. When near the Molucca Passage, though the winds will be mostly from the southward, yet but little difficulty will be experienced in passing through it; and when through, the route to the North coast of Australia, already recommended for vessels returning from China at this season, should be adopted.

From October to March, the passage to Singapore through the Java Sea, against the N.W. monsoon, will be tedious and difficult; a ship bound there during that season should therefore proceed to the northward by the Molucca or Gilolo Passage, where she would have the advantage of fine weather, and when to the northward of Gilolo the wind would probably come from the northward and eastward, with a westerly current, which would enable her to proceed round the North end of Borneo, and so with the N.E. monsoon, down the China Sea to Singapore. A ship returning at this season should pass through the Carimata Passage, through the Java and Flores Seas, and then to the southward of Wetta, and between Timor and the Serwatty Islands, to the North coast of Australia. It would be advisable to proceed through the Strait of Allas, and to the southward of Timor, as light airs and calms, with squalls from the South and S.S.W., are often encountered to the southward of the islands East of Java, while in the Flores Sea the N.W. monsoon blows steadily.

17.—FROM CHINA HOMEWARDS.

IN THE S.W. MONSOON.

The adverse voyage against the S.W. monsoon is best followed by adopting one of the ensuing routes, according to the time when the southern part of China is left.

FIRST EASTERN ROUTE.—Quitting Macao, or Hong Kong, in the end of April or beginning of May for the first Eastern Route, that is, the Mindoro Strait, a ship should run to the South as far as the Macclesfield Bank, if the wind allows, so as to reach the N.W. extreme of Mindoro without tacking in case of the wind shifting to S.W. From near the Macclesfield she should stand S.E., holding her wind if it is at all to the S.W., and should it not admit of her weathering the point of Calavite she should work along the coast of Luçon with the variable winds, with which she will come up to the N.W. extremity of Mindoro.

The channel to the East of the Apo Bank should be chosen for crossing the Mindoro Strait, giving the Mindoro coast a berth of some miles, if the wind is variable; a distance of 9 or 10 miles is necessary if the S.W. wind is

steady; she will then pass the islands of Ambolon and Ilin at a distance of about 15 miles.

Should the wind allow, she may cross the Strait of Mindoro, passing West of the Apo Bank, in the Northumberland Channel, formed by this bank and the Calamianes. Then keep along the coast of Panay, working, if necessary, at some distance from this island, according to circumstances, and approach the island of Quiniluban, so as to pass the dry sandbank between this island and the coast of Panay.

Having reached Cape Naso, stand for the strait of Basilan, making it well to the southward and westward, when the wind is from these quarters: but steering direct for it if the wind is easterly. The S.W. extreme of Mindanao being gained, it will be better to take the strait of Basilan than those formed by the islands to the S.W., the former route being the shortest; the Celebes Sea will thus be entered, and the ship will make for the strait of Macassar.

Instead of persevering in working at the entrance of the strait of Basilan against S.E. winds, it may be better to steer West, in order to pass West of the Sooloo Archipelago, between the point of Unsang and the island of Tawee-Tawee. There are two small islands close off the S.W. point of this island, bearing S.W., near Sibutu Island, and forming a good channel leading direct to the Celebes Sea. This channel is safe, and easy of navigation both by night and day, four hours sufficing for passing from one sea to the other by it, while under similar circumstances it has sometimes occupied four days in going from one sea to the other by the strait of Basilan.

To leave the Celebes Sea, a vessel may either take the Macassar Strait or the Molucca Channel. Some navigators prefer the latter when the S.E. monsoon prevails North of the equator. In fact, it is difficult, without a tedious passage to windward, to reach Allass Strait from the strait of Macassar; while by taking the Molucca Channel the S.E. monsoon is found in a latitude sufficiently to the eastward to enable you to take whichever eastern channel is preferred. But vessels bound to Batavia, or the strait of Sunda, will find the strait of Macassar the best.

On leaving the strait of Basilan, if the easterly wind is well established, a vessel should steer so as to make Cape Donda to the S.S.E. or South; but most generally, from the winds veering westward near the northern entrance of the strait, and the current setting eastward, it is prudent to keep as much as possible to the westward, in order to sight Point Kanneeungan. A ship off Cape Rivers is sometimes set to the eastward by the current along the coast of Celebes, and after fruitless contest with it, is sometimes obliged to take the Molucca Channel.

A ship having entered the strait of Macassar, should keep along the West coast of Celebes, passing East of the Little Paternosters, being very cautious, on account of the dangers North of the islands of Nusa Seras, in passing be-

tween them and the Great Pulo Laut. From thence she should steer for the strait of Allas, or one of the straits leading into the Indian Ocean. If bound to Batavia or the strait of Sunda from the strait of Macassar, she should steer South, if the wind will permit, and pass North of the Little Paternosters for the coast of Borneo, keeping along this coast and guarding against the dangers off it, as well inshore as to seaward. She would then enter the Java Sea, and reach Batavia or the strait of Sunda without difficulty; and thence the Indian Ocean, and make for the Cape, or the western coast of India, by the routes before alluded to.

A ship taking this route, and meeting with contrary winds from the strait of Basilan, so as to be unable to reach the strait of Macassar, may take the Molucca Passage, and should then steer for the islands near the N.E. end of Celebes; and passing between the islands of Banka and Bejaren, will clear the N.E. point of that island, and then steer to the southward, through the channel formed by Lissa Matula and Oby Major, which is the most frequented; or, if the wind should not permit her reaching it, should take the Greyhound Channel, between the islands Albion and Hammond (West of Nulla Tallyabo).

When it is difficult to get to the southward in the Molucca Channel, dull sailing vessels might try to do so by keeping near the West coast of Gilolo; thence they might enter the strait of Patientia, between Gilolo and Batchian, or the strait of Batchian, formed by the island of this name and Tawally and Maregoland.

However, a ship having reached the northern extremity of Gilolo or Morty in the height of the S.W. monsoon, should rather pass through the Gilolo Channel than that of the Moluccas, because it leads more directly to Pitt Channel, by which she can gain the eastern straits.

On leaving the Molucca Channel the Timor Strait or the strait of Ombay may be adopted if desirable. A ship should then pass close to Oby Major, in order easily to round the East coast of Bourou, and so pass between this island and that of Manipa. She would then run to the southward into the Banda Sea, where the winds are generally from E.S.E.; on leaving Manipa she would endeavour to pass to the East of Ombay, and having crossed the channel formed by this island and Wetta, would follow the West coast of Timor, and enter the Indian Ocean between Semaou and Savu. This is the shortest route during this season from Pitt Passage to the Indian Ocean.

SECOND EASTERN ROUTE.—The second eastern route for the Cape or West coast of India from China, with the S.W. monsoon, is adopted from the middle of May to the end of July. This route is by taking the Pacific Ocean East of the Philippines, and passing through Pitt Passage. In August it is too late to adopt this route, and a ship obliged to leave the S.W. of China then, should follow the coasts of Cochin China and Cambodia, as before di-

rected, unless from being a bad sailer it may be better to defer her departure until September.

With southerly or S.W. winds, a ship to pass East of the Philippines should steer South in order to enter the Pacific Ocean with tacking. If the wind admits, the channel between the Bashees and Babuyanes should be adopted. Having reached the Pacific Ocean, S.W. winds at this season will generally be found, with easterly or N.E. currents; she should then steer S.E. in order to avoid Cape Engano and Luçon, tacking if necessary so as to pass neither too far out nor too close, and taking care not to round the Pelew Islands farther to the eastward than is necessary.

The best route for making southing is then East of the isles of St. Andrew, Current, Mariere, Lord North, and the dangerous Helen Shoal. If the easterly drifts of the equatorial counter current are met they will not be strong as far as the Pelew Islands; but between lat. 5° and 2° N. they set at the rate of 30 or 60 miles per day. This part must therefore be crossed as quickly as possible if the wind is West, as it frequently is; and if the wind is light, a ship may be set far to the eastward by this current. But from the lat. of 2° N. to the equator a westerly current will be found, while near Dampier Strait it is again running to the eastward.

Having rounded to the eastward the island of St. Andrew, a ship should endeavour to keep between the meridians of 132° and 133° E., and when in 1° N. lat., if Dampier Strait is to be taken, she should make for Point Pigot.

The strait of Gilolo being broader than that of Dampier, is often preferred for that reason, and it has few difficulties to overcome in reaching Pitt Passage.

When Gilolo Strait is to be adopted, on leaving the parallel of 2° N. a ship should steer for the Asia Isles, and round them on the North, if the wind permits, unless she passes between these islands and Ayou.

Having passed the islands of Eye and Syang, she would then go North or South of the island of Geby, and if the weather be not favourable, instead of the strait of Bougainville she might take that of Gilolo, which is North of it; and in crossing this strait she should keep near the eastern coast, and enter Pitt Channel between Pulo Pisang and the Boo Isles, or else, according to circumstances, between Kekek and Pulo Gass.

A vessel entering *Dampier Strait* should round Point Pigot at a distance of 6 or 12 miles, and then steer for King William Island, keeping it West of her; when about 9 miles from it she should steer for Pigeon Island, and pass 2 or 3 miles South of it; she may then cross the strait, taking care to avoid any dangers in her way.

On leaving Dampier Strait she would go close round Cape Mabo, so as if possible to pass South of Pulo Popa; or she may pass North of this island

and enter Pitt Channel between the Boo Islands and Pulo Popa. In Pitt Channel she should keep mid-channel, borrowing rather on the southern than on the northern side. Having reached West of Pulo Popa, and cleared Pitt Passage, passing between Ceram and Bourou, the Indian Ocean may be entered by the strait of Ombay or one of those westward of it.

The strait of Ombay is the most direct route to the Indian Ocean in the S.E. monsoon. If intending to take the strait of Salayer, or those of Allas or Sapie, the N.W. part of Bourou should be gained, and thence the most northerly of the Toukan Bessy group should be rounded at 2 or 3 miles distance; and from thence enter the strait of Salayer.

18. CURRENTS AND PASSAGES AGAINST THE MONSOON, IN THE CHINA SEA.

In pages 28 to 30, are given some remarks on the currents experienced in the China Sea; and in pages 55 to 63 are directions for the various routes, according to the season, between Singapore and Hong Kong.

The following important notes are the result of the experience and observation of Captain A. Polack, master of the Hamburg barque *Madeira*, gained during thirty-five voyages up and down the China Sea, previous to November, 1867. They appeared in the Nautical Magazine for June, 1861, and are here given for the benefit of the mariner.

Although there is a fast and still increasing trade from China to Saigon, it is astonishing how very little this voyage up and down the China Sea *against the monsoon* is yet known and understood in general, for the greatest difference of arriving in China (as to time) exists in this little Saigon voyage of only about 1,100 miles distance. Ships which are acquainted with the voyage here make it in nineteen to twenty-three days, while the greater part not being well acquainted with it, require between thirty and forty-five days. A barque in 1865 took one hundred and ten days, and worse than all, another actually returned this year to Hong Kong, after having been out about sixty days, declaring it impossible to reach Saigon in the S.W. monsoon. As I have made now fifteen voyages from Hong Kong to Saigon and back, and traversed the South China seas up and down, and in all seasons of the year, thirty-five times, I hope you will hold me competent enough, and will allow me to give my brother sailors, who do not know the voyage, a little of my experience.

Leaving Hong Kong in the S.W. Monsoon, our first object ought to be to make southing, and try to reach the North Danger of the Palawan Shoals as soon as possible. But as the wind is most generally between S.S.E. and S.S.W. at starting, I nearly always stood W.S.W. and S.S.W. between Isle

Hainan and the Paracels even to the East coast of Cochin China, and worked along this coast as far as Cape Varela (*not False Varela*), always trying to be a good distance, say 40 miles off shore at noon, to stand in with the S.S.E. winds generally blowing in the afternoon, until 7 or 10 p.m. Then stand off with the wind, then veering a little off land, or about South and S.S.W. (*solar winds*). From Cape Varela I invariably stood to the south-eastward over to the Palawan Shoals, never thinking of going about, for here my greatest endeavour was to cross the Padaran stream of 40 to 70 miles a day to the N.E. as quickly as possible. I then worked along the shoals down to 7° N., and 111° or 110° E. long., and between 7° and 8° N. lat.

I worked from two to four days to the westward, until St. James bore N.W. by N., which I then generally reached in one or two days in one tack. In this track my longest voyage was twenty-three and my shortest nineteen days, at same time when other vessels took fifty and eighty-five days. In this route I generally had the current from Hong Kong (Taytang Channel) and Macao, to the South coast of Hainan from ten to twenty-four miles a day to the N.W.; from there to the East coast of Cochin China the current varies between North, N.W., and West, from 15 to 25 miles a day, but on the West side of the Paracels an East current of 12 to 30 miles will be found. On the East coast of Cochin China it runs from 10 to 20 miles a day to the N.N.W. and N.N.E., but there is often no current at all. From Cape Varela to the shoals I generally had the first day when right in the Padaran stream from 30 to 50 (one voyage 70') miles to the N.E. by E., but from 12° N. and about 112° E., its set is from 12 to 40 miles a day to the south-eastward.

On the shoals there is about 20' to the S.E., and sometimes to the South, but often no current at all. Between 7° and 8° N. lat., and 110° to 108° E. long., there is little or no current, sometimes even a slight drain to the westward. But standing over to Cape St. James a strong N.N.E. and N.E. by N. current of 36 miles a day will be found, while South of St. James it runs E.N.E. along the coast from Pulo Obi to Cape Padaran.

Should the wind at starting from Hong Kong be from the S.W., stand down S.S.E.; never think of going about till in 15° N., unless the wind should break off too much. In this track in the open sea, there is generally not over 20 miles a day of a N.E. current, especially after the strong E.N.E. China coast current, extending 60 to 75 miles South of Hong Kong, is crossed.

South of 15° N. lat., and in 115° E. long., or to the East of it, is very little current. I always give the preference to the inside track, for here the winds are more variable, the sea smoother, and getting the chance of a West or N.W. squall from land. Besides this, a vessel reaches the Palawan Shoals 60 or 80 miles farther West, and westing is very difficult to make

there, especially after July, when the S.W. monsoon blows from W.S.W. or West.

This voyage, as explained here, is quite plain and simple, but if asked, "Where were the other vessels who took from fifty to eighty-five days in their passage?" There is but one general answer. They tried to round Cape Padaran. Here they were lying for forty consecutive days, sometimes with a dozen and more ships together. This year a barque took thirty-five days from Japan to Padaran, but sixty days from there to Cape St. James, running short of everything, and had to be provisioned by other vessels. They sometimes go as far as Sapata, but never thinking that, bound to St. James in $10^{\circ} 10' N.$, they ought to go due South as far as $7^{\circ} N.$ lat., and even ships on the shoals in 9° or $10^{\circ} N.$ and about $111^{\circ} E.$, get tempted to stand W.N.W., intending to pass between Pulo Sapata and Pulo Ceicer. But when making the land, they find themselves between Padaran and Varela.

I know several instances of this. Or that a ship made a N.N.E. course sailing W.N.W. Although some vessels did make Padaran, and made a good passage (assisted perhaps by a N.W. squall), they form an exception, and may not do the same again in ten more voyages. Whereas the track along the shoals, and although about 300 miles longer, is pretty certain.

My short advice, therefore, is, go either East or West of the Paracels, and make the shoals of Palawan as soon as possible. A ship taking the inside route should work between the Cochin China coast and 40' off it, but should not remain there in the night, as there is seldom a land breeze, but much calm. Having reached the shoals as aforesaid, work along them, standing to 60 miles off. Never think of Padaran or Sapata, and do not leave the shoals unless in 8° or $7^{\circ} N.$ lat., as stated before, or you will surely be disappointed.

Bound from Saigon to China in the N.E. Monsoon.—Stand out to the S.E. and tack, even if the wind should be from East 40' off the land. The wind will haul up to E.N.E. and N.E., then try to pass the S.W. current (which runs the first day at the rate of 30 to 40 miles) as fast as you can; for about 150 miles S.E. by E. from St. James, in about $8^{\circ} 30' N.$ and $109^{\circ} E.$, the current runs already to the East and E.N.E. Working along the shoals, between them and 60 miles off from lat. $9^{\circ} N.$, as far as North Danger, about 75 miles off, will be right in the fair N.E. and northerly current (right against the wind), but I am inclined to believe that a ship should not go nearer the shoals than about 20 miles from them, because the northerly current extends not so far East, for I have often found there no current at all. From North Danger to about $119^{\circ} E.$, an easterly current from about 10 to 40 miles will be found. But in the early part of October the current off the North Danger runs from 10 to 15 miles to the S.E.

Along the West coast of Luçonia the wind is from N.N.W. to N.E. and East, with fine weather and 15 to 24 miles current to the North, but from Bolina it blows generally heavy, with a high, short northerly sea. If the first puff off Bolina is passed, and 100 or 150 miles are made to the N.W., the wind and sea are getting more handy and regular, and change one or two points farther to the East. But the ship wants canvas here, and must be in good and sound condition, for the sea rises here in short and high pyramids, on account of the hitherto uninterrupted northerly current, assuming here a velocity of 52 miles a day to the N.W. by N. and N.W., and running oblique to the N.E. sea. My longest voyage in this track was twenty-two days, and my shortest nineteen days from Saigon to Hong Kong. In February and October, a ship should not go East of the Scarborough Shoal, for in February it is not necessary, and in October there will be nothing but calms and a high northerly sea running.

This voyage against the N.E. monsoon is sometimes very easy, and done in less than nineteen days. But it is in general a difficult task, especially in November, December, and January, and requires a good ship and plenty of canvas on her, especially on the West side of the Palawan shoals, where the sea, running right against a North and N.E. current, is as high and short here as from Bolina to the Pratas. But many ships in this voyage commit a great error in working along the South coast of Cochin China and try to get out of Padaran, which is nearly impossible on account of the strong W.S.W. current and always very short sea.

After reaching Cape Bolina, and finding the above mentioned stiff gale and tremendous high cross sea, and thinking it blows a heavy gale all over to China, ships make a second mistake by creeping under the land again and waiting there sometimes for a fortnight, expecting better weather. And this is the same case with many ships South of Formosa when bound North along its East coast.

My advice, therefore, is stand boldly out, and remember that the current will assist you first with 50, and afterwards with 20 miles a day to the N.W. by N., as far as the Pratas. And at 60 miles from the China coast the wind will be about E.N.E., and sea moderating as you close the South China coast. But keep the first day from Cape Bolina good rap full, even if you head the first day to leeward of Hong Kong, and should a ship really fall to leeward of Taytang Channel, let her proceed in at the Ladrões, from which Hong Kong will be reached in one day. If bound to Swatow, Amoy, and the northern ports of China, work as far as Cape Bayadere, and then stand out N.W. or N.N.W., making long legs to the North, and short ones to the East, especially for the first 150 miles, where the strong N.N.W. current will be under your lee. South Formosa will generally be reached in three to four days, from whence to South Pescadores, and over to Swatow and Amoy, is plain sailing, and will be reached in one tack.

Bound to Fou-Chou-Foo and further North, ships have to pass round the South Cape of Formosa, and work to the northward East of the island, where the Kuro Siwo current will assist them 40 miles a day, decreasing to 20 miles as they advance to the northern boundary of the current in about 28° N. and 125° E. long., from where Shanghae is reached without difficulty. But always remember that the cold water current runs strong to the South on the East coast of China. Bound to Fou-Chou-Foo they may cross over from 26° N. lat., and about $122\frac{1}{2}^{\circ}$ E. long. in one tack.

A voyage up and down the China Sea with the monsoon presents no difficulty, but I would advise captains of ships to pass East of the Paracels, for in the S.W. monsoon the winds there are more steady and fresh than inside, or West of them, and a vessel has more sea room in case of a cyclone. After having passed to the West of Macclesfield Bank, steer a N. by W. or N. by W. $\frac{1}{2}$ W. course, on account of a N.E. current, and the winds blowing often from W.S.W. and West. December and January, and in some years the latter half of November, are the only months in the N.E. monsoon that I would advise to pass inside the Paracels when bound South, but which ought never to be done from February to the end of May on account of calms, and always lighter winds than in the open sea. I never went inside in these months, but gained on ships which did so, from eight days to a fortnight in the months of March, April, and May, bound South, as well as in the S.W. monsoon from June to September when bound North.

Every one who has perused the foregoing attentively will perceive that it is not the wind only that causes the long and troublesome passage, but that we have to consider the current as our greatest enemy. And as it has been my principal object from the beginning to make myself thoroughly acquainted with the subject, I beg leave to trouble you a little longer, and give you a slight illustration of my views about it, founded on the experience of my voyages.

Currents.—In the first place, I am positive when I assert that the whole current of the South China Sea is nothing but a large *circular* stream, in which the waters running from South have to pass North, in order to return down South again. Coming from the North through the Formosa Channel, and from the East by the Bashees, the first getting propelled by difference of specific gravity, and accelerated by the N.E. monsoon, it rushes down to the S.W., without finding material obstruction, until met by Capes Varela and Padaran. Here its waters are turned off to the South, part of them or the northern branch runs W.S.W. along the Saigon coast to Pulo Obi, and crossing the Gulf of Siam to Malacca; the main body, after having passed Padaran, resumes its course to the S.S.W., but the south-eastern part branches off to the South as far as 8° N. and $109^{\circ} 20'$ E., from where it runs to the E. and E.N.E. as far as 9° N. and 110° E. There it turns N.N.E.

and from $10^{\circ} 30' N.$ $111^{\circ} 20' E.$ to the N.N.W. into its own whirl again, to give place to new waters of the great counter stream or whirlpool. This explanation may be new, but it is, I fully believe, quite true, for I found it every voyage, bound North in the N.E. monsoon, only differing a little in force and direction according, perhaps, to the prevailing strange or light original main current. The E.N.E. and N.E. current or the first bend in this whirl runs strongest, and from 20 to 51 miles a day, decreasing as it advances North to about 25 and 15 miles when its direction is N.N.W. I consider this branch 50 miles broad, and the diameter of the whole whirl, from Padaran to its southern extremity, about 180 miles, and from Padaran to the S.E. about 140 miles.

If this whirl did not exist, how should we account for the strong N.E. current against a strong N.E. monsoon (and for the always sharp set about Sapata which we experience, and which Horsburg and the China Pilot mention), sometimes when the China Sea current to the North and S.W. of this whirl runs at the rate of 40 to 80 miles a day to the south-westward. This latter current I had in October, 1866, coming down from Hong Kong with the commencement of the N.E. monsoon, or why is there not a N.E. current in the N.E. monsoon, for instance, on the Macclesfield Bank, or at Pulo Condore as well? After this current of the aforesaid main branch has run down to the Natunas, &c., it gets obstructed again on the coast of Borneo, by which a slight drain to the East is caused, running along the North coast of Borneo, through the Palawan Passage (assisted perhaps by a part of the aforesaid eastern counter current of the Palawan whirl), and along the West coast of Luçonia, to run from Capes Bolina and Bayadere N.N.W. in the great China circular current, and commence its round via Padaran again.

This circular whirl-current about Padaran is the same in the S.W. monsoon, but in a contrary direction, but not so constant and regular as in the N.E. monsoon. H.B.M's. surveying vessel the *Rifleman* found the same amongst the Palawan shoals, where the commander says, "The stronger the monsoon, the stronger the current to *windward*," and this is according to the whirl theory quite conclusive, for the greater and stronger the counter current and the larger the whirl (and the stiffer the monsoon, the stronger is the China Sea current). I have often seen and noticed in the Saigon River, where the ebb tide runs at the rate of 5 knots an hour, in the middle of the river, after turning a sharp corner it causes a great counter current or whirl, in which the waters run 2 or 3 knots up the river close alongside the 5-knot ebb tide, so that a boat, and often my own vessel, when in it, drifted up the river at the above rate. And when a small river can produce such a strong whirl, what may not the mighty mass of the China Sea current be able to do? At all events I never found it necessary with the above N.E. current in the N.E. monsoon to take the Palawan Route, and

my results have shown that I never was behind, but generally ahead of those vessels which did take that dangerous Palawan Route.

This whirl current to the West of the Palawan shoals may also account for the different currents found by vessels which are working there at the same time, where one ship beats right in the counter stream, whilst the other is too far West or inside the whirl, or too far East and out of its influence altogether. And these little whirls are to be found around all the shoals in the China Sea, and although Horsburg recommends passing to leeward of all shoals, I have great reason from my own experience for cautioning captains even there. To leeward of the Pratas I found on two voyages the current setting East, or right on the shoals, against a stiff N.E. monsoon in the months of December and January. Although this is the general current it is nevertheless liable to irregularities and changes, in force and direction, and perhaps more than anywhere else, which is not at all surprising in a small sea like this, full of islands and shoals, and entirely enclosed by land, causing different winds on either side of it, and on which the current so much depends. For sometimes it blows a stiff N.E. gale to the North, while it is calm South of the Paracels, and commanders expecting perhaps a slight current are surprised to find one sometimes of 50 miles by observation, but in eight cases out of ten the above explained current will be found pretty correct.

And lastly, I take the opportunity to caution captains against trusting too much to red or green lights when in the vicinity of the Pratas and Paracels, for they are often exhibited by wreckers and pirates, especially at the Pratas. I once observed a green light to windward of me on the West side of the Pratas. I kept four points off, and being a clear night, I went aloft with my glass, and saw two junks, one of which carried the light.

CHINA AND JAPAN.

The following remarks on the passages along the Coast of China and between China and Japan are taken chiefly from the China Sea Directory, and are supplementary to those previously given which describe the best routes for approaching the southern ports of China.

19. PASSAGES ALONG THE COAST OF CHINA.

PASSAGE EAST OF FORMOSA.—When bound from Hong Kong to Ning-po, or Shanghai, or even to Fu-chau fu, during the N.E. monsoon, a vessel should be in good condition for contending with rough weather and for carrying sail. The best plan appears to be, to work along the coast as far

as Breaker Point,* and then stretch across to the South end of Formosa, and work up eastward of that island. By remaining in with the coast of China, she will have the advantage of the land wind at night, of smoother water, and the ebb tide out of the deep bays, which will generally be under her lee on the starboard tack, and in the event of its blowing too hard to make way, there are numerous convenient anchorages. It will be prudent to keep within 10 miles of the coast, to avoid being swept to the southward whilst standing off the land; but as this cannot be done at night without risk, a vessel should, if possible, anchor in the evening, and weigh in the middle watch, when the wind, generally coming more off the land, will enable her to make a good board on the off shore tack. By passing eastward of Formosa, also, a heavy short sea in the Formosa Channel will be avoided, as well as the constant set to the southward during the season.

After rounding the South end of Formosa, off which there is generally a troublesome sea, a vessel should make short tacks, if requisite, to keep within the influence of the Kuro siwo or Japan stream, which has sometimes been found running northward at the rate of 30 or 40 miles per day.

There are no harbours on the East coast of Formosa, except Su-au Bay, towards the North end of the island, and deep water will be found close to the land. The mountains rise almost immediately from the sea; their sides in some places are cultivated, and a good many houses will be seen. H.M. brig *Plover* anchored on an uneven bottom in Black Rock Bay, the vessel swinging from 13 to 22 fathoms, and rode out a gale from the S.W.; but it is by no means to be recommended.

Having weathered the North end of Formosa, it will be still advisable to keep to the eastward, and not approach the continent until the parallel of lat. $30\frac{1}{2}^{\circ}$ N. is gained. Should, however, a vessel be driven to the westward, she may always calculate on smooth water, and be able to tide it through the southern part of the Chusan Archipelago; and if disabled and in want of

* Towards the close of the N.E. monsoon, and still later, it would seem preferable to cross over towards Luzon rather than beat up to Breaker Point against fresh N.E. breezes, as the following remarks of Captain David W. Stephens, of the British ship *Harkaway*, tend to show;—"Ships from Hong Kong, bound through the Bashee or any of the other channels between Formosa and Luzon, from March to June inclusive, but more particularly in March and April, during brisk N.E. winds and a strong westerly current, frequently take a week beating along shore to reach Breaker Point before standing off; whereas, if after clearing the Lema Channel the vessels had stood off on a wind, clean full to the S.E., they would soon have got out of the westerly current, and on nearing Luzon would experience the wind more from the eastward and sometimes from S.E., enabling them to tack to the N.N.E. with a strong current in their favour, and thus would probably get to the eastward of Formosa in less time than it would have taken to reach Breaker Point by keeping along the Coast of China."

spars, she can remain at the southern side of Duffield Pass, and supply herself from the Fu-chau wood junks.

Upon this part of the voyage the following remarks, which appeared in the "Mercantile Marine Magazine" for 1865, will be interesting. They are by Capt. James Turnbull, of the *Glen Clune*, of Glasgow, and relate to an outward voyage made in September, 1864.

The object of nearing Formosa, is to get into an easterly set in-shore, working round and joining the permanent great stream from the Pacific on the East side near Botel Tobago. This set is found as soon as the N.E. monsoon has set down the Formosa Channel, impelling the water, and thus making it perform the entire circuit of the island, down the West and up the East coast. While working off the South coast, wind northing, stood right for the Bashees, there tacked and fetched Botel Tobago, when we were fairly in the Japan current, temperature of water 83° , average daily set 30 to 36 miles N.N.E. and made 70 to 80 miles per diem. From the East cape, too many vessels still commit the mistake of working to the northward, direct for Shanghai, whereas the current sets north-easterly right over the Hoa-pin-su Group. Follow it, drawing for its western edge a curve line from the East cape to 30 miles West of Hoa-pin-su, and on to the East side of the Linschoten or Cecille Group. Its eastern edge cannot be so well defined, but draw a line from Kumi to East of Raleigh Rock, and then past Sulphur Island and West of Lu-chu Group. The reason the western edge is better defined is, that it follows a sudden rise of the bottom, from ocean depth to about 50 fathoms. If you have an atlas on board, you will find the Japan stream placed 2° and 3° further south-easterly, that is just where a vessel would get the back eddies southwards,—any representation that I have seen of it being merely from the guesswork of generalisation, not from actual observation. When the winter has set in the temperature is a good guide on its N.W. side; but in summer and fall, the heat of the water right up to the in-shore set of the China coast is nearly the same, 81° to 82° . From Botel Tobago to off Sulphur Island I beat up in six days, then tacked, heading N.W. by W., and in two days fetched the light-ship. The *Anglo Saxon* and *Sir W. F. Williams* did the same with somewhat similar success, while of those who fought away North of Formosa, one went down, others sought refuge at Amoy to refit, and some came dropping in towards the middle of October, assisted by the southerly winds that often succeed the first six weeks of the N.E. monsoon. The sea is much the same as in the American Gulf Stream, and vessels that cannot stand it ought not to be sent to China.

On making the Barren Islands, as nearly the whole flood tide sets S.W., keep to windward, and do not be tempted to seek shelter under the Saddle Islands. Either work in the open sea under a press of sail; or, if possible, stand on until near the Amherst Rocks, when, if dark, anchor. You will

have rough riding, but the pilot boats and coasters do so at all times in preference to seeking shelter to leeward, as, in spite of the sailing directions, it is difficult to get back. Pilots are now in abundance, and in the N.E. monsoon ships run up to Wusung, and there take steam.

AMOY TO RIVER MIN.—If bound from Hong Kong to Amoy, or the ports between that place and the River Min, a vessel will generally find a difficulty in getting round Breaker Point; for the tide here is of no use, and all there is to assist is the likelihood that the wind will draw off the land after midnight, when, by being in-shore, a good board can be made, and possibly the Cape of Good Hope reached. Haimun Bay cannot be recommended, but still it would be better to anchor there than to be carried round the point. In this case, should West Hill be obscured, run in under the point, lower a boat, and let her find the sunken rock, and then come in with good way to windward of Parkyns Rock—if drawing less than 13 ft.—and shoot up round the boat into Fort Bay.

Having reached the Cape of Good Hope, the flood will assist a vessel to round it, and the ebb out of the Han River will be a weather tide; in the latter case, and not intending to go inside Namoa Island, endeavour to get along the South side of the island, where there is an eddy tide, and anchor in South Bay, should the weather prove too bad to proceed on the flood; both tides will be found strong off Three Chimney Point, and the same may be said of Jakako Point, round which vessels should take the first of the flood on the port tack.

Further northward about Rees Island, the flood tide in strong winds causes an uneasy sea, which will distress a vessel much. Red and Ting-tae Bays will be found good stopping-places; and the latter should be preferred, though at the loss of 2 or 3 miles, to anchoring in an exposed position in the entrance to Amoy Harbour; as when the N.E. winds freshen off here on the flood, they generally bring a mist in with them, which makes it difficult to find the entrance, and at the same time a vessel will have trouble to get out of the harbour against the tide.

To the northward of Amoy or Leeo-lu and Hu-i-tau Bays, both of which afford good shelter. Chimmo Bay is not so good; but with plenty of good ground tackle vessels may ride in it. The current in the monsoon overcomes the tide here; and advantage must be taken of every slant of wind, bearing in mind that it is likely to draw off the land in the middle watch, and in the event of anchoring for shelter, this is the time to start, should the wind moderate; by waiting for daylight vessels lose their offing, and will have to make an off-shore board at a loss. The fogs are at times thick, but the lead is not a bad guide, as the soundings generally change from sand to mud as the shore is approached. There is also fair anchorage under Pyramid Point, but not so good as that under the South Yit; and if the

vessel is looking up North, or anything East of it, the ebb out of Meichen Sound will be of assistance.

From the Lam-yit Islands or the South end of Hai-tan Strait to the White Dogs is beyond doubt the most difficult part of the passage. With steamers the strait will afford the best route; but sailing vessels should decidedly keep outside, and stretch over to the N.W. coast of Formosa, where they are likely to get a slant of wind, and the advantage of a weather tide; and as this portion of the coast has been surveyed, by attention to the soundings no vessel can come to any harm.

RIVER MIN TO CHUSAN ARCHIPELAGO.—North of the River Min the ebb is generally a weather tide (unless the wind is far to the North), and out of the river, and off Ting-hai and Sam-sah Bays, vessels will get a good lift; and with the flood, the indraught into the latter will be sensibly felt as far out as Larne Islet, and increases to 2 and 3 knots as the main is closed. As a general rule, tack for the in-shore tide, when the moon is on the meridian.

Tung-ying Island will be found a strong anchorage, and here the coast should be forsaken (unless the vessel is under 12 ft. draught), and the deep water to the eastward kept in. The tide will afford but little assistance until the vessel arrives at the Chusan Archipelago; the flood causes an uneasy sea in the shallow water, while the ebb has too much southing in it, unless the wind is eastward of E.N.E.; but Nam-ki and Pih-ki-shan Islands will afford good shelter.

On reaching the Chusan Archipelago, take the Beak Head Channel, unless the tide is nearly done, in which case there is Harbour Rouse and the South side of Luhwang Island as anchorages under the lee; and as the first of the ebb runs to the northward through the Foto Channels, the tide through may be saved, and anchorage gained on the Ketau shore. From hence, if bound to Ting-hai Harbour, contrive to arrive at the West end of Tower Hill Island about slack water; otherwise, in light winds, the vessel is liable to be carried on to Just-in-the-Way, and even through the Blackwall Channel.

In working through the North part of the Chusan Archipelago, as the set of the ebb and flood trends nearly East and West, advantage can always be taken of the tide, and vessels may count on feeling the influence of the ebb within an hour of the moon's meridian passage. When in the vicinity of Gutzlaff Island the first of the flood takes a direction to the southward of West, running into Hang-chu Bay.

The eddy tide, generally speaking, will carry vessels clear of the large islands; but when they are approaching detached rocks, great attention is required to prevent being set in amongst them.

IN-SHORE PASSAGE FROM HONG KONG TO THE YANG-TSE KIANG.—These directions for making the in-shore passage from Hong Kong to the Yang-tse Kiang by vessels of moderate steam power, during the N.E. monsoon, are drawn up from a report by Commander C. E. Buckle, H.M.S. *Frolic*, 1876, aided by Mr. T. E. Cocker, commanding the Chinese Revenue Cruiser *Ling-feng*.

A vessel should leave Hong Kong in time to anchor under Tam-tu Island for the night, if necessary, or by leaving earlier, to reach the well sheltered anchorage in Samun Road, between Tuni-ang and Samun Islands; or in Harlem Bay. Leaving Tam-tu at daylight, pass out through Tathong Channel; after rounding Tam-tu Island, steer to the westward of Nine-pin Group for Basalt Island, thence North of Tuni-ang Island for Harlem Bay. If in fine weather, and keeping to the southward, pass near to Single Island. From Harlem Bay, pass on either side of Middle Rock, round Fokai Point, and North of Pauk-Piah; thence steer for Goat Island, where good anchorage may be obtained on the N. W. side of the island.

A vessel may either proceed to the southward of Goat Island and North of Reef Islands for Chelang Point, or pass to the southward of Reef Islands, and thence for Tong-mi Point (good anchorage will be found in Chino Bay). Pass to the northward of Si-ki Island, and South of Tung-ki, thence for Hutung Point and Turtle Rock, from which steer in-shore for, and through, Tungao Roads, tolerably near White Rock and to the southward of Corea Rock.

Having rounded Breaker Point, not nearer than 2 miles, steer to pass near Tong-lae Point into Haimun Bay, South of Parkyns Rock into Hope Bay, where there is good anchorage during the N.E. monsoon. From abreast Swatow, steer to pass about half a mile to the eastward of Fort Island (giving Dove Rock, off Swatow, a good berth), being careful not to mistake either of the cones or hummocks of Fort Island, which appear detached, for the more distant Brig Island. If it be desirable to pass South of Namoa, the best anchorage for small vessels will be found in South Bay. When rounding the S.E. point of Namoa Island, care is necessary to avoid Glen-gyle Rock.

Passing North of Namoa, keep a good look-out for the heavy fishing stakes extending from Clipper Point, and proceed for Breaker Island. From Fort Head, steer towards Chauan Head for Owick Bay, where good anchorage will be obtained, with the rock off Owick Point bearing S.S.E. $\frac{1}{2}$ E., and Jokako Peak, N.E. $\frac{3}{4}$ E. In this bay it will be almost calm when there is a good breeze outside.

From Owick Bay steer for Bell Island; or, if keeping in-shore, haul out when closing this island, and pass to the southward of it. Between Bell and Square Islands a very disturbed sea and tide rip will be experienced; keep towards Jokako Point and into Jokako Bay, gradually hauling out to pass

about half a mile from the rocks off Cone Point, from which steer for Pagoda Island, gradually hauling out to pass close under Thunder Head, thence steer to the southward of Rees Rock. From Rees Pass, steer for the Hutau-shan River bar, and gradually haul out to pass about half a mile off Black Head and Tagau Point; passing tolerably close to and eastward of Hut Islet, thence westward of Spire Islet, and mid-channel between Crab Point and Cleft Islet, which is a desirable channel. Between Spire Islet and Cork Point there is usually a rough sea, and the coast should be followed as closely as Shun Rock will admit. Anchorage may be obtained in Red Bay.

The distance from Cork Point to the outer anchorage of Amoy may easily be run during a fine night, the islands and headlands showing out plainly:— Leaving Red Bay, give Cork Point a good berth, and steer to the westward of House Hill Point, edging out when closing the latter point; thence for Notch Island and along the coast for Table Head (off which some rocks are said to exist), and Chin-ha Point.

Proceeding to the northward, outside Amoy, steer for Leeo-lu Bay, in which, by passing close to Leeo-lu Head, good anchorage will, if required, be found. From Leeo-lu, steer to clear Dodd Ledge thence along the coast, keeping inshore. Safe anchorage may be found under Tongbu in addition to the many good anchorages shown on the chart. Sorrel Rock may be passed either on the East or West sides, and with a strong breeze a vessel may pass North of Loutz Shoal, through Lamyit Channel, and make for Hai-tan Strait. If the weather be fine, pass to the southward of Sorrel Rock, skirt Lamyit Islands, thence for Turnabout Island* and Hai Head. Good anchorage will be obtained under Hai Head, with Turnabout Island shut in.

From Hai Head, steer towards the White Dog Islands, passing westward of that group thence to Matson Diplo, and Spider Islands, between Spider and Cony Islands, or to the westward of Spider Island, and through Seaon Channel, thence to Fuh-yan or through the Chuh-pi Pass, to anchorage in Lishan Bay. From Fuh-yan, keep along the coast, and pass between Tungpwan and Shroud Islands, thence into Bullock Harbour, if necessary. Leaving Bullock Harbour, pass out between Pwan-peen and the northern Tseigh Islands, eastward of Coin Island, and southward of Hea-chu, off the Tai-chou Islands:—With a strong breeze a vessel may steer from Coin Island to pass between Taluk and Chin-ki, thence between San-shi Islands and Stragglers, to good anchorage under Shetung. Proceed between Chikhok and Low Chikhok, West of Squall Islands, and between Fir Coin and

* A sunken rock, on which the S.S. *Sunda* struck, in 1875, is said to be situated from 1 to 1½ mile northward of Turnabout Island.

Chuh-sen, to good anchorage westward of Gau-tau Island. Proceeding to the northward from this anchorage, pass between Kinmen and Gau-tau Islands. In fine weather pass to the eastward of Heroine Rock (the accepted position of this rock, as given by the U.S.S. *Ashuelot*, being S.E. by E. $\frac{3}{4}$ E., 4 miles from the S.W. end of Lea-ming Island) and Twins, or in a strong wind steer for Cape Conway and through Sheipoo Roads.

Fair anchorage in a N.W. wind will be obtained under the northern Kweshan Island, but there is a better anchorage to the N.W. of Castle Rock. It is, however, advisable to get as close to Gough Pass for the night as possible, ready to go through at daylight, or if in time, go through the pass and anchor for the night near Sing-lo Island. After passing Sing-lo Island proceed through Tower Hill and Blackwall Channels; anchorage may be found under Dunsterville or Volcano Islands, both of which should be left to the eastward on passing, thence steer for Rugged Islands.

Care is necessary when navigating this part of the coast, as the tides run strong.

It should be borne in mind, that at all times during the N.E. monsoon the weather is uncertain, and strong breezes set in without any warning, sometimes lasting for two or three days, or even more. Fogs are experienced in the early part of the year in the same manner.

No vessels of small steam power should attempt to proceed northward during the N.E. monsoon, except by the inshore passage, and the same might be said of the typhoon season.

PASSAGES IN S.W. MONSOON.—There will not be the same difficulty in getting to the southward against the southerly monsoon, as there is in going to the northward against the other, as it is not so permanent in its direction, and land and sea breezes prevail; the current has generally been found running strong to the northward in the Formosa Channel, but vessels are not liable to the same detention which they often experience in the northerly monsoon. Care, however, must be taken not to overshoot the port.

Fogs prevail in the early part of the season, and render the navigation at times as harassing as it is in the N.E. monsoon; they, however, generally lift in the vicinity of the land, and a ship's length from where the bowsprit can hardly be seen will carry her into sunshine.

The chief difficulty to overcome in making the passage between the Gulf of Pe-chili and Hong Kong during the southerly monsoon is the strong easterly or north easterly current. After passing the parallel of the Yang-tse kiang, it will be advisable to keep near the China coast; for although a vessel may lie up South or S. by E. on the starboard tack, it should be remembered that she is making little better than a S.E. course in consequence of the easterly set. A stretch to the north-westward, though apparently a loss of ground, will ultimately prove useful.

H.M.S. *Pique*, Capt. Sir Frederick Nicolson, C.B., in making this passage in July and August, was not favoured when close in shore by any land and sea breezes, nor had the least slant, but generally lost the wind. A weather tide was occasionally felt when near the shore in the Formosa Channel.

Although the constant adverse current makes this a tedious passage against the monsoon, there is nothing to prevent a vessel of moderate sailing qualities making the passage at this season. The *Pique* had seldom more than single-reefed topsails, and the sea was generally smooth; she made the passage from the Gulf of Pe-chili to Hong Kong in 31 days.

It would appear that North of the tropic to the parallel of 30° N., North and N.E. winds prevail during the greater part of the year, but alternating with calms, variables, and S.W. winds during the summer months.

20.—PASSAGES BETWEEN CHINA AND JAPAN.

DURING THE NORTH-EAST MONSOON.—HONG KONG TO YEDO.—A vessel bound from Hong Kong to Yedo at this season, should work up the Coast of China as far as Breaker Point (or see note, page 92), taking care to be always under the land at nightfall, the wind during the night always hauling to the northward (off the land), when she may make a long tack off, standing in again in the morning when the wind shifts to the N.E., and frequently more easterly still. From Breaker Point the vessel may then stand across with the wind free for the South end of Formosa, experiencing a southerly set whilst in the Formosa Channel; but on nearing the island she will lose it, and on passing South Cape fall in with the Kuro Siwo setting to the N.E.

Having passed South Cape Formosa, the vessel may work up the coast of that island, passing between it and the Meiaco Sima Group, and to the westward of the Liu-Kiu Islands, having the current with her as far as the parallel of 26° N., beyond which parallel she will experience no current until 30° N., where a strong current will be found setting to the eastward, the wind also being more from the North and West. She may then pass through any of the channels between the islands lying off the South point of Japan, after which, keeping at about from 50 to 10 miles from the land, in the strength of the Kuro Siwo, she may make the lights at Oo Sima (entrance of the Kii Channel), and passing them at a distance of from 5 to 10 miles, may steer to pass just outside Mikomoto (Rock Island).

FROM YEDO TO HONG KONG.—On leaving the Gulf of Yedo, stand to the south-westward as far as 28° S. and 135° E., whence a course may be shaped to pass northward of Kakirouma, one of the Liu-Kiu Group, thus avoiding the influence of the Kuro Siwo. After passing Iwo Sima, a straight course may be steered for Tung Ying, on making which island stand down the China coast for Hong Kong.

FROM SHANGHAE TO NAGASAKI.—At this season, if the wind is to the eastward of North, it would be well on leaving the Yang-tse to stand to the north-westward on the starboard tack, and when the wind hauls round to the north-westward, which it will as the ship advances northward, tack, and steer a straight course for Nagasaki, making allowance for the south-easterly and easterly set from the Yellow Sea and Korea Strait, otherwise the ship may be swept to the eastward through Van Diemen Strait. During the periodic easterly winds (variable between E.N.E. and S.E.) which prevail on the China coast in the vicinity of the Yang-tse, from March to June inclusive, with a sailing vessel, every opportunity must be taken to make easting, even with a fair wind, which it may be almost surely inferred will be but of short duration. In May and June, however, the set of the current will be changed, and will be found running to the north-eastward; under these circumstances there is a probability that a vessel kept on the starboard tack would be set over to the Korean Archipelago. With these considerations the navigator must act on his own judgment, there being only difficulty in making the passage, when baffling winds, and thick, rainy, and squally weather are met with in the vicinity of the Meac Sima, the Pallas, or the Goto Islands, or they are passed on dark nights. If not, therefore, sure of the vessel's position, it would be well to make them in the daytime, unless the nights are moderately fine.

HAKODATE THROUGH KOREA STRAIT.—If bound on to Hakodate at the same season, or even as late as the end of June, it will be found difficult with a sailing vessel to make easting at all along the West coast of Nipon. It will be advantageous in April, May, and June, to pass well East of Tsu Sima in the strength of the Japan stream, which sets N.E. by N. through the Korea Strait, attaining at times, although not constant, a velocity of 2 knots an hour. Should a S.W. wind occur at this season, it may be expected to last only 24 hours, unless it follow an easterly gale with depressed barometer. During the winter, gales from North and N.W. are very frequent in the Korea Strait, lasting three or four days, and are sometimes violent. A rapidly falling barometer indicates their approach, the wind increasing in force after the mercury commences to rise, and not attaining its height until 24 hours after. In such weather, if making for Nagasaki on the port tack, beware of being blown to leeward into Van Diemen Strait, for if set through by the Japan stream it will take a long time to regain the lost ground against the current (one vessel having been nearly three weeks endeavouring to beat round Cape Chichakoff); and if on the starboard tack, there is probability of being set up the Korea Strait to the northward of Ose Saki. As both cases have happened to vessels, it is recommended that they should endeavour to make the land in daylight, and find anchorage, or secure a knowledge of their position.

In winter, when N.W. and West winds prevail, a direct course should be

steered from the Korea Strait when bound to Hakodate; but if bound from Hakodate southward, it is necessary to endeavour to make westing when possible, and keep a long offing, for the coast of Nipon is a lee shore. After passing Korea Strait as well to windward as possible, the winds will be found more liable to change when arrived at lat. 32° N., long. 125° E., but sometimes they continue so steadily between N.W. and W.S.W. as to set a vessel to leeward of the Yang-tse.

SHANGHAE TO YEDO.—On leaving the Yang-tse, the wind will be rarely found as far to the eastward as N.E.; it is best, therefore, to keep the ship on the starboard tack, remembering that she will be set to the eastward towards Van Diemen Strait, after passing which, pursue the same route as directed in the passage from Hong Kong.

DURING THE SOUTH-WEST MONSOON.—HONG KONG TO YEDO.—A vessel bound from Hong Kong to Yedo should run up the China coast as far as Tung Ying, then shape a course for Akusi Sima, one of the Linschoten group. On passing the meridian of 125° E. the set will be strong to the north-eastward. Pass through any of the channels between the islands South of Japan in preference to Van Diemen Strait, as the dense fogs which hang over the coast at this season render the navigation of this strait difficult, whilst farther seaward, when in the warm stream of the Kuro Siwo, the atmosphere is bright and clear. After passing the channel steer to make the lights at Oo Sima, remembering the current sets along the coast of Japan to the north-eastward at this season from 2 to $4\frac{1}{2}$ knots an hour. After passing Oo Sima at a distance of from 5 to 10 miles, steer for Mikimoto (Rock Island) light. If bound from Hong Kong to Nagasaki, after leaving Tung Ying steer for Meac Sima, passing between which group and the Pallas Rocks, a course E.N.E. 80 miles will place the ship off the lighthouse on Signal Head (the North point of Iwo Sima) at the entrance to Nagasaki Harbour, on nearing which it should not be brought to bear northward of E.N.E.

FROM YEDO TO HONG KONG.—This passage is so seldom made by sailing vessels that very little is known of the best route to be pursued; the following, however, is recommended:—

On leaving the Gulf of Yedo shape a course to the south-eastward, to cross the parallel of 30° N in about 145° E., and, passing East of St. Margaret's Island, cross the meridian of 140° E. in lat. 21° N., thence steer (with a favourable current) for the N.E. point of Luzon, on passing which enter the China Sea, when a direct course may be shaped for Hong Kong, taking care to allow for the drift-current setting to the N.E. at this season. It may here be remarked, that this route lies directly across the paths of the typhoons, which are prevalent in the tropics at this period.

This voyage is rarely made, as sailing vessels so take advantage of the monsoons that they leave Hong Kong for the northern ports and Japan at

the commencement of the S.W. monsoon, and, remaining at the ports of the latter islands until the monsoon takes off, leave for the South at the commencement of the N.E. monsoon.

Steamers, however, run at all times between the two places, and at this season usually on leaving Yedo Gulf, and, passing Mikomoto, keep well in shore to Oo Sima, passing which they keep up the Kii Channel through Isumi Strait and the Inland Sea. On passing Simonoseki Strait, if not bound to Nagasaki, they keep to westward of the Goto Islands, and making the Saddle Islands off the Yang-tse, keep close to the shore, and from thence pursue the same course to the southward as vessels bound from Shaghae to Hong Kong.

FROM SHANGHAE TO NAGASAKI.—On leaving the Yang-tse, steer to pass between the Pallas Rocks and Meac Sima (Asses' Ears), which last is visible in clear weather at a distance of 30 miles. The current will be found setting to the north-eastward through Korea Straits; care must be taken, therefore, to avoid being set to the northward of Ose Saki, the South point of the Goto Islands, as the current during the S.W. monsoon is often strong in this locality. Passing the Amherst Rocks, a course E. $\frac{3}{4}$ N. 390 miles will lead midway between the Pallas Rocks and Ose Saki (Cape Goto).

The foregoing is a general account of the tracks most usually followed in traversing the Indian Archipelago or the China Sea. The more particular instructions for each locality will be found in their respective places hereafter.

In such a variety of routes there is necessarily some diversity of opinion as to which is best, and this has not been lessened of late years by the increased variety in the build and trim of the vessels employed in oriental commerce. The route practicable and advantageous to the swift sailing clipper cannot be followed by the heavy-laden and slow-sailing ship of former years. In what is here given, these different routes are each given, some from older authorities, some from recent experience. Some of the best tracks have been avoided from our ignorance of their nature, and their supposed dangerous character. This is fast disappearing before increased knowledge, and it may be predicted that some settled system for the navigation will be established in the course of a few years.

PART II.

DESCRIPTION OF THE COASTS AND ISLANDS.

In the succeeding pages will be found a detailed description of the shores and seas of the Indian Archipelago and China, commencing with the Strait of Malacca, and proceeding thence southward and eastward in regular succession. This arrangement has been preferred to that of following a particular voyage in one direction, as the present exigences of Oriental commerce require the subject to be considered in such varied aspects, that no other than a strictly geographic arrangement can be applicable to every case. The plan of the future pages will be thus readily understood.

Physical Geography.—The Indian Archipelago presents many remarkable features, worthy of the consideration of the passing navigator, as some of its peculiarities will thereby become better understood. This subject was well treated by Mr. Geo. W. Earl, and more recently, in its relation to animal and vegetable life, by Mr. Alfred Russell Wallace.

The first great feature of its constitution is the line of active volcanoes which encircle the whole of the north-western and most extensive area. A line of spiracles and rugged mountains from which they issue may be followed from Cheduba, in the Bay of Bengal, to the Andaman Islands, passing through the entire length of Sumatra, nearer to its S.W. coast; is continued along the southern part of Java, and passes through the chain of islands to the eastward, which are separated by narrow but very deep channels. Thence past the North part of Timor towards New Guinea, where it is met by another chain running from N.N.W., where it may be traced along Kamschatka through the Kurile Islands, Japan, Loo Choo, and the Philippines, after which it divides into two branches, the western passing down to the Moluccas, &c., past Celebes, and joining the first-named line at the West end of New Guinea, and hereabout its greatest effects are evident, in the fantastic forms it has given to Celebes and Gillolo and other islands. These rise abruptly from immense depths,* and to this and other causes may be attributed that want of fertility which characterises them: the rich soil caused by the decomposition of the rocks and vegetation being washed away from their arid surfaces into the deep ocean. The two lines of volcanic action

* H.M.S. *Challenger* found a depth of 2,150 fathoms between Celebes and Gilolo, 2,550 fathoms off the S.W. end of Mindanao, and similar depths in most parts of her track from Torres Straits through the Molucca Passage, Celebes and Sulu Seas, to Manila.

thus united may be followed to the eastward along the North coast of New Guinea, along the Louisiade Archipelago, to New Ireland along the Soloman Group towards the New Hebrides, and may be seen in detached spots as far as New Zealand, and the islands South of it.

This volcanic band is of a totally distinct character in its productions to the other parts of the Archipelago. As in all other parts of the world, the volcanic rocks, which are easily and rapidly decomposed by atmospheric influences, form a soil of unparalleled fertility when cultivated, although there are few useful natural productions, unless the nutmeg be so considered. This feature has attracted the numerous European settlements which are scattered along the bases of these chains, where the sugar and coffee plantations of Java, and the spice groves of the more eastern islands, afford such materials for commercial enterprise, which would seem to be almost illimitable. Mineral treasures are not to be hoped for in these ranges; the action of the volcanic heat has so altered the character of the superimposed rocks, that they afford nothing to the metallurgist.

The second great feature which may be noticed are those parallel lines of primary rocks which trend in a N.N.W. and S.S.E. direction across the archipelago, as well as in the countries of Asia to the northward, and across the continent of Australia to the southward. The chain which forms the backbone of the Malayan Peninsula is perhaps the most conspicuous of these; it may be traced southwards through Banka, &c. It is in this formation where the great deposits of metal are most abundant, or at least most easily worked, as in the famous gold and tin mines of Malaya, and the Banka tin mines. Sumatra, apart from its volcanic ridge, affords another example of these primary ridges. A third traverses Cambodia, &c., showing itself at Pulo Condore and the Natunas, and then reappears at the N.W. end of Borneo, and is lost on the North coast of Borneo. Another passes along the coast of Cochin China, traverses a portion of Borneo and the southern part of Celebes. One feature of these ridges is the existence of the teak tree, which only flourishes on them. When this important tree is transplanted on to the rich volcanic soil, it languishes.

A third feature is the great banks which extend from Asia and Australia, but do not join. This was first pointed out in their relation to their productions by Mr. Windsor Earl. He says: These banks of soundings, which extend from the continents of Asia and Australia, form very remarkable features in the geography of this part of the world, and, as such, are deserving of more attention than has hitherto been bestowed upon them, since it will be found that all the countries lying upon these banks partake of the character of the continents to which they are attached; while those which are situated on the deep sea which separates them are all of comparatively recent volcanic formation, with the exception of a few small coral islands, which are in all probability constructed upon the summits of submerged

volcanoes. The depths on these banks average about 30 fathoms, deepening rapidly as the edge is approached, and shoals gradually toward the land. The great Asiatic Bank extends into the archipelago to a distance of nearly 1,000 miles; in fact, to within 50 miles of Celebes, and perhaps farther.

The great bank which fronts the North and N.W. coasts of Australia commences near the N.W. cape, and extends in a N.E. direction to New Guinea, where it terminates at the base of the high but narrow mountain range that unites the western with the eastern part of that great island, and separates the Banda Sea from the Pacific. It is at this point that the edge of the bank is most remote from Australia, its edge being 400 miles distant from it. It appears again on the South coast of New Guinea, near Torres Strait, and extends along the N.E. coast of Australia.

The Arru Islands and New Guinea are thus united to Australia, and possess in common some features hitherto supposed to belong exclusively to Australia, such as the kangaroo, &c.

The volcanic islands between these great shoals appear to have a world of their own, different from the countries on either side. This remarkable feature cannot be dilated on, but may be followed in the excellent papers given by Mr. A. R. Wallace. It would seem as if the animal life especially belonged to a different order generally from that found on the neighbouring continents, and is even different between adjacent islands, so that these anomalies have given rise to some interesting speculations.

Respecting our knowledge of the coasts and seas, it is of varied character. Although much more perfect than it was a few years since, there are some serious defects in the hydrography of the archipelago, especially in the eastern portion of the area. The surveyors of the East India Company in former years, and our Admiralty hydrographers in later times, have examined the principal passages leading into the China Sea, as the Straits of Malacca and Singapore, Banka, &c. The Dutch Government have given charts and directions for the countries adjacent to these possessions, such as Sunda Strait and the coasts of Java, and the nautical world owes much to the Dutch commission for the improvement of charts and navigation. Under the auspices of this body a fine series of charts, of various and extensive portions of the archipelago, were published. These have since been mostly copied by our Admiralty. For the Spanish possessions in the Philippine Islands, &c., we have the older and modern surveys of that nation. The coast of China has been excellently surveyed by our Admiralty. All these authorities will be generally enumerated in the course of the ensuing pages.

Before proceeding with the descriptions, we must make our general acknowledgement of indebtedness to the *China Sea Directory*, published by the Admiralty. This work, derived from many sources, gives a correct picture of our present knowledge, and is therefore deserving of all confidence.

CHAPTER III.

THE STRAIT OF MALACCA.

This great highway into the China Sea may be considered to be limited on the N.W. by a line joining Acheen Head and the South point of Junksey-lon, which would be about 225 miles in length; and from this limit to the Carimon Isles, at its S.E. end, is 500 miles, so that it has more the character of an inland sea than a channel between Sumatra and the Malay Peninsula. In a more contracted sense it may be said to commence at Diamond Point on Sumatra, and Pulo Penang on the Malayan side, and these are 164 miles apart East and West.

The monsoons, interrupted by the high land of Sumatra on the one hand, and that of the Malay Peninsula on the other, each crossing the line of their normal direction, are only felt for a short distance within the respective en-trances, and from its position so near to the equator, the strait is subject to baffling and light winds and calms. In a former page the peculiarities of the winds and seasons have been referred to.

Its coasts have not been completely surveyed, but partial examinations have been made by Lieuts. Woore, W. Rose, and Capts. Moresby and C. Y. Ward. The charts, it is believed, are sufficiently complete for the safety of its navigation, which, under proper precaution, is free from danger.

The *British Possessions*, called the *Straits Settlements*, are the *Province Wellesley*, a strip of coast on the Malay Peninsula, about 10 miles broad and 35 miles long, at the back of *Pulo Penang*, also a British possession, a patch of country, 22 miles in length from North to South, with the island of *Pancore* lying off its southern portion, as hereafter described. The territory of *Malacca*, about 40 miles in length, and 25 miles in mean breadth, with its capital of the same name, and the great commercial emporium *Singapore*. These form a governorship, which, till the year 1851, was sub-ject to the jurisdiction of Bengal. In that year it was placed under the Indian Board; and on January 1st, 1867, it was transferred from that of India to the Colonial Office, and some changes were made in their constitu-tion. Each of these settlements is largely peopled with Chinese immigrants, who are the most industrious of the people. The Malay States from North

to South are named as follows—Quedah (Wellesley), Perak (Dinding), Salangore (Malacca), and Johore. The maritime population of these would be formidable pirates, were it not for the vigilance of the states cruisers, and gun-boats of light draught, which can follow the delinquents into the shelter of their rivers. Notwithstanding this, small vessels and boat parties should be on their guard, as among a population of this character, where morality is at so low an ebb, it is only a fear of being overpowered in the attempt, or found out and punished after the act is committed, which deters them from similar acts of violence to those committed in years gone by.

In recent years British Residents have been placed as advisers to the rulers of the different native states, and it is hoped by these means to increase the trade and otherwise improve the government of the peninsula.

The greatest mineral production of the country is tin, which seems to be met with in almost every part of the interior, and in very great abundance. The tin districts which have been most worked of late years are situated at Klang, in Salangore; at Laroot, in Perak; and at Linghie, near Malacca. "The mines in these districts," says Mr. Braddell, in 1874, "are so rich, and the profit of working them has been so great, that, notwithstanding the difficulties in dealing with the Malay chiefs as to the royalty to be paid, and notwithstanding the oppression of the chiefs, and the frequent massacres of the Chinese miners, they are still attracted to the place, and succeed yearly in sending large quantities of tin to Singapore and Penang."

THE EASTERN COAST.

Province Wellesley extends from the state of Queda, or Keddah, on the North to the river Krian, or Karian, S.E. of the South point of Penang. In 1851 its population was 64,801, a number five times as great as in 1824; and in 1873 it had reached to 160,000, of whom about 450 were Europeans. It resembles Penang in its geological structure, granite, over which is found the cellular clay iron-stone, so abundant in these regions, and known by the name of laterite.

The settlement produces sugar, rice, and coconuts in abundance, and among many other products a great variety of delicious fruits. Its chief importance, however, arises from the fact, that the capital of the island is a great emporium for the manufactures of Britain, and for the products of the countries of the Malay Peninsula on the one hand, and of Sumatra on the other.

PULO PENANG, or Prince of Wales Island, is about 14 miles long and 9 miles broad, and separated from the Malay coast by a channel from 2 to 5 miles broad. It is intersected by a range of granitic hills, the highest peaks

of which are Government Hill, to the West of the fort, 2,550 ft. ; West Hill, 2,713 ft. ; and Mount Elvira, near the centre, 2,384 ft. It was ceded by the King of Quedah to the East India Company, July—August, 1786, for a naval station. It has answered every expectation of its founder, Captain Light, and is, like the other straits settlements, entirely free from any impost on shipping.*

Pulo Penang, or Prince of Wales Island, is justly termed the Eden of the East, and the northern part especially is an immense spice garden. Fruit and vegetables are in great abundance, and in fact all Eastern delicacies, not forgetting the water, which may be considered the best in or out of the straits.

The N.W. part of the island is lofty and irregular, but seen from a distance, as far as 20 leagues off, it has a regular oblong appearance. The West coast forms a slender bay, with low wooded land reaching to the foot of the interior hills. The southern part of the island is lower. The town is on the East side. The climate is hot, but considered healthy.

The exceeding magnificence of its mountain views, the richness and variety of their component parts, and the coolness and transparency of the atmosphere which this country enjoys, give a freshness and elasticity to the mind never experienced in the sultry plains of India. It is almost inconceivable how nature, in so small a compass, has contrived to crowd such a wonderful diversity of pleasing objects.—*Logan.*

Tanjong Puchat Muka.—The N.W. point is in lat. 5° 28' 40" N., long.

* PORT RULES, 1872.—The limits of the Port of Penang are as follows:—From an obelisk built at Klarwey in a straight line to Bagan Jermal, along the western shores of Province Wellesley, to an obelisk at Bagan Luar, and in a straight line to Penang Bridge, thence along the eastern shores of Prince of Wales Island, to the obelisk at Klarwey, including the mouth of Prangin River, as far as the second Teetee Papan Bridge.

The limits of the South Channel are as follows.—From the North bank of the Penang River to Nos. 8 and 5 red buoys, from thence along the eastern bank of Pulo Perajah to the south-easternmost point of Pulo Rimo, thence in a straight line to No. 9 white buoy, then passing close to Nos. 8, 7, 6, 4, and 2 white buoys, and in a straight line ending at the obelisk built at Bagan Luar.

Signals in case of fire.—In the daytime, the Commercial Code signal of distress indicated by "NC:" at the same time, when possible, two guns should be fired, at an interval of one minute ; at night time, two rockets fired, and two blue lights burned alternately at an interval one one minute, and two guns fired as in the daytime.

Requiring the assistance of the Police.—In the daytime, the national ensign to be hoisted at the main-masthead ; at night, one gun to be fired, and one blue light burnt.

Masters of vessels are prohibited from anchoring abreast of the jetty, or in any place within 250 yards on either side thereof.

Vessels remaining upwards of 24 hours are to moor and keep a clear hawse. No sailing vessel is to be unmoored or shifted about without permission from the harbour-master, and on no account after dark, except in case of emergency.

100° 13' E. It is bold-to on the westward, and has 4 fathoms close-to. From it, on the eastern side, a shoal bank skirts all the North end of the island for 11 miles to the point on which George Town stands, the 3-fathoms edge being from 1 to 2½ miles off shore. At 3¼ miles East of Muka Point is the *Feringi Rock*, close in-shore, and at 3½ miles farther is *Pulo Tikus* (or Tee-coos), a rocky islet with some rocks around. Between this islet (on which is a white obelisk) and the Malay shore is the shoalest part of the channel which insulates Penang, not having more than 4 fathoms.

George Town, or Penang.—The chief place of the island stands on its eastern point, the extremity of which is occupied by *Fort Cornwallis*. It contained probably nearly 60,000 inhabitants in 1873, of whom a very large proportion are Chinese—many of them merchants and shopkeepers. It is situated on a low plain stretching out in a point into the sea, on the side of the island next to the mainland, and its harbour, which is simply the almost landlocked strait between the island and the mainland, is of great extent and unrivalled calmness. It has always a large fleet of vessels of every rig, from the finest British steamer to the Chinese junk.

The distance from the fort to the mainland opposite is about 2 miles, and this forms the harbour. The Fort Point is steep-to, having 9 and 10 fathoms near to it. In the middle of the strait are from 12 to 15 fathoms, and 6 to 7 fathoms on the Malay side. The best berth for anchoring is about a quarter of a mile South of the fort, in 9 or 10 fathoms, or less for small vessels. The tides are more regular here than close to the point, where they cause eddies. It is high water off the fort at 12^h, at full and change, but the flood runs southward till 3 o'clock in the main stream. Springs rise 9 ft., and neaps about 7½ ft.

Channels.—Mr. J. G. Maddock remarks:—"Both the northern and southern channels are safe, the northern shallows being well marked by fishing stakes, numbers of which are in 4 to 5 fathoms water. I have often passed between them, but a stranger having any regard for his copper ought to give them a good offing, as there are many old stakes broken off 2 or 3 ft. under water. The southern entrance is well buoyed, and also marked by beacons; but unless you have a good commanding breeze from the southward or S.W., which is not often the case except in the first of the rainy season (August and September), and if coming from the southward, I should always prefer the northern channel. I recollect once coming up with the *A. J. Kerr*, from Singapore. I had a good stiff breeze from the southward and westward, which I made available for the southern entrance. I had got to within half a mile of my anchorage when I was met by a northerly wind. I gave orders to clew up and anchor, and left the two winds to battle the match how they liked; in the morning I found the northerly wind had gained the day: this is not an uncommon occurrence in the southern channel."

The best route to reach the anchorage, as above stated, is by the North

channel. The southern one is intricate and also dangerous without an intimate knowledge, and with a large ship. With westerly winds, steer for the North end of the island, or with the wind from N.E. or northward, make for the mainland to the northward, and approach Pulo Bunting from N.W. by W. or W.N.W. The *Bunting* (or *Boonting*) Isles are four in number, with an islet between them, lying about 12 to 15 miles North from Penang. The largest is the northernmost, and is opposite to the peak of Quedah; and the southernmost is *Bidan*, or *Biddan*, which is nearest to the shore, and has only 2 or $2\frac{1}{2}$ fathoms inside of it. By night these islands may be neared to within depths of 14 or 15 fathoms; by day there is no danger but what may be seen. When past them, steer about S.S.E., with Pulo Bidan bearing about N. by W., keeping about midway between the North part of Penang and the main to avoid a flat extending off the Malay shore, and also that which encircles the North end of Penang, as before mentioned. The bar, or shoalest part of the channel, will be found when abreast of Pulo Tikus, and is only 24 ft., barely sufficient if there be any swell, which seldom occurs, if the draught be more than 20 ft.

The Fort Point is $3\frac{1}{2}$ miles to the S.E. of Pulo Tikus, which, as before stated, has some rocks around it; but having passed it, the water deepens towards the harbour. The N.E. shore of the island forms a slender bay, filled with a muddy shoal, which suddenly drops from 2 to 5 fathoms. The lead is not a sufficient guide in thick weather, or at night, in passing over the flat between the N.E. point and the Malayan shore, as the depths are nearly the same all across until within $1\frac{1}{2}$ mile of either shore. The shore of the main land is low, and covered with trees, so that it is not so conspicuous as the high land of Penang, which will thus appear the nearest when in mid-channel. From within Pulo Tikus to the fort, stand off again when $5\frac{1}{2}$ or 6 fathoms is reached. By daylight there is no difficulty in thus reaching the harbour, as the rocks of Pulo Tikus are bold-to. In the N.W. monsoon which sets in in August, there may be some difficulty in beating out by this North channel, but at all other times it is preferable for large ships. A good leading mark is to keep the West end of Pulo Jerajah, which lies off the East coast of Penang, clear of, or just open of the point on which Fort Cornwallis is built. This will carry you clear of all danger, the least water being $4\frac{1}{2}$ fathoms, mud and sand. Should you not see Pulo Jerajah, owing to hazy weather, the long leading mark is as before mentioned, Pulo Bidan, the southernmost of the Bunting, bearing N. by W. until you get sight of Pulo Jerajah.

The South Channel, though intricate, is very serviceable during adverse winds, as it affords a ready outlet in fine weather to the southward for ships drawing under 17 ft. water. Pilots are stationed at Pulo Jerajah. It is bounded on the West side by the Middle or Long Sand, marked by three buoys along its eastern side, which begins about three-quarters of a mile

South of the Fort Point, and stretches nearly to the North point of Pulo Jerajah. On the East side it is bounded by the northern spit of the *Great Kra Flat*, or as it was termed the Praya (or Pry) Sand. It is a bank of soft mud, which stretches from the Malay shore for 10 miles, when to the South of Penang.

Pulo Jerajah, or *Jeraga*, is 5 miles S. by W. from Fort Point, and is 734 ft. high. It has a narrow channel of 3 to 5 fathoms between it and Penang. Off the S.E. point of Penang is *Pulo Remo*, or *Ramio*, close to the South of which the channel passes.

Buoys.—The South Channel is marked by ten buoys, numbered from North to South, each placed red on the western, and white on the eastern edge of the channel, in about 2 fathoms of water. Of these, three painted red mark the eastern edge of the Middle Bank; and six, painted white, the western edge of the Great Kra Flat; a fourth red buoy lies S.W. of Remo Island. No. 1, a red buoy, is moored on the North end of the Middle Bank, a mile southward of Fort Cornwallis. No. 2, white, S.S.E. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile from No. 1, marks the eastern side of the channel, which is here quite clear, and nearly three-quarters of a mile in width. At $1\frac{1}{4}$ mile below No. 2 buoy the channel is marked on either side by red buoy No. 3 and white buoy No. 4, which are two-thirds of a mile apart; hereabouts the soundings suddenly decrease from 6 to $2\frac{3}{4}$, 3 and 4 fathoms, the deepest channel being nearer to the white buoy. At about three-quarters of a mile below Nos. 3 and 4, Nos. 5 red and 6 white, three-quarters of a mile apart, mark the opposite sides of the channel. The deepest part of the channel here is towards No. 6, as a spit projects out from the red buoy. No. 7 white buoy, $1\frac{1}{2}$ mile S. by W. $\frac{1}{2}$ W. from No. 6, marks the eastern side of the channel opposite the highest part of Pulo Jerajah. Hence to the southward the channel is broad and deep. No. 8 buoy, white, marks its eastern side, and lies S. by E. $1\frac{1}{4}$ mile from the South end of Pulo Jerajah. No. 9, red, marks the western side of the channel, 2 miles S.W. of Pulo Remo; and No. 10, white, marks the eastern side at its South extremity, and lies $1\frac{1}{2}$ mile southward of No. 9 red buoy.

In *leaving* Penang Harbour by the South channel, get under weigh about half flood, and steer S. by E. and South to enter the channel between the Middle Sand and the Pry or Praya Sand. When the bar is neared, keep near the eastern edge of the Middle (or Long) Sand, the depth in crossing it is nearly 5 fathoms, between the North end of Pulo Jerajah and Kra Flat. When the North point of Pulo Jerajah bears to the northward, the soundings will decrease to 6 and 7 fathoms, then haul near to that island, and these depths will continue through the channel in steering out to S.W. seaward, past the S.E. point of Penang and Pulo Remo. The greatest depths are near the East sides of these islands, which are steep-to, but on the East side of the channel the water shoalens suddenly upon the edge of the Kra Flat. After passing Pulo Remo close on the East side, the course is

about S.S.W., or S. by W., according to the set of the tide, to proceed through the channel fairway between the Kra Flat on the port hand, and the mud bank off the South end of Penang to starboard. The leading mark is to keep the body of Pulo Jerajah on with the East end of Pulo Remo, if Pulo Jerajah is shutting in with Pulo Remo, a ship will be on the West side; and if entirely open with it, she will be on the East side of the channel.

The mouth of the *River Krian* is in about lat. $5^{\circ} 16' N$. This river serves as one of the roads down which the tin is brought from the mines in the interior.

The State of Perak,* extends along the coast from Wellesley Province to the State of Salangore, or from 1 to 2 miles southward of the mouth of the Kutong River to the mouth of the Bernam River, a distance of about 100 miles. A portion of this coast line, however, belongs to Great Britain, having been ceded in the year 1826, and the cession again ratified in the year 1874. This includes the Island of Pancore, or Dinding, and coast of the mainland at the back of the island, and thence for about 20 miles to the northward. The Bruas and Dinding Rivers enter the sea within its boundaries.

The district of *Laroot* is situated to the northward of this British territory, and is bounded on the North by the Krian River. The physical aspect of the district is thus described by Mr. Birch:—"From the sea-shore to some 20 miles inland, Laroot is a great level; here it begins to rise in uplands until it reaches a mountain-range rising to an altitude of some 3,000 ft. above the level of the sea. This level or plain is well watered and well suited for the cultivation of sugar, tapioca, tobacco, &c. Rice is the only cereal now cultivated. The whole of the land, comprising a strip of about 50 miles long by 6 miles broad, along the Laroot Range, is more or less stanniferous, and the supply of tin is inexhaustible. At present (1872) about 4 square miles are occupied for mining purposes, and there are 120 mines open. It is unskilfully worked, and only about 600 tons were exported in 1874. Of the Laroot Range, *Gunong Buboo*, or the 'Wild Mau,' is said to be the loftiest. It is said to be the most conspicuous landmark to mariners beating up the Straits for the mouth of the Perak River, which is several miles South of this mountain."

The population of the State of Perak, which extends eastward as far as the Malayan chain of mountains, was estimated to number 25,000 in 1874, mostly established near the shores of the Perak River, which passes through the country in a direction from North to South at a distance of about 30 miles from the coast. It is from this River Perak or Pera (silver) that the country takes its name. The country is plentiful in fruit-bearing and timber-

* Pronounced like "Pera," the terminal k in Malay words being scarcely sounded at all.

producing trees, among the latter class being the teak. India-rubber and gutta-percha trees are also found. In minerals, iron, saltpetre, and gold, are found, besides the tin before mentioned.

Pry River enters the sea on the southern side of the point, lying E.S.E. of Penang. Here it is high water, full and change, at 12^h. Springs rise 9 ft., neaps 7½ ft.

The *Kutong River*, in lat. 5° 6' N., is merely a southern outlet to the River Krean, and flows along the South side of the North Mound.

The *River Laroot*, rising in the neighbourhood of Gunong Hijau in the Laroot Range, falls into the Sea in 4° 44' N., 28 miles to the S. of the Krean River. Mr. Irving says:—"Compared with other rivers on the coast, it is an inconsiderable stream, as the range of mountains which forms the watershed of the peninsula, at this place, approaches the coast. The colonial steamer *Pluto*, drawing only 6 ft. of water, was not able to do more than enter the river; but the small steamers belonging to the Tunku Mantrie, or headman, are able to get up to the town, a distance of 2 miles from the coast." The town, in 1872, was surrounded with stockaded positions, and Mr. Irving observed that there was an excellent road all the way to the mines in the Laroot Range, about 10 miles from the town. The coast of Laroot between the Kurow, 20 miles northward of the Laroot River, and the Jurom Mas (or Gold Needle), 12 miles to the southward, is a perfect network of rivers and rivulets, and indented by endless creeks and bays, which afford countless sheltering places for pirates. Most of these creeks and inlets have been explored by the boats of the *Thalia* and the *Midge*, when in search for pirates in 1872, under Captain Woolcombe.

The Kurow River enters the sea in 5° N., and 10 miles south-eastward of it is the mouth of the Silensing. This latter river is connected with the six outlets to the sea between it and the Jurom Mas River, in lat. 4° 33' N. These outlets are named in order, Besar, Kechil, Larut, Trong, and Jurom Mas. About 1 mile South of the Jurom Mas is the mouth of the small river Hut. Between this and the mouth of the Bruas River, which is situated 4 miles to the south-westward, is the northern boundary of the British Territory.

At 16½ miles S.E. by E. from the S.E. end of Penang is a hill, called the *North Mound*, which is 5 or 6 miles South of the Krean River, and at 13½ miles further to S.E. by E. is another called the *South Mound*. Further inland high mountains are seen, which extend to the southward.

The Coast is fronted by an extensive shoal, which commences in the strait insulating Penang, and which, South of that island, is called the Great Kra Flat, the 5-fathoms line being as much as 12 miles from the beach. This extensive mud-bank, the produce of the many rivers, before mentioned, which enter the sea from the adjacent coast, gradually shoalens to the shore,

leaving a wide space, which covers and uncovers with the tide, and continues with varying break for 54 miles, till its outer edge comes close to the land at *Pulo Tallong*, near the hills known as *False Dinding*, or *False Suggur*. The outer edge of the bank is steep-to, decreasing suddenly from 13 to 12 fathoms to 2 or 3 fathoms, so that it would be imprudent to stand nearer than that depth, even with the lead kept briskly going, especially in the night. There is some advantage in keeping in with the coast, for by doing so the westerly current usually prevailing in the offing will be partly avoided. The winds will also be more favourable, and anchoring easier than in deeper water.

DINDING ISLAND, or PULO PANCORE, before mentioned as forming a portion of British Territory, was examined together with the channel on its eastern side by Commander Napier, in H.M.S. *Nassau*, in 1876. The island is of irregular shape, 5 miles long N.W. by N. and S.E. by S., and 2 miles broad. Off its S.W. end is *Little Dinding Island*, sheltering a bay; off its N.W. end runs a narrow promontory, $1\frac{1}{2}$ mile long; and midway between the promontory and *Little Dinding Island* a narrow island $1\frac{1}{2}$ mile long juts out on its western side. The highest part of the island is 1,318 ft. high, and situated about 2 miles S.E. of the N.W. point. On the North and South extremes are two hills, respectively 748 and 992 ft. high. Two other mountains rise near the centre of the island, and attain a height of more than 1,000 ft.

Great Dinding Island is densely covered with jungle. The woods consist of ebony, sandal wood, several varieties of gum, india-rubber, and palm-trees, bamboo, and several native woods, some of which are similar to mahogany; coffee and cotton are also grown here. The whole of the woods are farmed out by the colonial government at an annual rental. The population in 1876 consisted of about 250 Bataks or Malayan native hill tribes, and 100 Chinese. A Dutch fort formerly existed on the East side of the island. Poultry, eggs, and occasionally pigs, may be procured at most of the native villages at reasonable prices. Fish and fruit are plentiful; turtle in the season. Fresh water of good quality is plentiful at almost all the villages, but owing to want of proper conduits can only be obtained in small quantities.

North Entrance.—The passage between the North side of Pulo Pancore and the main is divided into two channels by the *North Bank*, which shows breakers in places. This bank is 4 miles long in a N.W. and S.E. direction, and from half a mile wide at its southern end, opposite the mouth of *Dinding River*, on the mainland, to $1\frac{1}{2}$ mile wide at its North end, near which lies *Wedge Rock*, 3 ft. above water, N. by E. $\frac{1}{2}$ E., $1\frac{2}{3}$ mile from *North West Islet*, which lies 5 cables N. by W. $\frac{1}{2}$ W. from the North point of Pulo Pancore, is wooded, 100 ft. high, and difficult to discern until close. A 3-foot rock lies nearly a cable off its West side, otherwise it is steep-to all round.

A small islet, 7 ft. high, lies in the channel nearly midway between North West Islet and Pulo Pancore.

Between the North Bank and the bank skirting the shore there is a channel, suitable for vessels of not more than 10 ft. draught of water; but the passage is difficult, and should not be attempted without local knowledge. Pass Tanjong Hantu, a projecting point, 11 cables N.E. by N. of Wedge Island, at about 2 cables distant on a S. $\frac{1}{4}$ E. course, after which steer S.S.E. $\frac{1}{2}$ E.; this course will lead direct to the centre of Dinding River passage, and in not less than 4 fathoms water. H.M.S. *Nassau*, drawing 13 feet, passed through the channel at three-quarters flood.

The channel westward of North Bank is not recommended for vessels of large draught, for although with care and attention not less than 4 fathoms water will be obtained, the passage is narrow, being only 2 cables wide in the narrowest parts, and the leading marks are not of the best description. The eye, however, is the surest guide.

Give a wide berth to North bank, the western limit of which bears North from the N.W. point of Pulo Pancore. To clear this and the outlying 3-fathoms patch 7 cables W.S.W. of Wedge Rock, the North peak of Pulo Pancore should not be brought to bear southward of S.E. $\frac{1}{4}$ S. North West Islet will be sighted ahead on this bearing, and passing it on the starboard hand at half a cable distant, steer E. by S. $\frac{3}{4}$ S. for *Offlying Rock*, 2 ft. high, near North Point. Between North-west Point and North Point, which are 3 cables apart, a rocky bank projects $1\frac{1}{2}$ cable to the northward, at the extremity of which is Grasshopper Islet, 120 ft. high and wooded. Pass Offlying Rock also on the starboard hand, at half a cable distant; then alter course quickly to starboard, and bring the summit of North West Islet to bear W. by N. $\frac{3}{4}$ N., and midway between Offlying Rock and North Point. This mark will lead a cable North of *Bower Patch*, and 1 cable South of a projecting part of North Bank. When *Scorpion Point* (which forms the eastern entrance point of the large bay indenting the North side of Dinding Island) bears S.W., alter course to starboard, and bring *Table Rock*, lying near a point, and 22 ft. high, to bear S. by E. $\frac{1}{4}$ E.; then steer 6 or 8 cables to pass the latter one, or $1\frac{1}{2}$ cable distant; and thence, preserving the same distance from the island, to the anchorage off Port Pancore.

Charybdis Rock, a pinnacle having a depth of 2 ft., lies North $1\frac{1}{4}$ cable from Scorpion Point. The 2-fathom bank surrounding it extends a quarter of a cable farther North. The ground is foul between Charybdis Rock and Scorpion Point.

Shoal water of 10 to 17 ft. extends a distance of $2\frac{1}{2}$ cables to the N.E. and East of Scorpion Point, and also fills the bay formed to the N.E. of Table Rock.

Bower Patch, having a depth of 15 ft., is nearly circular, about half a mile in diameter, and lies N. by W. $\frac{1}{4}$ W., 3 cables from Scorpion Point. The

summit of North-west Islet, in line with North Point, leads on to Bower Patch. The summit open of North Point, and bearing W. by N. $\frac{3}{4}$ N., leads North of Bower Patch in 4 fathoms least water.

If bound to Dinding River, keep North West Islet bearing W. by N. $\frac{3}{4}$ N., and when Scorpion Point bears S.W., sheer out a little to the southward, to give the S.E. extreme of North Bank a wider berth, and bring the leading mark on again before the tongue of South Bank is approached.

The South Channel lies between the eastern side of the island, which is almost steep-to, and the bank which extends about a mile off the main.

Fairway Rock, 27 ft. high, lies S. by W. $\frac{1}{2}$ W. $3\frac{3}{4}$ miles from the S.E. point of Pulo Pancore; a sunken rock, having less than 6 ft. water, lies half a cable from its North side, and a depth of 4 fathoms near the West side of the rock. There are 9 to 16 fathoms water between the rock and the mainland, and 10 to 23 fathoms between the rock and Pulo Pancore.

Pulo Katta, N.E. by E. $3\frac{1}{2}$ miles from Fairway Rock, is a small wooded islet, 114 ft. high, standing on the edge of the bank near Tanjong Katta, and is separated from the mainland by a shoal and rocky passage 3 or 4 cables wide.

To reach Port Pancore from the southward, having passed Fairway Rock and Pulo Katta, steer to bring Table Rock in line with Tanjong Hantu bearing N. by W. $\frac{1}{4}$ W.: keep these marks in line, which will lead nearly mid-channel to the anchorage off Port Pancore.

If wishing to enter Dinding River, steer from the anchorage to pass Table Rock 2 cables distant, and thence midway between East Bank and the island, until the North summit of Pulo Pancore bears S.W. $\frac{1}{2}$ S.; then bring the summit of North-west Islet bearing W. by N. $\frac{3}{4}$ N. open of North Point, and proceed on that course to the entrance of the river.

Abreast of Port Pancore there will be found secure anchorage for vessels of large draught, and sufficient space for several vessels to moor. The best berth is with the shore end of the pier bearing W.N.W., distant 3 cables, in 8 fathoms, mud. In this berth the vessel will be distant 3 cables from the edge of East Bank, the shoal which skirts the mainland adjacent. Bathing is unsafe on account of the numerous alligators which swim across the channel.

It is high water full and change in Dinding Channel at 3^h 15^m; springs rise 9 ft., neaps 5 ft. The flood stream in the North entrance sets fairly through the channel. In Dinding Channel and South entrance the ebb sets N.N.E., and flood S.S.W., at the rate of 2 to 3 knots at springs.

To the S.W. of Pulo Pancore the flood sets S.E., and ebb N.W., and sets through the narrow passage between Pulo Pancore Laut and Pulo Pancore at the rate of 2 to $3\frac{1}{2}$ knots at springs.

There is anchorage in the bays on the western side of Dinding Island.

Dinding River, perhaps the only river without a bar in Malacca Strait,

has a deep and clear entrance, which between Mehegan and Motts Points is 8 cables wide. A channel 3 cables wide, and having 5 to 9 fathoms, extends 3 miles up the river, the farthest point reached by the surveying parties. The water shoals more gradually towards the North shore than towards the South, which is rocky. Yellow Cliff, 14 ft. high, and Red Cliff, 26 ft. high, both on the South side of the river, are conspicuous. On the North shore of Dinding River, at the West side of the entrance of Sungie Sumpit (small river) is situated a police station, a conspicuous bungalow standing on a spit, and easily recognised by the palm trees westward of it. On the South shore of Dinding River, opposite the police station, is a native village. The flood and ebb tides set at the rate of $3\frac{1}{2}$ knots at springs, and 2 knots at neaps. Directions for approaching it from the Dinding Channel are given previously.

The southern boundary of the British territory is in the bay 2 miles East of Pulo Katta.

The Sambilang Islands are 8 miles South of Dinding. They are so called from the Malay word for nine, their number. They are generally high and bluff, covered with trees, and visible 20 miles off.

The *White Rock*, 15 ft. high, is the south-westernmost of the Sambilangs, and is in lat. $4^{\circ} 0' 10''$ N., long. $100^{\circ} 32' 15''$ E. The *Black Rock*, not very high above the water, is 1 mile North from it. The Sambilangs are quite bold-to, with very deep water, 15 to 46 fathoms, and very irregular bottom, so that the lead is no guide in approaching them. There is a safe channel inside them.

The RIVER PERAH, or Perak,* is an extensive stream, and is much frequented by the country vessels trading for tin. Mr. Birch, in one of his last speeches made at Singapore, speaks about this river in these terms:—“The river is a very magnificent one. At least 150 miles from the mouth, it is over 400 ft. wide, and, as the tidal influence extends a very short distance from its mouth, it may be well imagined what rich and fertile lands are to be found along its valley. The greatest resources of this fine district lie in its soil, which is remarkably rich and suitable for the cultivation of tobacco, sugar, or indigo.”

A vessel entering Perah River should close the North coast, and having passed Pulo Katta, bring the South point of Pulo Pancore, or Great Dinding, to bear N.W. by W. $\frac{1}{4}$ W., and nearly touching the North point of Little Dinding Island. This mark will lead over the bar in 11 ft. at half-tide neaps, and 17 ft. at high water springs, and past the outer clump of

* It was at Passir Salah, a town on this river, about 70 miles from its mouth, that Mr. Birch, the British Resident, met his death at the hands of the natives. The murder took place in November, 1875, at a time of great excitement, caused by the struggles of two rival claimants for the throne of Perah, after the death of Sultan Ali.

fishing-stakes at about three-quarters of a mile on the starboard hand ; the bar is (January, 1876,) situated N.E. by E. from these stakes.*

Keeping the same marks in line, a second clump of fishing stakes is passed on the starboard hand about a quarter of a mile distant ; then alter course gradually to starboard, and pass between this clump and another large clump bearing E. by S. Passing the latter at a quarter of a mile distant, the vessel should steer along the bank for the point on the North side of the entrance, keeping about a half or three-quarters of a mile off shore, and passing outside some small fishing-stakes moored close to the bank, until the mouth of the river is reached. Avoid the first point on the port hand, as there is a long spit extending off it, and steer over to the South or left bank of the river, keeping it at a distance of 50 to 70 yards, as there is a shoal in the centre of the river.

Between the entrance of the river and Kota Striah, distant 25 miles from the bar, on the route recommended, soundings of $2\frac{1}{2}$ to 5 fathoms will have been obtained. There is anchorage off Kota Striah, in $3\frac{1}{2}$ to 4 fathoms, stiff mud, at $2\frac{1}{2}$ cables from the shore.

Durian Sabatang, a town of eighty or ninety houses, the highest point which may be reached by gun-vessels drawing 11 ft., is 43 miles from the entrance. The trade, which is chiefly in tin, is in the hands of the Chinese, and is carried on entirely by junks.

Bandar Bahru, the site of the British Residency, is estimated to be 19 miles above Durian Sabatang. Kota-Lumut is the highest point steam launches can reach.

Bernam River, 12 miles southward of Perah River, is the boundary between the States of Perah and Salangore. It has been for years the resting place of pirates, but in 1870, after some severe fighting, they were dislodged, and it is hoped that by an occasional visit of one of H.M. gunboats, the practice may be checked for the future. The river extends about 150 miles inland.

PULO JARRA lies in the middle of the Strait of Malacca, bearing S. $\frac{1}{2}$ W. 78 miles from Penang, and $26\frac{1}{2}$ miles W. by S. from the Sambalang Islands. It is about 300 ft. high, very small, covered with trees, and may be seen in all directions for 20 or 25 miles. It is very steep-to, the lead affording no

* In June, 1876, the *Ringdove* crossed the bar at high water neaps with the same marks, and had 22 ft. least water. Also H.M.S. *Maggie*, crossing on the 26th of December, 1876, had 25 ft. least water at one hour before high water ; the outer fishing-stakes bore S. by E. The channel of deepest water is probably very narrow, and it may shift. Navigating-Lieutenant Pownal Aplin, H.M.S. *Modeste*, 1876, remarks, that vessels of 9 ft. draught may always enter at high water. Ships of greater draught should not attempt it except at springs, unless in cases of urgency. The best channel in 1861 was 1 mile South of Pulo Katta.

indication of its proximity. The depths around it are from 14 to 48 fathoms, with 25 to 30 fathoms in the channel between it and the Sambilangs; and from 30 to 40 in the channel between it and the Brothers, 39 miles to the S.S.W. It is best to pass to eastward of it, because the current often sets strong to the N.W. in the middle of the strait, and calms are more prevalent there than nearer the coast. It is in lat. $3^{\circ} 58' 20''$ N., long. $100^{\circ} 8' E.$

SALANGORE,* the capital of the Malayan State extending from Bernam River to Langat River, lies within the entrance of a small river at 60 miles S.E. from Pulo Sambilang. The town was founded at the commencement of the last century by a colony of Bugis from Celebes, and was at one time frequented for tin, for which the Dutch had here an establishment and monopoly. The fort on the South side of the entrance to the river is in lat. $3^{\circ} 19' 50''$ N.; there are also some forts on the northern shore. The river is navigable at high water for vessels of some burden, and H.M.S. *Rinaldo*, draught 15 ft. 4 in., entered here in July, 1871, to punish the natives for a piratical attack which had been made in a junk from Penang, when thirty-four persons were murdered. They found the bar 2 miles in width at high water, and grounded at low water when anchored in front of the town. Captain Bloomfield, who examined the river in 1871 up to where it ceases to be tidal, at 22 miles from its mouth, reports that vessels drawing more than 10 ft. water should not attempt to enter the river until more accurate surveys are made. H.M.S. *Pluto* ascended the river 13 miles, or to 1 or 2 miles above Quedah. The spring tide was running very strong, with a rise and fall of 15 ft. There is anchorage abreast of the river at $3\frac{1}{2}$ to 5 miles off shore, in from 4 to 7 fathoms, with Cape Caran bearing N.W., and Pulo Anza bearing S. by E., or S. by E. $\frac{1}{2}$ E., about 9 miles distant. It is high water, at full and change, about 5 hours.

The False Parcelar Hill, or *Bukit Jerom*, is close to the shore, and 7 miles from Salangore. It is sometimes called the *Hill of Salangore*. In passing it, it scarcely seems higher than a clump of trees. Its sides are covered with cocoa-nut trees, and its summit by a grove of senna trees. Off it lies a line of islets and rocks, running to S.W. by S. for $3\frac{1}{2}$ miles. They were formerly called the *Botel* (or *Bottle*) *Islands*. The innermost is *Pulo Besar*, and the outer one is *Pulo Tekolo*. At a mile, or further from it, is a rock, on which the *Calcutta* brig was lost. It bears S.W. $\frac{1}{2}$ S. from it, and should not be approached too nearly; there are 5 fathoms water close to it.

From the outer reef (sometimes also called the Sail Shoal), *Pulo Anzas*, on

* It is probable that within a few years more trade may be done on the coast of Salangore. Under the advice of the British Resident, the Sultan issued a proclamation in March, 1876, declaring it illegal for any, save those properly authorized, to levy taxes on merchandize. Hitherto vessels passing up and down the river have paid heavily to different chiefs, who converted the money to their own use.

the opposite side of the channel, bears W. by S. 3 miles. There are two of them standing upon the eastern edge of the shoal which limits the strait to the westward. (They are the Mudancoos, or Mud and Goose, of the old charts.) The bank and the islets are steep-to. The bank extends for 13 miles to N.W. by N. from them, and gradually shoalens from 2 and 3 fathoms up to *Pulo Colong* (or Callam), the North point of which is 10 miles S.E. by E. from the *Pulo Anzas*.

At 80 miles from the *Sambilangs*, and 30 miles from *Salangore*, is a projecting point, formed by the islands of *Colong* or *Callam* and *Lamaut*, formerly called *Cape Coran*, or *Tanjong Awat*, or *Mud Point*. A shoal bank fronts it for $2\frac{1}{2}$ miles from it, and therefore caution is necessary. This bank of sand and broken shells stretches for 15 miles to N.N.W., and is $6\frac{1}{2}$ miles from shore. On its edge and between it and the shore, the depths are 5 and 4 fathoms, and as they decrease the bottom becomes hard. After the *Sambilangs* disappear, the *False Parcelar*, or *Hill of Salangore*, will come in sight to the S.E. by E., or rather more eastward. The ship will then be in 10 fathoms, green mud, and should steer along the coast to S.E. in not less than 8 or 9 fathoms. When *Cape Caran* bears East, the beach may be neared with safety, but should have a berth of 2 miles, after which the lead will be a sufficient guide.

Pulo Colong, with *Pulo Lumaut* to the South of it, forms a channel called the *Strait of Callam*, or *Colong*, which was formerly used by ships of moderate draught in order to avoid the dangers of the North and South Sands. It is still used by the local steamers. To the eastward of *Pulo Lumaut* two rivers enter the *Lumaut Strait*. The *Callang* or *Klang* is said to be navigable for vessels of light draught, 15 or 20 miles, as far as *Damar*, and for boats by poling as far as the neighbourhood of the tin mines. *Langat River* enters the strait at about 6 miles to the southward. To the northward of *Parcelar Hill*, in $2^{\circ} 50'$ N., the river bifurcates, near *Langat*, the residence of the Sultan and of the British Resident; and a second mouth is formed on the coast S.W. of *Parcelar Hill*, and named the *Jugru River*. Mr. Braddell was on this river in 1874, and says that following the river from bight to bight they found 3 and 4 fathoms wherever they went. Mr. Irving, speaking of the district says:—"It is a magnificent country, with a fine soil and great mineralogical resources. It is watered and opened up by fine navigable rivers, which run up within easy distance of the richest tin districts, situated in the watersheds of the *Salangore*, *Klang*, and *Langat Rivers*. It only wants security for life and property, and a few easily constructed roads, to make it burst out into exuberant life."*

* For further particulars, see a Paper in the *Journal of the Royal Geographical Society*, vol. xlvii, 1876, by W. Barrington D'Almeida, on "The Geography of *Perah* and *Salangore*."

The Strait of Colong, or *Callam*, is about 15 miles in length between the islands, and has sufficient depth for moderate ships. It is not much used now, the less so, as it is said that pirates have been found lurking in its creeks.

Mr. Logan says:—The strait is like a large river or canal. The islands between which it lies are merely flats, and formed of black mud, covered with mangrove thickets. In steaming through it you see nothing but a wall of thick mangroves on either side. Towards the northern extremity of the thickets one place of considerable extent was quite naked, and covered with flying foxes, which have settled here for many years. The strait is (or was) used by the local steamers in passing between Singapore, Malacca, and Penang.

The following are the old directions for those who would wish to follow it:—

To run in for Salangore and the Straits of Colong, after you have rounded the Sambilangs, steer away to the eastward E.S.E. or E. by S., and rise the low land, coming no nearer than 8 or 9 fathoms, but do not rise the beach from the deck. As you lose sight of the Sambilangs, you may see the hill of Salangore, or *False Parcelar*; steer in for it, keeping the above depth, you will soon after make the true hill, which appears like a grove of trees; when you come nearer you cannot mistake it, as it is the only hill near the water side. In observing these directions, you will not meet with the shoal of broken shells that lies to the N.W. of Salangore, and those which follow will enable you better to avoid it.

When you can just discern Salangore Hill from the deck, bearing S.E. by E. or S.E. by E. $\frac{1}{2}$ E., you will have 10 or 11 fathoms, green oaze, with small broken oyster-shells, at 5 or 6 miles from the nearest shore. The course along shore is about S.S.E. 14 or 15 miles. The soundings on the shoal are from 6 to $3\frac{1}{2}$, 5, 4, and $6\frac{1}{4}$ fathoms, with overfalls of 1, 2, and 3 fathoms at a cast: as you deepen you will have soft ground, and the contrary as you are shoaling. When you have sailed the above mentioned distance, allowing for the tides, Parcelar true Hill will be seen from the deck bearing S.S.E. $\frac{1}{2}$ E., distance from the nearest shore 7 or 8 miles, in 14 or 15 fathoms, soft ground.

When you see the False Hill bearing S.E. by E. or S.E. by E. $\frac{1}{4}$ E. from the deck, steer off shore to the southward, until you lose sight of the white sandy beach from the taffarel; then steer to the S.E. along shore, taking care not to raise the white beach, and that will carry you clear without the shoal, in soundings not less than 8 or 9 fathoms. When you have run the above mentioned distance to the S.S.E., you may then with safety raise the beach, or borrow on the shore; but come not under 8 or 7 fathoms, soft ground, as it shoals very fast from that depth until you are past Tanjong Awat.

But to resume our instructions for sailing into Salangore. After you have seen the low land beyond Tanjong Awat, you may be guided by the lead, giving that point a berth of a mile, or $1\frac{1}{2}$ mile, to avoid the shoal which stretches from it. To run into Salangore Road, you keep the hill a little open to the southward, and anchor a little to the northward of it, in 4 or $3\frac{1}{2}$ fathoms, soft mud, as there is a shoal to the southward projecting $1\frac{1}{2}$ mile.

Going to the Straits of Colong, steer for Pulo Anzas, and to the eastward of them you will then see the entrance, or North mouth of the straits. The Pulo Anzas are bold-to, but the islands, which are on the eastern side of the channel, are the reverse. Off the southern or outermost island, Pulo Tekolo, lies a dangerous rock, bearing from it S.W. $\frac{1}{2}$ S. a mile distant, and with 5 fathoms close to it. On the S.W. of the channel there is a sand-bank, but on the other side it is mud. When you are past the above islands, approach nearer the sand-bank than when you leave hard soundings; on the opposite part stand on at pleasure.

A little to the northward of the North entrance of the straits lies a shoal, to avoid which, as well as to keep in the best channel, you are to keep the Middle Botel Island in one with Salangore Hill, observing not to open the hill to the eastward; another leading mark is to keep Parcelar Hill on the West point about its own breadth. After passing this shoal you may be guided by the lead on this side, keeping in from 5 to 9 fathoms. There is also another shoal in a line of direction from Mud and Goose Islands to the West point, but of no great extent.

In working up the first reach there is no danger, having good water from side to side, which at the upper end of the reach is very deep, with irregular soundings from 12 to 22 fathoms. The opening that is on the port hand at the bottom of this reach is the River Colong or Klang; opposite to which is Deep-water Point, the South point on the starboard hand, of the first reach.

The second is Bar Reach, which is clear while abreast of a creek on the port side, opposite to which is the shoalest part of the bar; before you come up to this creek, you meet with another, which it is necessary to avoid, as there is an indraught. It will be best to anchor about a cable's length, in 6 fathoms, before you cross the bar, as it shifts very much, and of course it is requisite to sound. On our sounding we found 3 fathoms at low water the greatest depth, which is a little more than a third over from the S.E. side: you will carry 3 fathoms about twice the ship's length after being over. A good leading mark is some low land just open with the first point; you may stand till it is two sails' breadths open, and close it on the other shore; but the best and safest mark for crossing the bar is to bring Deep-water Point to bear N.E. $\frac{1}{2}$ E.; you may also be guided by the lead, which cannot be done on the opposite side, being a bank steep to that extends along and across

about one-third over to the western point of the Third Reach, and from thence up to the northern extremity of a creek, in that reach, your soundings are from 3 to 9 or 10 fathoms.

The bar is narrow, and begins at the entrance of the first creek, on the S.E. shore, having the least water about half a cable's length to the S.W. ; you then deepen it from 3 to 5 fathoms gradually, and will be abreast of the second creek.* From this you carry not less than $5\frac{1}{2}$ fathoms, about a large cable's length from the port shore. Keep nearly that distance till you pass Point Anna Grabs (so called from a small ship wrecked here), as it is shoal on the starboard side, hard ground, with overfalls. Indeed, you must avoid for the same reason, the starboard shore, until you are beyond the second opening to the sea.

The tide flows about 9 ft. in the springs.

PARCELAR HILL, or Bukit Jugru, a great leading mark, stands in lat. $2^{\circ} 50' N.$, long. $101^{\circ} 26' 10'' E.$, $26\frac{1}{2}$ miles E. $7^{\circ} S.$ from the lighthouse on the One-fathom Bank, and 10 miles eastward from the southern entrance of the Colong Strait. It is 890 ft. high, of oblong form, sloping at each end when viewed from the westward, with the summit a little to the westward of its centre ; but of a regular pyramidal form when seen from the southward or S.S.E., with very gentle declivities in each direction. It is darker in appearance than the neighbouring hills. In front of it, to the S.W., is the Jugru mouth of the Langat River, before mentioned.

The **NORTH SANDS**, which lie off the Malay coast between Salangore and Parcelar Hill, are extensive and dangerous. Their north-western edge is steep, and drops from 5 fathoms to 15 or 30 fathoms in 3 or 4 miles. They have been surveyed by Captain Ross, and his chart shows them as several parallel ridges of sand, trending from N.W. and N.N.W. to S.E. and S.S.E., with deeper water, from 8 to 14 fathoms, between them. The north-western edge of their most dangerous part lies $21\frac{1}{2}$ miles W.S.W. from Salangore. These patches have from 4 to 18 ft. water, with 7 to 10 fathoms on either side. They extend south-eastward for 18 miles, leaving a channel, 3 miles in width, between their extremity and the shoal which extends from Pulo Colong, and which has from 5 to 14 fathoms of water. The chart is the best guide for their position and character, and the various patches need not be enumerated, as it is difficult or impossible to give clearing marks for them.

* After you pass the bar, Captain Elmore advises to "steer direct for the South point of the Sea Reach, until the North point of that reach bears West by North, to avoid the wreck of a large Portuguese ship, which bears West from that point, and lies on the eastern shore, between Anna Grab Point and the bar ; when these bearings are on, and you are 2 cables' lengths off shore, it is best to keep the eastern shore on board, to prevent the flood tide from horsing you through the opening to seaward (which I call Sea Reach), where there is no passage, being entirely choked with sand banks, dry at half ebb."

The **Blenheim Shoal** is one of the most dangerous of these shoals, and lies on their western edge. It nearly occasioned the wreck of H.M.S. *Blenheim*, when it was first discovered. It bears from One-fathom Bank light N. 15° W. 11 miles, and from Parcelar Hill W. 23° N. 31½ miles; Salangore Hill bears from it N. 56° E.; and another hill to the S.E. of it N. 66° E., lat. 3° 3' N., long. 100° 56' 15" E. It has only 6 ft. least water, and there are several dangerous patches to the East and N.E. from it. It is cleared so long as Parcelar Hill does not bear northward of E.S.E.

It is high water at the N.W. head of the North Sands, on full and change, at 6^h 30^m. Springs rise 12 ft., neaps 12½ ft.

When the Round Arroa (presently described) is seen from the mast-head (being 31 miles off), bearing S.S.W. to S.S.W. ½ W., you are on the N.W. edge of these sands, and will pass over spits of 8 and 10 fathoms. As these spits, which form the N.W. part of the North Sands, have 9 to 12 fathoms on their outer edges, it is advisable, when bound to the southward in contrary winds, to keep near the western edges of the sands in working, making short tacks to the westward, and standing in to 10 or 11 fathoms, in a large ship, or to 8 and 9 fathoms in a small one. By this means moderate depths will be found for anchoring during the ebb, with the tides more regular and more favourable than further out in deep water. For here, during S.E. winds, a current is often found to set W.N.W. and westward when tides are prevailing along the edge of the sands. The strength of the ebb generally sets between N.W. and N.W. by N. 2½ miles an hour, the flood in the opposite direction, about S.E. ½ S., standing a little on the western edges of the sands, or running nearly parallel with them, but it is not so strong as the ebb.

The **ONE-FATHOM BANK**, which forms the S.W. part of the North Sands, and is also on the North side of the channel between the North and South Sands, was considered as the most dangerous shoal of the vicinity. According to Lieut. Ward's survey, it is about 1½ mile N.N.E. to S.S.W., and 1 mile broad E.N.E. and W.S.W. It has 6 ft. least water. By keeping Parcelar Hill E. ¼ S., the North end will be cleared, and E. ¼ S. the southern edge will be passed safely.

The **Lighthouse**, on screw iron piles, is painted in stripes of red and slate-colour. It is placed on the centre of the bank, in 15 ft. water, half a mile S. by E. of the position occupied by the lightvessel previous to May, 1874, when a *revolving bright light*, attaining its greatest brilliancy every minute, was first exhibited from the lighthouse. It is shown at 61 ft. above the sea level, and visible 13 miles off. Its position is in lat. 2° 52' 8" N., long. 100° 59' 2" E.

A *red buoy* marks the North end of the bank. It lies in 14 ft. water, at 1½ mile N.W. from the lighthouse.

There is a safe channel between the One-Fathom Bank and the Blenheim Shoal, but there is a small 21-foot bank midway between them, with 7 to 16 fathoms around it. It lies $6\frac{1}{2}$ miles N. by W. $\frac{1}{4}$ W. from One-Fathom Bank lighthouse; and a second bank of similar depths lies 2 miles S.E. of it, and 4 miles N. $\frac{1}{2}$ E. of the lighthouse. Parcelar Hill bearing E. by S. $\frac{1}{4}$ S., nearly, is the best course to pass between these banks and the One Fathom Bank. This channel has not been used by large ships, as the tides run in strong eddies over the sands during spring tides. A better course is to steer so as to pass southward of the lighthouse.

The **ARROA ISLANDS** form the western side of the main channel of the Strait of Malacca past the North Sands. They are a group of small islets and rocks on an extensive shoal which lies in the middle of the strait. The northernmost of the cluster is the *North Rock*, in lat. $2^{\circ} 55' 20''$ N., long. $100^{\circ} 36' 5''$ E. It is of considerable height above the water, with regular soundings very near the rocks that front it of 8 and 9 fathoms mud.

East Rock, or *Batu Mandi*, is a flat black rock, very little above the surface of the sea. It has deep water close on its eastern side. It lies somewhat off the mud bank, as it has a deep channel of 17 fathoms three-quarters of a mile wide to the West of it, between it and a line of *sunken rocks*, covered at half flood, on which the sea breaks at times.

The *High Rock*, or *Batu Balia*, lies 2 miles West from the sunken reef just mentioned. It is surrounded by other rocks, and there are 9 fathoms in the space between, with 7 to 10 fathoms in the channel West of it.

Pulo Jummur, the *Great* or *Long Arroa*, is the largest of the group. It consists of two islands nearly joined, is covered with trees, flat, and is nearly 3 miles S.W. by S. from the North rock. It is nearly a mile long, and the shores appear to be lined with rocks, and a *reef* extends to the N.E. from it for about three-quarters of a mile. The Malay fishermen come here for fish and turtle. Boats landing should therefore be on their guard. Water can be got in a cove with a good sandy beach, on the East side of the South isle. Several springs of good water fall into the deep valley. The *Western Arroa* is a group of islets and rocks lying about a mile to the westward of the Long Arroa, and on the same rocky bank.

The *Round Arroa*, or *Pulo Tukong Simbang*, the chief mark for the channel to the eastward, is very small, high, round, and has a tuft of trees on each side of it. It may be seen 18 miles off. It has several rocky islets near it, two of which are visible 12 miles off; one of these lies to the northward, the other to the southward, with straggling rocks around. The *South Rock*, or *Pulo Tukong*, the southernmost islet or rock, above water, is $1\frac{1}{2}$ mile S.S.W. from the Round Arroa.

The Arroa Islands should not be approached by night, as there is now no necessity for it, since the light on the opposite side of the channel is

established. The currents and ebb tides set very strongly here, and might horse you among them. Should a vessel be working near them against a heavy N.W. swell, there is shelter from N.W. or westerly winds by anchoring under the Long Arroa, guarding against the reef which projects a mile to E.N.E. from its North end.

In sailing down the Malacca Strait from the northward, and having got in mid-channel between Pulo Jarra and the South Sambalang, keeping to the eastward to guard against the easterly tendency of the current, steer about S.S.E. or S. 20° E. to keep well to N.E. of the Arroas, but not too far on the North Sands. Excepting a shingly spot of 13 fathoms in lat. 3° 20' N., bearing South from the Sambilangs, the soundings are tolerably regular on this track generally between 34 and 40 fathoms in the direct line. Should the winds hang to the eastward or E.S.E., keep in with the Malay coast in from 20 to 30 fathoms, until 8 or 10 leagues past the Sambilangs; then steer more southerly to get soundings of 16 to 18 fathoms on the N.W. face of the North Sands, which may be rounded close, provided you do not come into less than 14 or 16 fathoms, and then either the Arroa Islands or the light-vessel, or Parcelar Hill, will come in view, and will be a further guide.

The **SOUTH SANDS**, like those forming the North Sands, are a series of parallel spits which run E.S.E. and W.N.W., or more southerly in the same direction as the Malay coast, and 13 or 14 miles distant from it. The main channel on the North side of them having that breadth, and a depth of from 20 to 40 fathoms (with some exceptions), extends for 60 miles from the One-Fathom Bank Light to Cape Rachado. The South Sands vary in width from 2 to 6 miles. The *northernmost* dangerous patch, with 16 ft. water, is 10 $\frac{3}{4}$ miles S. by E. $\frac{1}{2}$ E. from the lightvessel, and the south-easternmost is a small patch of hard sand, named on the chart the *Pyramid*, with 6 ft. least water. From it Cape Rachado appears like an island, bearing E. $\frac{1}{2}$ S., and from 5 to 9 miles further S.S.E. are several patches of 15 to 4 fathoms. These eastern patches are the most dangerous part of the shoal of Malacca, and require all caution. On the North side of the channel is the *Bambek Shoal, awash*, which is 21 miles from Parcelar Hill, and 14 miles from Cape Rachado.

The space between the Sumatran shore and the South Sands is full of shoals and dangers, and should never be attempted.

It is high water at full and change at the One-Fathom Bank at 6 o'clock. Springs rise 15 ft., and neaps 12 ft. The tide runs strongly at springs, and then there are eddies on the spit which projects from the One-Fathom Bank. Between the sand heads the strength of the ebb runs nearly N.W., but the commencement and end of it run very irregularly. The flood is more regular in its direction, and runs with less velocity. The light is found to be most useful in these strong tide ways, when, if the land

be not visible, the navigation would be as formerly, very embarrassing.*

The CHANNEL between the North and South Sands, which has been known by the name of the *East and West Channel*,—a term probably derived from the fact that the leading marks through it lay East and West of each other. It is about 10 miles wide between the northernmost danger of the South Sands and the lighthouse; and there is a 21-foot patch at $7\frac{1}{2}$ miles S.W. by W. from the lighthouse, which requires caution.

In passing through this East and West Channel, having passed the Round Arroa and brought it to bear W.S.W., there is no danger from the North Sands, so long as it can be seen from the deck. Then steer an easterly course away from it bearing W. $\frac{3}{4}$ S. When the Round Arroa sinks out of sight, the lighthouse will come in view, as will also Parcelar Hill, bearing about East. Bring the latter to bear about E. $\frac{1}{4}$ N., and you will pass safely to the South of the One-Fathom Bank. A course with Parcelar Hill bearing E. $\frac{1}{2}$ S. will clear the bank. Having passed this, the channel within the South Sands is open to the south-eastward. Parcelar Hill may at times be obscured by clouds, when the low land at the entrance of the Strait of Colong may be seen. If this piece of low land be kept N.E. by E. $\frac{1}{2}$ E., or its East end be brought to E.N.E., you will clear the banks in coming from the eastward. This low land comes in sight when abreast of the One-Fathom Bank, and from aloft the tops of the trees may be seen as far as Parcelar Hill.

* Several wrecks having taken place on the South Sands, the following extracts from remarks by Mr. G. J. Maddock (pilot) will prove useful;—"I will now endeavour to give an account of the chief cause of ships being lost on the South Sands. First, with respect to the loss of the *John Curry*, Captain Tucker, in January, 1854. From the wreck, Parcelar Hill bore N.E. by N.; when conversing with Captain Tucker, and informing him that the current and tide out of Calam Strait had been the cause of the loss of his ship, he acknowledged that such must have been the case from the set which he noticed after the ship had struck. About two months afterwards, a large Dutch Indiaman, the *Menado*, got on shore under similar circumstances in the night, and, strange to say, within a cable's length of the spot where the *John Curry* was lost. I also met the captain of the *Menado* in Singapore, and he acknowledged that my version of his loss was correct, as he could not account for it in any other way. Some time afterwards, strange to relate, one of H.M. ships, the *Andromeda*, came to grief in the same locality. In passing up and down the straits some time before, I noticed this set of the tide, or perhaps rather an under current, and always kept correct bearings of the Parcelar, and on a dirty night or when dark, was invariably able to pick out an anchorage in 7 to 10 fathoms; but these observations are nearly useless now, for there is a light on the One-Fathom Bank (North Sands), and if the Government place a second light on the South Sand Head, the principal dangers can be easily avoided. There are nights, however, when all these advantages will be found useless—at short intervals during the north-westers and Sumatras."

The Malay Coast about Parcelar Hill forms a slight bay, instead of a convexity, as was shown on the old charts, an error which led to some disaster. This bay, at the head of which the southern mouth of the Langat River is situated, is filled with a shallow bank, and at about 9 miles southward from the hill is a slight projection named *Parcelar Point*, not easily distinguished on the *low land of Parcelar* of the old charts. It continues low and woody to the E.S.E. for 15 miles, to the N.W. limit of a bight, of which *Tanjong Kamuning*, 7 miles farther on, is the S.E. point. Above the head of this bay is the *South Hummock*, 973 ft. in height, and further inland are seen some other high lands towering above the trees on the coast. This bay is filled with shoals, and a line of detached shoals lies off its mouth. These shoals are formed by the debris brought down by the River Lukut, which enters the head of the bay in lat. $3^{\circ} 35' N$. A few miles up the river, on its left bank, is the town of Lukut.

The *Bambek Shoal* lies midway between *Parcelar Point* and *Cape Rachada*, on the line joining their extremities, and 3 miles off the N.W. point of the bay just mentioned. This shoal was much dreaded by the early navigators, and several ships were lost on it. It is rocky, and nearly awash in the centre, and has several heads of $2\frac{1}{2}$ to 3 fathoms over a space of $2\frac{1}{2}$ miles E.S.E. and W.N.W., dropping to 7 and 8 fathoms at each end, and having 10, 12, and 15 fathoms close outside it, so that the lead by night does not afford a very safe guide on approaching it. The dangerous *Pyramid Shoal*, the south-easternmost of the *South Sands*, is also difficult to avoid by the lead, as the soundings are deep close up to it, the depth of the strait being very irregular throughout its breadth. This danger is not lessened by the strength and irregularity of the tides, which set in various directions among the channels between the *South Sands*. The ground is all oaze, except about the middle of the channel.

The shoal which runs north-westward from *Tanjong Kamuning* is $2^{\circ} 32' N$. above mentioned, has an opening through it abreast of that cape, upwards of a mile and a half in width, and the shoal continues in a direction parallel with the coast as far as *Cape Rachada*, 8 miles to the south-eastward, and at from a mile to $1\frac{1}{2}$ mile from it, leaving a channel inside it, having a depth of from 6 to 12 fathoms. A small island, *Arrang-Arrang*, lies to the S.E. of *Tanjong Kamuning*.

CAPE RACHADA, or *Tanjong Tuan*, derived its Portuguese name from its rugged, cleft character. It is 28 miles S.E. by E. from the point abreast the *Parcelar Hill*, and comes in sight just after passing that point. It is perpendicular toward the sea, and is something like *Mount Dilly* on the *Malabar coast*, but not so lofty.

It projects to seaward in a long narrow point of land, which forms a deep bay on each side of it, with a small rock or islet near its extremity. When first seen coming from the northward it makes like an island, for the neck

of land which joins it to the main is much lower than the cape itself. There are two wells of fresh water under the cape.

The **LIGHTHOUSE** on Cape Rachada, completed in 1863, is a circular white stone tower, 78 ft. in height to the top of the lantern, in lat. $2^{\circ} 24' 30''$ N., long. $101^{\circ} 51' 10''$ E. It shows a brilliant fixed light over half the horizon, or when bearing from S.E. by E. round eastward and northward to N.W. by W. The light is elevated 446 ft., and may be seen 25 miles off.

The tides are very strong off Cape Rachada, and pass it in noisy rippings, especially at springs, the flood to southward, and ebb to northward. This is the narrowest part of the Malacca Strait, the opposite point of Sumatra, Ujong Bantam being only 21 miles from it.

In sailing down this portion of the strait, do not pass within a line joining Parcelar Point and Cape Rachada, nor bring Parcelar Point, the South extreme of the land to northward, to the southward of S. 60° E. to keep clear of the shore bank, giving Parcelar Point a berth of 3 or 4 miles in passing it. When Cape Rachada or the light is seen, keep to the eastward of S.E. by E. $\frac{1}{4}$ E. to keep clear of the Bambek Shoal. Cape Rachada brought to bear E.S.E. is a fair mid-channel bearing throughout, standing off to the southward to E. by S. $\frac{1}{2}$ S. It would be dangerous to exceed these bearings when the cape appears as an island. When approached within 10 or 12 miles the low neck comes in view, and the channel then becomes wider, and the boards may be continued further to the southward. Cape Rachada light kept in sight clears Bambek Shoal in the night time.

Lingey River.—The coast continues somewhat to the North of East from Cape Rachada for 5 miles, and then turns to E.S.E. for 3 miles more to the mouth of the *Lingin* or *Lingey River*, a large stream visited for tin, and tutenague, the white metal alloy used by the Chinese to imitate silver. This river is the boundary between the native state Sunghy Ujong and the British state of Malacca. Off the point to the South of this river are some small detached rocks, and the whole of the coast to the N.W. is skirted by a shoal bank and straggling rocks. A buoy marks the eastern side of the *Battoo Mandi*, a small shoal, which lies $1\frac{1}{2}$ mile S.W. by S. from the southern entrance point of the river. E.S.E. of the buoy lies the Battoo Tinga Rocks, at half a mile from the shore. At 10 miles from the mouth of the *Lingin* is the *Diana Rock*, a large rock always above water, and $1\frac{1}{2}$ mile from the shore, with 15 to 19 fathoms irregular bottom close outside it.

Tangong Kling is 22 miles S.E. by E. from Cape Rachada, and may be known by two or three trees on its extremity, more elevated than the others near the sea. The shore hereabout should not be made too free with in the night, as the soundings are deep and irregular, affording but little guide.

On the opposite side of the strait is the *Quin Shoal*, discovered by Admiral

Quin, in H.M.S. *Raleigh*. It has $3\frac{1}{2}$ to 4 fathoms on it, and is about $1\frac{1}{2}$ mile long from N.N.W. to S.S.E. It bears from Cape Rachada S. $\frac{3}{4}$ E. $17\frac{1}{2}$ miles. Mount Ophir peak bore from it E.N.E., the North end of Pulo Roupat, Ujong Bantam, on the Sumatra side, West, and the South end of Pulo Roupat S.S.W. $\frac{3}{4}$ W.

MALACCA (or Málaka), the capital of the British Province to which it gives its name, stands on both sides of a small stream, at 27 miles from Cape Rachada, and 5 miles from Tanjong Kling.

Malacca was occupied by the Portuguese in 1511, and in 1641 was taken from them by the Dutch, who surrendered it to the British in 1795. It was occupied by us till 1818, when it was restored to the Netherlands Government, by whom it was again surrendered to us in exchange for Bencoolen in 1825. In 1826 it was incorporated with Singapore.

The State of Malacca extends from the River Lingey, on the N.W., to the Cassang, on the S.E., having a coast line of about 40 miles in length, with a mean breadth of 25 miles, which includes the interior territory of *Nanning* or *Naning*, so that it has an area of about 1,000 square miles. In 1865 the state had a total population of 71,600, chiefly Malays. At the census in 1871 the Malays numbered 57,474, the Chinese 30,456. The trade has been considerably reduced since Singapore has risen into pre-eminence, but tin and gold are still sent to that emporium in large quantities. In 1871, imports were valued at £503,326, and exports at £526,428. It has no direct trade with the United Kingdom. In 1875, 651 vessels, of 101,476 tons, entered the port.

Malacca derives its name, according to Malay history, from the Malacca tree (*Phyllanthus Emblica*), and was founded in the thirteenth century.

The town of Malacca is divided by a small river into two parts, connected by bridges, one of which was given by a munificent native merchant. On the left or southern bank rises the verdant hill of St. Paul, surrounded by vestiges of the ancient Portuguese fort. Around its base lie the barracks, lines, and most of the houses of the military; the stadthouse, courthouse, gaol, church, civil and military hospitals, the site of the old inquisition, convent, the police-office, school, post-office, and the master-attendant's office. On its summit stand the ruins of the ancient church of Our Lady del Monte, erected by Albuquerque, the Portuguese conqueror of Malacca, and the scene of the labours and supposed miracles of that apostle of the East, St. Francis Xavier; also the lighthouse and flagstaff. A little to the South rises the hill of St. John's, and in the rear that of St. Francis. On these eminences are still the remains of batteries erected by the Portuguese and Dutch, commanding the eastern and southern entrances to the town. Smaller knolls intervene, covered with the extensive cemeteries of the Chinese.

The view of Malacca from the roads is extremely picturesque. It has the appearance of being situated in the bend of a crescent or bay; the southern

horn of which is formed by a chain of beautiful islets, called by the Portuguese the Aguadas, or Water Isles, stretching out seawards from the coast. On the South side, the shore trends to the West, terminating in an elevated and well wooded point called Tanjong Kling. A few other islets stud the shore. The first objects that strike the eye are a cluster of trees crowning the summit of St. Francis, the Star fort on St. John's to the South, the lighthouse and ruinous church on St. Paul's, and the white edifices that skirt its base, stretching along the sea shore, and gradually lost in the thick groves of cocoa-nut trees that cover the dwellings of the Portuguese, Chinese, and Malays, in the suburbs of Bauder Ilir, and Ujong Passir. In the back ground of this pleasing view rise the hills of Bukit Bertam, Bruang, Panchur, &c. To the North, in the distance from the mountains of Rumbawe and Srimenanti, and far away to the East, the triple peak of Ophir, celebrated for its gold, shoots into the sky with softened outline.—(*Lieut. T. J. Newbold*, vol. i., pp. 109—111.)

The Lighthouse is a turret on St. Paul's Hill, as above stated, and is in lat. $2^{\circ} 11' 15''$ N., long, $102^{\circ} 15' 30''$ E. It shows a bright fixed light, elevated 146 ft., seen 12 miles off. When seen to the northward of N. by W. $\frac{3}{4}$ W. it will lead clear of the Water Islands.

A red light is also shown on the pier-head at Malacca, visible 6 miles off in clear weather.

The roadstead of Malacca is perfectly safe. It is neither visited by the hurricanes of higher latitudes, nor within the influence of the monsoons; as was said in the sixteenth century, "it is the beginning of one monsoon and the end of another.

The Road is limited to the North by *Fisher Island*, a small islet known formerly as Pea or Woody Island, surrounded by a shoal and foul ground, which joins with the shore. This is nearly 3 miles westward from the entrance of the river. It ought not to be approached within 9 or 10 fathoms, which is near to the edge of the shoal. With the extremes of the island bearing from N. by W. to N.N.W. and the body of it N. by W. $\frac{1}{2}$ W. half a mile distant, there is a small circular shoal, having only 18 ft. on it at low water. Near to the city is *Pulo Java*, or Red Island, on the edge of the shoal water. To the S.E. of this is *Pulo Panjang*, a rocky reef or flat, projecting $1\frac{1}{2}$ mile from the shore, and extending along it to Pulo Java. The church and flagstaff on the hill bear N. $\frac{1}{2}$ E. from the West end of Panjang Reef $1\frac{1}{2}$ mile distant, and from its East end N.N.W. $\frac{1}{4}$ W. $3\frac{1}{2}$ miles distant. There is a depth of 18 or 19 fathoms within 2 cables' lengths of its southern edge, similar to that in the offing, therefore the lead is no guide to clear it. From 20 fathoms in the offing the depths decrease regularly over a bottom of soft mud towards the road, where the best anchorage is under 10 fathoms, with the church on the hill N.E. by E., Fisher Island N.W. $\frac{1}{2}$ W., and the tuft of trees East, the town $1\frac{1}{2}$ or 2 miles distant. When the depth exceeds

10 fathoms, the bottom is generally a stiff tenaceous clay, which holds the anchors very firmly; under that depth it is generally of soft mud.

There is no danger going into Malacca Road; if you are in the offing, in 20 or 23 fathoms, you shoalen your water gradually to 7 fathoms, as you run in for the road. A large ship should not go into less than $7\frac{1}{2}$ fathoms; for it shoalens suddenly from 7 to 5 and 4 fathoms. And they should be still more careful not to go too far to the southward, or to the S.E. part of the bay, for there the ground is foul and rocky, and shoalens suddenly from 8 to 3 fathoms. Off Fisher's Island there is no danger; and it is found that a ship, upon occasion, might go within half a mile of it, in 16 fathoms water, or have 10 fathoms within a quarter of a mile, and 20 fathoms within 1 mile of it. You may anchor in Malacca Road from 13 to $7\frac{1}{2}$ fathoms, oazy ground, Malacca church on the N.W. part of Mount Moar, E. $27^{\circ} 30'$ N.; the S.W. part of Fisher's Island W. $36^{\circ} 15'$ N.; and the outermost of the Four Brothers, or Water Islands, E. $50^{\circ} 20'$ S.; distance from Malacca $1\frac{1}{2}$ mile. The flagstaff bearing N.E. or N.E. by E.; Fisher's Island N.W. by W.; and the outermost Water Island S.E. $\frac{1}{2}$ S.; you have 8 fathoms. The flagstaff N.E. $\frac{1}{2}$ N., and Fisher's Island N.W. by W., you are in 10 fathoms. The flagstaff N.E., and Fisher's Island N.N.W. $\frac{1}{2}$ W., you have 14 fathoms, all good anchoring ground.

Ships should not anchor on the East side of the road, near Red Island, for the bottom is foul and rocky, the depth suddenly decreasing from 8 to 3 fathoms, on the North end of Panjang Reef.

During the period of the S.W. monsoon, sudden hard squalls frequently blow into the road from the Sumatra side in the night, accompanied with much thunder, lightning, and rain. It is high water full and change at $7\frac{1}{2}$ hours; springs rise 11 ft., neaps $8\frac{1}{2}$ ft. The rate is about 2 knots. The ebb and flood tides continue to run for 2 hours after high and low water by the shore, and boats cannot enter the river after half ebb. The proceed into the river soon after quarter flood, steering for the church on the hill, keeping it rather on the starboard bow; and when the bar is approached, the channel may be discovered by the stakes in the entrance.

Malacca stands on low ground, but within, the country rises into undulating hills, moderately elevated, among which is that called *Bukit Barong*, 4 miles inland, in a N.E. direction.

Mount Ophir, or *Gunong Ledang*, may be better distinguished than the rest, as it is much higher, 3,840 ft., and lies 24 miles to E.N.E.

The **WATER ISLANDS**, or **Four Brothers**, are a cluster of four small islands and one larger, lying 6 miles south-eastward from Malacca. The outer ones are small round islands covered with trees, and the innermost, *Pulo Bessar*, has excellent fresh water on its eastern side, and thus gives its name to the group. This can be procured at all times, but near low water, when the shore reefs are dry.

The outermost island, *Pulo Undan*, is $1\frac{1}{4}$ mile South of the next, *Pulo Nanka*, and this half a mile South of the third, which has a channel above a mile wide between it and *Pulo Bessar*, but nearly in mid-channel there is a sunken rock. This channel may be used by ships if pressed, by carefully avoiding this rock. This may be passed in 10 to 12 fathoms water, by keeping close to the middle Brother, or to the South end of *Bessar*, for the rock is nearly a mile from the S.E. end of the latter, and one-third of a mile from the middle Brother. Coming from the eastward, keep the South end of *Bessar* N.W. until the southernmost Brother is shut in with the two others.

The *Rob Roy Bank*, so named from a ship which grounded on it during the survey, a very dangerous 6-foot shoal, $3\frac{1}{2}$ miles in extent, lies on the Sumatran side of the channel, opposite the Water Islands and Malacca, from which it is distant 20 miles in a S.W. direction. It is therefore much best to keep in with the Malay shore hereabout, and not to stand off more than 10 or 12 miles, guarding against the uncertain set of the tides. The depth rather increases towards the *Rob Roy Shoal*, which is steep on its northern face.

The coast south-eastward from the Water Islands is low and clean, covered with trees, and intersected by several rivers, the most noticeable of which is the *Sung-ei Moar*, or *Kassang*, 20 miles from Malacca. It is the S.E. boundary of the state. *Bakit Moar*, or *Mora*, an isolated hill covered with trees, lies 9 miles to the S.E. of the river, and is just visible from Malacca Road. The coast, which slightly recedes, is skirted by an extensive shoal, and therefore must be avoided. *Tanjong Tor*, a low level point, is about E.S.E. 33 miles from Malacca, and here the shore bank appears to be much narrower, a moderate depth being found close to the point, while the edge of the bank N.W. and S.E. of it trends in a straight direction, the land recedes into slender bays on each side.

Mount Formosa, or *Gunong Batu Pahat*, is more distinguishable than *Mount Moar*. It is the highest summit, 1,480 ft., of a long ridge of undulating hills near the shore, which are seen to extend inland to the N.E. Its S.W. slope forms a bluff point, *Tanjong Seginting*, on the western side of which is the entrance of the *Sung-hei Batu Pahat*, or *Formosa River*. A small island, *Pulo Sheilo*, lies off the pitch of the cape.

The strait opposite this part becomes more embarrassed with shoals, long narrow spits trending in a N.W. and S.E. direction, some of which are 30 or 40 miles long within the 10-fathoms line. On the Malay side of the strait the more dangerous are not more than 4 or 5 miles off shore, but on the Sumatran side they reach to 18 and 25 miles off. The *Hannah* or *Formosa Shoal* is the most formidable on the northern side. It lies off the foot of *Mount Formosa*, extending thence 7 or 8 miles, and having only 12 ft. water on its shoalest spots. Its S.E. end is $2\frac{1}{2}$ miles from the point of *Mount*

Formosa, and its N.W. end is 5 miles from the adjacent shore. There is a channel between the shoal and the shore, but there are some dangerous spots of 18 ft. in it, one of which is about 2 miles due West of Pulo Sheilo, the islet off the Mount Formosa Cape.

The main channel of the strait abreast of the Hannah Shoal is about 10 miles in width; beyond that distance there are the dangerous patches of the S.W. banks, which have nevertheless deep water channels between the spits. The southern edge of the Hannah Bank and the northern face of the Sumatran Banks are steep-to, but if the lead is very carefully and briskly used, it will indicate their proximity. A long and narrow bank runs along this fairway channel with depths varying from 5 to 12 fathoms, having depths of from 15 to 25 fathoms on either side. All over the eastern and middle parts of it you have soft clay with 8 to 12 fathoms; towards the East end it becomes harder and shoals to 5 and 7 fathoms. This bank was formerly known as the *Pisang* or *Fair Channel Bank*.

The coast south-eastward of Mount Formosa, for an extent of 40 miles, is low and wooded, with nothing remarkable except a small mound near the sea, *Batu Balu*, about 15 miles from Formosa. It is all fronted by mud banks from $2\frac{1}{2}$ to 6 miles in breadth, the edges of which are very steep. This feature is also found in all other banks of this part of the strait, caused probably by the strong currents, and is on that account a dangerous feature in its navigation. It is especially so near Pulo Pisang.

In sailing down the fairway channel from abreast of Mount Formosa at 7 miles distance to Pulo Pisang, the direct course should be S.E. by E.; the distance is between 9 and 10 leagues. Having doubled Formosa Bank, when the mount bears N.E. between 3 and 4 leagues, you will raise this island bearing E.S.E. $\frac{1}{2}$ S., or S.E. by E., you will then have soundings from 20 to 22 or 23 fathoms, oazy ground. In turning to windward on this course, the Pisang Bank is of the greatest service both for anchoring on during the ebb, and for the purpose of keeping on, either in the night or day, during the squalls, which are generally accompanied with rain; for by steering along its verge, on either side, you may run the whole length of the bank without fear or danger, and upon deepening off the end of it may steer for mid-channel, between the Carimons and Pulo Cocob. By keeping in 11 or 12 fathoms on either edge, if you deepen your water, you know which side to steer towards; whereas, by running along the top of the bank, if you deepen, it is uncertain on which side.

PULO PISANG or **Pesang** is a tolerably large and woody island, 200 ft. high, and a mile in diameter, which lies at 2 leagues distance from the main, and there is a channel between it and the main, in which there are not less than 4 fathoms water; on the West side of it lie three small islands, the largest of which sometimes affords good water, and boats may land there commodiously at high water, in a bay on the N.W. part; this island may be

seen in clear weather 9 or 10 leagues off; then it makes in three small hummocks, like boats turned bottom upward.

The Lighthouse constructing (1877) on Pulo Pisang is to show a light, visible between S.E. by E. $\frac{1}{2}$ E. through South and West to N.W. $\frac{1}{2}$ N.

It is high water at full and change at Pulo Pisang at 9 o'clock. The flood tide generally sets fairly through the channel from the Water Island to the Carimons at the head of the strait, and the ebb also, in the contrary direction; the rate about 2 miles at spring tides.

Pulo Pisang bears S.E. by E. 65 miles from the Water Islands, and when abreast of the outer island from 1 to 4 miles off, a S.E. by S. course will carry you about the same distance outside the Formosa Bank, if not drifted out of it by the tide.

When Mount Formosa is brought to bear about N.E., keep within 3 or at most 4 leagues of the Malay coast, to keep well clear of the middle bank on the Sumatra side, so as not to get to the southward of its N.W. end.

If the weather is clear, and Pulo Pisang be discerned, keep it between E. by S. $\frac{1}{2}$ S. and S.E. by E. $\frac{1}{2}$ E., until Mount Formosa is brought to bear North or N. by W. in working between the North side of the Middle Bank and the Malay coast. In passing the Formosa Bank in the night, if it is found that the ship has got too far to the southward so as to be southward of the Middle Bank keep along the southern side, or you may work against a contrary wind, in the channel between this and the next bank to the southward, the breadth of this channel being about $2\frac{1}{2}$ miles, with 16 to 19 fathoms water. But it should be remembered that these long narrow banks, as they get nearer to the Sumatra side, have less water on them, and therefore the most prudent course would be to cross the Middle Bank by some of the numerous channels between its shoaler parts, rather than risk being drifted to the southward into less water. This may be done when Pulo Pisang is brought to bear about N.E. by E., when a depth of $5\frac{1}{4}$ to 7 fathoms will be found on the ridge. Pulo Pisang may be brought to bear S.E. by E. when standing towards the edge of the bank which skirts the coast between it and Mount Formosa, excepting at about 5 miles to N.W. of that island, where it forms an elbow, and should not be approached too closely. When Mount Formosa is brought to bear N. by W., Pisang may occasionally be brought to bear E. $\frac{1}{2}$ S. or East in standing towards the Middle Bank. The channel is about 10 miles broad; during the night stand into 10 fathoms on the shore bank, and off to 18 or 20 fathoms. By day, when abreast of Mount Formosa, and Pulo Pisang is visible, bearing E.S.E. or S.E. by E. $\frac{3}{4}$ E., steer for it; either of these bearings will carry you in mid-channel. When near to the island, its western side and the two islets may be approached within half a mile, as they are bold close-to, with 13 to 15 fathoms within a cable's length of them. In standing off shore about 10 miles from the island you will be close to, or upon, the S.E. part of the middle bank, where

there will be $4\frac{1}{2}$ to $6\frac{1}{2}$ fathoms. In working past Pulo Pisang, tack about $1\frac{1}{2}$ or 2 miles from it in 14 to 17 fathoms, and do not stand off from it more than 3 leagues.

Pulo Cocob (or *Cocops*) is 12 miles S.E. from Pisang Peak. It is a long flat island close to the Malay coast, between which and the shore is a narrow boat channel. It is covered with trees, those at the N.W. end being mangrove bushes, and more like grass; and at the S.E. end they are tall, upright grown trees, like those on the adjoining coast. The island is 2 miles in length. At low water it is surrounded by a dry sand-bank, which extends off the N.W. extreme $1\frac{1}{2}$ mile. Vessels may approach it within three-quarters of a mile.

Tanjong Bolus, or *Buru*, or *Peie*, the southern extremity of the Malay Peninsula, may also be taken as the western limit of the Strait of Singapore. It is in lat. $1^{\circ} 17' 15''$ N., long. $103^{\circ} 27' 20''$ E., and is a low point of land, covered with tall trees, bearing from the South point of Pulo Cocob E.S.E. $5\frac{1}{2}$ miles. At low water it is fronted by a dry sand-bank, and shoal water extends 1 mile from the point, which is very steep. Vessels, therefore, should be careful not to approach too close.

The **CARIMON ISLANDS** form the southern side of the strait opposite Tanjong Bolus, and consist of a cluster of one large and several smaller islands and rocks.

Little Carimon extends furthest to the North. It is a high island, $2\frac{1}{2}$ miles in length N.N.W. and S.S.E., and 1 mile broad. It rises in two peaks, which are ill defined and difficult to distinguish, covered with thick wood. The North end bears from Tanjong Bolus S.W. $\frac{1}{2}$ W. 9 miles, the breadth of the strait, which is free from dangers (except the flat off Tanjong Bolus, before mentioned). The N.E. side of the Little Carimon having deep water close-to.

The **Brothers** are two small rocky islets $2\frac{1}{2}$ miles to the N.W. of the Little Carimon. They have deep water close to them; but at 400 yards to the W.N.W. of the eastern islet there is a *dangerous rock*, just awash at low water. South by East of the East Brother, and West of the North point of the Little Carimon, is another islet of singular appearance, called the *South Brother*; and S.W. $\frac{1}{2}$ S. of this is a rock above water, named the *White Rock*.

Great Carimon is a high island, separated from the Little Carimon by a narrow strait, and lying to the S.W. of it near its North end; it rises to two high peaks, 1,376 and 1,474 ft. high respectively, which are well defined and conspicuous objects, and may be seen 36 miles off. The lowest, or North peak, bearing S.E., clears the danger on the Long Middle Bank, before mentioned. To the westward of the island are several islets and rocks, both above and below the water, but which are entirely out of the track of ships.

The description of the *Strait of Singapore* will be given in a future section.

We now return to the northern entrance describing the Sumatran coast of the strait.

The **COAST of SUMATRA**, between Achin Head and Diamond Point, was surveyed by order of the East India Company, by Commander Fell, I.N., in 1851-8, and later by the Netherlands Government in the years 1872-4, and the N.E. coast of the island thence southward by Lieut. Jackson, I.N., in 1860. These excellent surveys, combined with the previous observations of Captains Moresby, Rose, and Ward, have given us a very perfect representation of the shores of this otherwise little known island.

This side of Sumatra may be described, generally, as a vast alluvial plain, but very little above the sea level, unbroken by any great bays or inlets; but formed at the narrowest part of the strait, of low islands. This great level expanse is 600 miles in length, and from 60 to 120 miles in breadth; an area more than half of the extent of Great Britain. It is intersected by numerous rivers, some of considerable magnitude, which, rising in the great mountain chain, lying nearer to its S.W. side, or the few lakes at their base, afford almost the only clear space for cultivation and the habitations of the people, which are all derived from one stock—the Malayan, but divided into several families or nations, some of which have made considerable progress in civilization, in the arts and agriculture, as well as writing, &c; others are of a very rude and wild class, those living in the mountainous portion of this vast island. Altogether they are estimated by Mr. Logan, the best writer on the subject, to amount to 898,650 souls.

The whole island, except the kingdom of Achin, is nominally under the Dutch Government; but very little power is, or can, be exercised by the few European or native representatives of that nation. The Sumatra shores of the Strait of Malacca belong to the kingdom of Achin, or Acheen, at the North end; the Batak nation, next to the south-eastward; then the Siak State, traversed by the finest river of Sumatra, bordering the narrowest and upper part of the strait.

Achin, or *Acheen*, the northernmost state, is of some interest, as the spot which the earliest English navigators visited in 1602. Its chief feature is the Golden Mount, or Ya Muria, rising 7,546 ft. in height to the S.E. of the capital town, and to be seen 92 miles off. The town in early times rose rapidly to eminence and great commerce; and when Dampier came here in 1688, it had 45,000 or 50,000 inhabitants, a number equal to the whole present population of the state. Its fall, subsequent to this, was equally rapid, and the sovereignty is now passing from the native rulers to the Dutch Government, who commenced the war on Achin in 1871. Previous to this, all the island, except Achin, was under Dutch Government, this

state being protected by the treaty of 1824 between England and Holland, by which treaty English rights in Sumatra were exchanged for Dutch possessions, in Malacca and in the Peninsula of India, with the proviso that Achin should remain unmolested. In 1871, however, when the Dutch Government gave up to us their possessions on the Guinea Coast of Africa, this part of the treaty was cancelled, and the Achin war began; the pretext for the war being the many acts of piracy committed by the Atchinese. Up to October, 1875, the Dutch had lost 5,144 men in this war. Achin is now very unimportant, and rice is one of its chief products. A portion of it is known as the *Coast of Pedir*, the produce of which is the areca nut and a little pepper.

Batak, the next nation to the S.E., the country of the Bataks or Battas, has been partially conquered and explored by the Dutch. It is singularly unlike most other parts of the Malayan Archipelago. A considerable portion of it consists of a dreary, treeless, and sterile plain. The people are more strange than their country. They have a knowledge of letters, but undoubtedly are cannibals. The Dutch authorities say that those under their sway are readily dissuaded from this dreadful crime. There is very little commerce.

Siak, the third division, is but little known. Its great river has been ascended for a considerable distance, and is navigable for vessels of considerable burden for 90 miles to the town of Siak, and for those of 200 tons for 100 miles, but it is almost closed by a sand bank.

The portions of these states unoccupied by man, or lying on the borders of the rivers, is one vast primeval forest, to clear and cultivate which is far beyond the powers or wants of its small and puny population. Its cultivated portion is the chief source of the sago of commerce; camphor and benzoin are also produced. Coffee cultivation has largely extended; besides these, there are other and minor objects of trade.

ACHIN HEAD, the N.W. point of Sumatra, and the islands and passages lying off it, have been described in our Indian Ocean Directory.

Pulo Brasse Lighthouse, 120 ft. high, on the N.W. point of the island, completed in 1875, is a white tower, with its upper part painted red. From it is shown a *revolving light*, elevated 525 ft., and visible 32 miles off to the northward and eastward between W. $\frac{2}{3}$ S. and S.E. $\frac{1}{2}$ E. An *auxiliary red light*, to indicate the shoals which lie to the N.W. of the lighthouse, is shown between N. by W. $\frac{1}{2}$ W. and W. by S. $\frac{1}{2}$ S. from the same tower, at an elevation of 430 ft., visible 8 miles off.

Eastward $1\frac{1}{2}$ mile from Pulo Brasse lighthouse is a projecting point, which shelters an anchorage in Lembalei Bay, to the southward of it. The best anchorage is in about 9 fathoms off the village of Ujong Poneng, S. by W. nearly half a mile from the extremity of the projecting point. There is also

anchorage in *Rots Bay*, a small bay, about a mile wide on the eastern side of Pulo Nancy. It has an islet, forming its South entrance point, in lat. $5^{\circ} 38' 5''$ N., long. $95^{\circ} 11' 25''$ E. At half a mile South of this islet is a stream of fresh water.

Achin Head, the North part of which forms the eastern side of the Surat Passage, is in lat. $5^{\circ} 34' 10''$ N., long. $95^{\circ} 15'$ E., is steep-to, and has a high cliff land on its North side. At three-quarters of a mile E. by S. from the eastern extreme of the head is *Pulo Tuan*, a small circular islet, surrounded by dangerous rocks, which also lie between the islet and the head. A mile E.S.E.-ward of Pulo Tuan, is a shallow inlet, which receives the waters of the *Maraksa River*. Achin or *Atjeh River* entrance, in $5^{\circ} 35' 35''$ N., $95^{\circ} 20' 45''$ E., bears from it E. by N. $\frac{1}{4}$ N. 6 miles; there is no flagstaff, or any conspicuous object, to point out the entrance of the river. The anchorage is in 9 or 10 fathoms, with the eastern extreme of Pulo Way bearing N. 20° E.; Achin Head, S. 69° W.; the shore between Achin Head and River may be approached to 5 or 6 fathoms.

Pulo Burroo, or *Malora*, N. 36° E., $6\frac{3}{4}$ miles from the entrance of Achin River, is a small rocky islet, with a tree on it. It is $2\frac{3}{4}$ miles off shore, with soundings of 13, 9, and 12 fathoms between it and the mainland, from which the eastern extreme of Pulo Way bears N. 5° W., the bluff entrance near Point Pedro S. 41° E.

In working along this part of the coast, attention ought to be paid to the tides, and be sure not to go out of soundings should the wind be light and unfavourable, as the soundings extend but a short distance outside Pulo Burroo. Three miles to the East of it there is no ground at 275 fathoms.

PULO WAY (*i.e.* Water Island), which forms the N.W. side of the Bengal Passage, is steep-to on all sides; the nearest part of it is distant from Pulo Burroo $5\frac{1}{2}$ miles. Off the South side there is a rock, situated a short distance from the shore, on which the sea breaks, and is dry at low water. On its S.E. side there is a deep bay, with 70 fathoms water at its entrance, and 25 fathoms close to the sandy beach at the head of it.

Point Pedro, in lat. $5^{\circ} 39' 10''$ N., long. $95^{\circ} 27'$ E., bears E. 22° N. from Achin Roads, distant nearly 9 miles; it is low, with a few trees on it, and may be approached to 9 or 10 fathoms. It is $7\frac{1}{2}$ miles to the E.N.E. of the bluff formed by the high land, which terminates in a gentle slope. Off this point the bottom is rocky, and the soundings do not extend more than $1\frac{1}{2}$ or 2 miles from the shore. At a mile W.S.W. of it, and S.E. of Malora Island, is a small river named the *Tjankul*, and S.W. 3 miles from this is another small stream entering the sea, and called on the charts *Gigchen River*.

Krang Ryah Bay, in which there is anchorage sheltered from E. and S. winds, lies 6 miles S.E. from Pedro Point. On its eastern side a cliffy coast commences, and off its eastern entrance point is a small islet, Batu Kapal. At 6 miles eastward of Batu Kapal is *Tanjong Batu Putie*, a cliffy point bear-

ing N. by W. from the western slope of the Golden Mountain. Thence the coast takes a general E.S.E. direction to Pedir Point. There is, however, a slight bay between Tanjong Batu Putie and Tanjong Segie, $8\frac{1}{2}$ miles E.S.E.-ward from it, on the shores of which are the few small villages, Lanteba, Bihu, Powad, Lawang, and Kalore. There are no dangers marked on the charts at more than half a mile off shore hereabout.

PEDIR POINT, or *Batu Pedir*, is a table land of moderate elevation. Off Pedir Point, with the exception of a few rocks close in, the shore is steep-to, there being 112 fathoms water 1 mile distant from the shore. From this point the coast is cliffy for $3\frac{1}{2}$ miles, and runs to the southward, thence it takes a general S.E. by E. direction for 16 miles to *Endjung Creek*, a few miles up which is the village of *Sawang*. Six creeks, with sand banks off their mouths, are found on the coast between Pedir Point and Endjung Creek. *Batu Creek*, the first, lies 4 miles southward of Pedir Point. *Bungala Creek*, a mile N.E. of which is anchorage in 9 fathoms, lies $1\frac{3}{4}$ mile E.S.E. of Batu Creek. *Pedir Creek* is $2\frac{1}{2}$ mile E.S.E.-ward of Batu Creek. The village is not visible from the anchorage, which is abreast this creek in 10 or 12 fathoms. *Gichen Creek* is $2\frac{1}{4}$ miles E.S.E. of Pedir Creek. Between this and *Burong Creek* the distance is $1\frac{1}{2}$ mile. Burong may be known by a flag-staff in the centre of the village. The creek is very narrow, and the bar at its entrance very shallow, and only passable at high water. The anchorage is abreast of the village in 15 or 18 fathoms water. From Burong Creek to Ije Labu Creek, which enters the sea at a slight projection of the coast, the distance is $3\frac{1}{2}$ miles. Endjung Creek is $3\frac{1}{2}$ miles beyond this. Sawang entrance, before mentioned, may be known by a high grove of trees near to it.

At E. $\frac{1}{2}$ S. $7\frac{1}{2}$ miles from the entrance of Sawang or Endjung Creek is *Merdu Point*, low and sandy, with a few small round trees on it. *Beradjang Creek* lies 2 miles westward of the point, another creek enters the sea at the point, and *Ulim Creek* 2 miles south-eastward of it. Between Merdui Point and *Rajah Point*, lat. $5^{\circ} 14' 30''$, long. $96^{\circ} 28' 30''$, the distance is $13\frac{1}{2}$ miles, and midway between *Samalangan Creek* enters the sea. Rajah Point may be known by a high grove of trees near its extreme. There is a depth of about 15 fathoms, at a mile off shore, between Merdui and Rajah Points. To the eastward, *Pedada Creek* is in long. $96^{\circ} 35'$; *Djimpa Creek*, $96^{\circ} 39' 45''$; and *Passangan Creek* in $96^{\circ} 48'$.

Passangan Point is in lat. $5^{\circ} 18' N.$, long. $96^{\circ} 51' E.$, and bears from Oujong Rajah E. $\frac{3}{4}$ N., distant 23 miles, between which the shore may be approached to 12 or 14 fathoms, excepting when near to Passangan Point, which is steep-to, having 30 fathoms within half a mile from the beach. Passangan Point is low and sandy, with a few cocoa-nut trees near to its extreme, and is in one with *Elephant Mountain*, bearing S. $42^{\circ} W.$

East 4° South from Passangan Point, distant $9\frac{1}{2}$ miles, is *Agum-Agum*, or *Goma Goma Point*, the coast between is slightly concave, and halfway between

there is a high square grove of trees, near which the *Klumpang Dua Creek* enters the sea. *Manéh Creek* enters the sea a mile eastward of Passangan Point. The shore may be approached between these points to 8 or 10 fathoms, but not when abreast of Agum-Agum, which is low, with a little jungle on it, as two sunken rocks lies off this point, one a mile W.N.W. of the point, and another, the *Sumatra Rock*, at a mile off shore and 2 miles eastward of the point. Do not shoal the water under 25 fathoms when in the neighbourhood of the Sumatra Rock, if you wish to pass outside of it. From Goma Goma Point the coast takes a general E. by S. $\frac{1}{2}$ S. direction for 12 miles to *Telok Samoi*, or *Teles Amoi Point*, S.S.W. from which is a table land of moderate elevation, with a few conspicuous trees on it. The point may be rounded at any convenient distance, as there are soundings of 7 and 10 fathoms within 100 yards of the beach. *Krang Guku Creek* is $4\frac{1}{2}$ miles eastward of Goma Goma Point. At Telok Samoi Point the coast recedes and forms a bay, open to the North and East, with a river flowing into its S.W. corner; and two villages on its shores, *Telok Samoi* on its western, and *Maraksa* on its South side.

From Maraksa, just eastward of which a small creek enters the sea, the coast runs in an E.N.E. direction to Diamond Point, and may be approached to 7 or 8 fathoms, except when approaching Diamond Point, there is a shoal of hard slaty clay, with 2 fathoms on it; it is not more than 20 yards in extent, with 7 and 8 fathoms close round it. From the shoal, Diamond Point bears E. 1° N., distant $5\frac{3}{4}$ miles; a small gap in the jungle S. 1° E.; and Curtoy Creek (which is situated $8\frac{1}{2}$ miles to the westward of Diamond Point, at the West extreme of the belt of thick jungle), S. 22° W.

Passier or *Passey*, now an unimportant place, about 25 miles south-westward of Diamond Point, is frequently mentioned in old Malay annals as being a place of some note, at one time rivalling Malacca. It attained its notoriety as an *entrepôt* for trade carried on between the countries East and West of it. Between Passey Creek and Legabatang Creek, $8\frac{1}{2}$ miles eastward of it, are the *Kerti* or *Kertoy*, *Tyankoy*, and *Pidada Creeks*.

DIAMOND POINT, or *Jambie Ayre*, or *Tanjong Goere*, forms the eastern extremity of the coast of Pedir, the trees on it being of unequal height, and higher than those of the contiguous land, make the land appear like a low sloping island, when viewed at a considerable distance, although the ground is very little elevated above the sea at high water spring tides. A reef extends from the point about $1\frac{1}{2}$ mile in a northerly direction, having 3 fathoms sand on its outer edge, and shoaling gradually to the point. A ship should come no nearer the latter than $2\frac{1}{2}$ miles, nor under 12 fathoms in passing it and the shoal to the westward; for the water shoals quickly under this depth to the westward of the point. This place is frequented in the fair season by fishermen from the coast of Pedir. Inland to the S.S.W. there is a high Table Mountain, visible from the offing in clear weather.

Tides.—Although the tides along the Pedir coast are weak, and only perceptible near the shore, there being a current usually setting to the westward in the offing during the S.W. monsoon, yet they begin to run strong at Diamond Point. The flood here sets to the S.E., and the ebb to the N.W., about 2 miles per hour, with a rise and fall of 9 or 10 ft. on the springs. At the western part of the coast of Pedir, it is high water at about 10½ hours, on full and change of the moon, and at 12 hours off Diamond Point. The soundings are not very regular in the offing, the depths being from 20 to 35 or 40 fathoms, about 3 miles, to 45 and 60 fathoms at 5 or 6 leagues from the point; and soundings extend from hence across to Pulo Pera, and from the latter to the Ladda Islands, and to Penang. A little outside of Pulo Pera there are no soundings.

The coast to the south-eastward has been surveyed by Lieut. Jackson; but the directions of Commander Fell are adapted to this later chart.

Adie, 20 miles South of Diamond Point, claimed Dutch protection in 1874, and a coal depot has been established here. Between Diamond Point and Adie are several rivers and creeks. On the western side of Diamond Point is *Djambu Ayer Creek*, and on its eastern side *Mentui Creek*. In lat. 5° 14' N. is *Bekas Creek*. *Pareh Busuk*, in 5° 13' N., is an entrance between two islands. *Ringin Creek* is in lat. 5° 11' 30"; *Belas Creek* in 5° 11'; *Simpang Olim River*, in 5° 9' 30", has its entrance marked out by stakes on the sand banks; the town is about 6 miles from its mouth, and there are some pepper grounds on its banks. *Malikan River* is in 5° 8' N. *Arakun Dur River*, in 5° 6' N., has a town, *Telok Sintang*, 1½ mile from its entrance, and some pepper grounds higher up. In lat. 5° 4' 35" is the mouth of the *Djolokh River*, a mile below it the *Buging River*; a mile S.E. of Buging River is *Bagan River*, and in lat. 5° 2' 45" the mouth of the *Bagan Panas River*.

Edie Besaar River has a fort and flagstaff on the South side of its entrance, in lat. 4° 58' 40" N., long. 97° 46' 35" E. Some stakes mark the entrance, which lies between sand banks that extend off either point and form a channel, running N.W. and S.E., and open to the northward.

Prauhilah Point, in lat. 4° 53' 15" N., long. 97° 53' 30" E., bearing from Diamond Point S.E. ¼ E. 11 leagues, has a reef projecting North and N.N.W. from it about 4 miles, near which the soundings are very irregular, although between it and Diamond Point they are regular at a short distance from the shore. There are 4½ fathoms, mud, 2¼ miles from Prauhilah Point. On the North side of the point is the entrance into the river, which is almost dry at low water; but inside of it there are 2 fathoms for several miles up, with a small fishing village at a considerable distance from the entrance. Off this part it is high water, at full and change, at 12^h.

Raija River, the North entrance point of which is in lat. 4° 44' 38" N., long. 97° 57' E., has an extensive sand bank lying off its entrance. Along the South side of this sand bank the channel into the river carries a depth of

2½ fathoms, but there is less water outside, as little as 4½ ft. being found at 1½ mile S.E. of the North point.

LANKSA BAY, 20 miles S.E. by S. from Prauhilah Point, formed by Ujong Byan to the N.W., and Ujong Kwala Lanksa to the S.E., is about 4 miles wide, containing numerous shoals, with narrow channels leading into the different rivers, which fall into this bay. Near Ujong Kwala Lanksa lies *Pulo Laga Tojoo*, a small island, about a mile in extent, having a channel about 300 yards wide, with 6 and 7 fathoms water between it and Ujong Kwala Lanksa.

The entrance into Lanksa River bears from it about South, and there is a safe but narrow channel on either side of the island; the best channel, however, is from the N.E., between the island and Ujong Kwala Lanksa, having 2½ fathoms least water. In the entrance of the river there are two small islands, and the town is said to be at a considerable distance inside, containing a number of inhabitants, who cultivate rice, pepper, and rattans. There are only 3 fathoms, mud, about 6 miles distant from the bottom of the bay, and the reefs extend 3½ or 4 miles from the nearest land. Five leagues S.E. of Lanksa Bay is *Ujong Tannang*, or *Tamiang*, with *Ujong Roquit* midway between them. The coast in this interval is safe to approach, having from 15 to 20 fathoms about 2 miles off shore, excepting at Pulo Roquit and at Ujong Tamiang, where there are reefs of breakers, which project out a mile. It is high water at full and change here at 12^h 30^m.

Lunkat River, or *Kwala Bubon*, in lat. 4° 1½' N., long. 98° 29½' E., lies at the S.E. extremity of a deep bay, formed between it and Ujong Tamiang. The bay is not easily perceived from the offing, as *Pulo Tampelu* and *Pulo Sampatuan*, two large islands fronting the bay, appear, unless close in-shore, as part of the mainland. Between these islands there is said to be a safe channel for small vessels, that leads to *Kaya-la-pun River*.

From the mouth of the Lunkat a bank extends about 6 miles to the northward and N.E., having dry patches on it, with breakers in some places. About 5 miles off the entrance of the river the depth is 3 fathoms, mud, and the tide rises and falls about 2 ft. on the springs; high water at 3½ hours, on full and change. About 4 leagues S.E. of Lunkat River there is *Lankat-tuah Island*, close to Ujong Lankat-tuah, which is safe to approach, and which forms the northern extremity of the concavity of the land, where Dehli River is situated.

Balawan and Dehli Rivers are separated at their entrances by a low island, covered with jungle, 2½ miles long from East to West, and 1¾ mile wide, the eastern extreme of which is in lat. 3° 47' N., long. 98° 48' E. The importance of these rivers arises from the fact that the Dutch Government have recently established a *coaling station* on the shore which faces the western end of the island before mentioned. Up to the coal sheds the least depth (8 feet at low water) is found between the outer dark wooden cross and outer

white beacon. The entrance to Balawan River is about 300 yards wide, and much deeper than Dehli River. At 3 miles to the northward of the East extreme of the island which separates Balawan from Dehli River are the outermost of some fishing stakes, which lie 2 miles off the low wooded shore to the westward, and mark the western side of the entrance to the channel, which thence extends to the S.S.W., and is marked on its western side by white basket-topped beacons, and on its eastern side by crosses of dark wood. About $3\frac{1}{2}$ miles up the channel branches off to the westward, between the island and the main, half a mile beyond a beacon marking a projecting shoal on the port hand it turns to the southward, a mile up which reach there is anchorage off the coal sheds. Dehli Town is reached by a channel to the S.E., in which there are $1\frac{1}{2}$ and 2 fathoms water. Here the rise and fall of the tide is from 8 to 9 ft., high water at 3 hours on full and change of the moon.

South of the entrance to the Balawan River a depth of 3 fathoms is found at 4 miles off shore, and for 3 miles eastward of the East point of the island the sand nearly dries. The mouth of the Dehli River is about a quarter of a mile wide, having 4 ft. at high water on some parts, but inside it deepens to 2 fathoms; about 3 miles from the entrance is the town of Dehli or Labuan. A mile up from the entrance the channel separates into two branches, one leading N.W. towards the coal sheds, and the other leading S.W. towards the town. There is only 3 or 4 ft. water in some parts of the channel, and abreast the town the river is only 40 yards wide, with a fresh stream always descending.

From Dehli to Tanjong Mattie, which forms the northern part of Batu Barra Bay, the coast extends about S.E. by E., 55 miles, having regular soundings to $4\frac{1}{2}$ fathoms, within 2 miles of the low sandy beach that lines this part of the coast.

There are some dangerous shoals off this part of the coast, as shown by the survey of Lieut. Jackson.

The Dehli Shoal is the first of these, and lies 17 miles East by North from the mouth of the Dehli River, and nearly 12 miles from the nearest shore. Its least water is 27 ft., and it is surrounded by depths of 6 and 7 fathoms; just outside it there are 10 and 13 fathoms. No marks are given to avoid it.

The Bungan Banks, or Varela Reef, are still more dangerous. They lie from 6 to 9 miles from the nearest land, *Point Bungan Bungan*, 25 miles W. by S. from Pulo Varela, and are two in number. The outer one is a narrow spit, extending $3\frac{1}{2}$ miles N.W. and S.E., with only 9 ft. least water on some parts. A channel, with 7 to 9 fathoms, nearly 2 miles in width, separates it from the inner bank, which is also narrow, and extends in the same direction for 4 miles. Between it and the coast, the channel, 4 miles wide, has a depth of from 7 to 11 fathoms. The Peak of Pulo Varela,

bearing E. $\frac{1}{4}$ S., just clears their northern edge; the same peak, E. by N. $\frac{1}{4}$ N., clears their southern part; and a high tree on the main land, bearing S. by E. $\frac{3}{4}$ E., will lead clear of their eastern face.

PULO VARELA, in lat. $3^{\circ} 46' 20''$ N., long. $99^{\circ} 29' 15''$ E., and 22 $\frac{1}{2}$ miles off the Sumatran coast, is very high, and may be seen 8 leagues off, although it is not more than a mile in circumference. It is wooded, and clear all round, with very deep water, 24 and 25 fathoms, close-to. A small rock or islet off its N.W. point, and another off the South end. There are some small sandy bays, the largest of which is to the S.E. On the South side is a small cove, in which at some seasons water may be procured. It runs down the hill slowly into a small well. The island is visited by the Sumatran people for the purpose of catching turtle and preserving their eggs, fish-roe, &c. As these people are sometimes treacherous, boat parties landing for fire-wood, fishing, or water, should be on their guard.

A bank of 6 to 9 fathoms water lies to N.N.W. of Pulo Varela. It is 7 miles in length, its S.E. end being 7 miles from Pulo Varela. Although the above depths were only found on the survey, it is reported that there are only 2 fathoms over some parts. There is another bank with 8 and 9 fathoms at 4 or 5 miles to the S.W. of Pulo Varela.

Point Mattie is 25 miles due South from Pulo Varela; off it is the *Mattie Shoal*, nearly awash in parts, and 9 miles in extent, parallel with the coast, between which is a channel of from 15 to 5 fathoms water, from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles wide. It is high water here, at full and change, at 3 hours, rise from 7 to 10 ft.

Off Tanjong Mattie, to the northward, the depth increases to 12 and 14 fathoms, and shoals suddenly to 5, 3, and 2 fathoms, on a sandy spit which projects about $1\frac{1}{2}$ mile from that point, and $6\frac{1}{2}$ miles to the eastward of it, and the same distance to the northward of Batu Barra there is an extensive and dangerous sand-bank, having only $1\frac{1}{2}$ fathom, with a safe channel between it and the mainland, 3 miles wide.

BATU BARRA RIVER, in lat. $3^{\circ} 14' N.$, long. $99^{\circ} 35' 30'' E.$, and the coast for some miles eastward, is fronted by an extensive mud flat, from 2 to 4 miles off shore, having regular soundings, and projecting out to within 5 miles of the South Brother. The river is about 300 yards wide, with regular soundings to the dry banks at its mouth, where a little way inside it divides into two branches, one to the eastward, and the other to the westward. About a mile up the western branch is the town where the chief rajah resides. On the banks of the eastern branch stands another town, and there are said to be other towns further up the river. The people on the coast are generally Malays; those in the interior are Bataks. European vessels discontinued visiting this place for many years, owing to the perfidious conduct of the Malays, who formerly cut off several vessels that touched here to

trade. Nevertheless the people of Batu Barra appear more industrious and better inclined to trade than is usual with the other inhabitants of this coast; and they carry in their own proas, to Penang and Malacca, the rattans, pepper, or other articles produced here. Goats and poultry are plentiful, at reasonable prices.

The **BROTHERS**, two small islets, lie off Batu Barra, at $10\frac{1}{2}$ and $15\frac{1}{2}$ miles respectively, to the N.E. by E. The northernmost, *Pulo Pandan*, or *Quandan*, is much lower than Pulo Varela, from which it lies S.S.E. $\frac{3}{4}$ E. $25\frac{1}{2}$ miles distant. It is covered with wood, and surrounded on all sides by a reef to a considerable distance off it. Therefore it should not be made free with. The southernmost, *Pulo Salanama*, is larger, and much more bold-to, although there are some rocks stretching from its North end for above half a mile, and another rock or islet lies to the East of its South end. The channel between the two islets, 4 miles in width, is perfectly safe with 20 to 30 fathoms water; and there is also a channel inside Pulo Salanama, about 3 miles in width, but then it should be borne in mind that the Sumatran coast is here bordered by an extensive shelf, which extends for nearly 5 miles off the point to the southward of the southern Brother. From this circumstance, it should not be used except under great necessity, seeing that the course outside it is so much preferable. There are several other spots shown on the charts, which will demonstrate the necessity of caution, should a vessel get too far over to the Sumatran side. The best course is, as before directed, to the eastward of Pulo Jarra.

The **COAST** of Sumatra south-eastward of Batu Barra is laid down on the charts from the surveys of Lieuts. Rose and Moresby, I.N., and has not been so minutely examined as that to the north-westward; but this is of the less importance, as a great portion of it is unapproachable to shipping, in consequence of an extensive mud flat which stretches off it for many miles.

Assarhan River, in lat. $3^{\circ} 1\frac{1}{4}'$ N., long. $99^{\circ} 52\frac{3}{4}'$ E., has a mud flat, extending from its entrance 8 miles to the N.E., upon which the soundings regularly decrease. From hence to Reccan River care is required not to approach too near the coast, as several mud flats extend to a considerable distance, upon the verge of which the water shoals suddenly; particularly about 5 or 6 leagues to the S.E. of Assarhan River, fronting the bay of Lidang and its contiguous rivers, where the flat extends $3\frac{1}{2}$ leagues from the shore at the bottom of that bay.

RECCAN, or **Rakan River**, has at the entrance two islands, *Pulo Lalang Besar*, in lat. $2^{\circ} 12'$ N., long. $100^{\circ} 36\frac{1}{2}'$ E., and *Pulo Lalang Kechel*; the former is the largest, from which the other bears S. by E. $\frac{1}{2}$ E., about $2\frac{1}{4}$ miles; and there is a shoal channel between them leading into the river. They are low and woody, and not discernible above 10 miles. Having passed between these islands, and being a little to the eastward of them, the entrance to the river bears S.E. $\frac{3}{4}$ E., and extends in this direction about 30

miles; then a small and shoal bank projects to the westward, called *Banka*; but the main branch takes a S.E. direction, and is called *Tanah Putie River*, having a town of the same name at the mouth of this branch, which is here about $1\frac{1}{2}$ mile wide, and is said to take its rise from the mountains. It is shoal and dangerous, from the rapidity of the tides; but several large and populous villages are said to stand on its banks, subject to the Rajah of Siak. The greatest breadth of the mouth of Reccan River is about 15 miles, decreasing about 8 or 9 miles up to 4 miles, afterwards 2 miles, and then continuing this breadth till it forms the two branches mentioned above. It is almost dry at low water spring tides, and is rendered exceedingly dangerous by their excessive rapidity of 7 miles per hour, producing a bore on the springs, and having a rise and fall of 30 ft.

At the mouth of the river it is high water at 6 hours on full and change of the moon; the rise and fall of tide about 26 ft.; and here the velocity of the stream is about $5\frac{1}{2}$ miles per hour, but it becomes much greater a few miles up. On the bank of the river the *Nautilus* found a straggling village, whence the inhabitants came off in great numbers, and entreated to be admitted on board, under pretence of friendship, which was refused excepting to a few of them. They afterwards, without the least provocation, endeavoured to cut off one of the boats, which had got adrift by the rapidity of the tide.

The *Arroa Isles*, described previously, lie off the mouth of the river, 40 miles to the northward.

From Reccan River the land on the eastern bank projects to the N.W., forming the headland called *Ujong Perbabean*, in lat. $2^{\circ} 16\frac{1}{2}'$ N., from which a mud flat extends to the N.W. and N.N.W. about 10 miles, and upon this flat the soundings decrease regularly. When clear to the eastward of this bank, and having *Ujong Perbabean* bearing S.W., and *Parcelar Hill* N.E., you enter upon the most dangerous part of this coast, its various sand banks extending from it over to the *South Sands*, with gaps and narrow channels of mud soundings between them. As the soundings afford no guide in approaching these banks, the depth decreasing suddenly upon them, it is necessary for a vessel intending to pass between them to have a boat ahead sounding, and a good lookout kept from the fore-yard, for the shoal banks are plainly seen when the sky is clear in the daytime.

PULO ROUPAT, the North point of which is called *Ujong Bantam*, is in lat. $2^{\circ} 8'$ N., long. $101^{\circ} 40\frac{1}{2}'$ E. It is bold to approach, having 30 fathoms within $1\frac{1}{2}$ mile of the shore. The eastern side of this island is bold until the entrance of *Brewers Strait* is approached, where a mud bank extends out from the shore of *Pulo Roupat* about 5 or 6 miles between the North point of *Pulo Roupat* and *Ujong Perbabean*, the coast forms a deep bight, which is fronted by an extensive sand bank; this bank, together with those in the

offing, mentioned above, render this part of the Sumatra side of the strait very intricate and dangerous.

BREWERS STRAIT, or Salat Panjang.—The North entrance of this strait is formed between the mainland of Sumatra and *Pulo Bucalisse*; *Tanjong Jati*, the North end of the latter, being in lat. $1^{\circ} 36\frac{1}{2}'$ N., long. $101^{\circ} 59'$ E., a shoal bank, extends 8 miles to the northward from the point.

The northern navigable part of this strait is about 5 miles wide, with soundings of 8 to 15 and 20 fathoms, mud; and 8 miles from the entrance, on the western shore, is the town of Bukit Batu, upon the banks of a very narrow river of the same name. The town is not easily perceived, the houses being scattered among and hid by the trees; but it may be known by a tree, formed like an umbrella, near the entrance of the river.

At *Ujong Ballai*, a point of Sumatra, $3\frac{1}{2}$ leagues to the S.E. of Bukit Batu River, the strait becomes contracted to 3 or 4 miles in breadth; and opposite to the point is the entrance to the narrow strait called *Salat Padang*, affording a safe passage for boats; it is formed between Pulo Bucalisse and Pulo Padang. From Ujong Ballai, Brewers Strait turns from a S.E. to a South direction, till opposite the mouth of the Siak River.

From the entrance of Siak River, Brewers Strait extends S.S.E. to the western end of Pulo Rantow, where it contracts to 1 mile in breadth, with regular mud soundings from 8 to 10 fathoms. Between Pulo Rantow and Pulo Padang is formed a channel leading to the sea, called *Salat Ringit* by the natives, and said to be used only by boats. From the western end of Pulo Rantow the strait takes an easterly direction about 20 miles, with depths from 10 to 15 fathoms, till a small island in mid straits is approached, on each side of which the passage is practicable, taking care to avoid the stream of the island, as a mud flat extends from it to the westward $2\frac{1}{2}$ miles in the middle of the strait. From hence the direction to the strait is to the S.E., and, after passing three small islands on the port hand, the southern entrance opens, off which there are a great number of islands. The safest channel out appears to be between Panton Point and Pulo Senappu, having regular but shoal soundings of only 1 fathom at low water in some parts.

SIAK RIVER, the entrance of which is in lat. $1^{\circ} 11\frac{1}{2}'$ N., long. $102^{\circ} 12\frac{1}{2}'$ E., on the western side of Brewers Strait, is about three-quarters of a mile wide, having a sandy spit, nearly dry at low water, extending almost across, but leaving a safe, although very narrow channel, close to Ujong Liang, the eastern entrance point; the river becomes narrow, with deep soundings inside, and is said to have its source in the mountains.

The town of *Siak* stands at 65 miles from the mouth of the river. The *Nautilus* anchored in 6 fathoms, mud, within a quarter of a mile of the mouth of the Siak River, and found the time of high water at full and change of the moon to be 9 hours; rise and fall of the tide about 12 ft., and the velocity $2\frac{1}{2}$ miles per hour.

Campou River, in lat. $0^{\circ} 43' N.$, long. $103^{\circ} 0' 30'' E.$, is fronted by an extensive mud flat, almost dry at low water; and it is little frequented on account of the rapidity of the tides, occasioning a bore at times similar to that of Reccan River, which it resembles in several respects. In approaching the southern entrance of Brewers Strait, the tides are greatly influenced by this river, producing a strong eddy round some of the islands, so that, while the tide is running to the southward on one side of an island, it may be often found running to the northward on the other side.

The rise and fall of tide near the southern entrance of Brewers Strait is about 15 ft. in some parts, with a velocity of about $3\frac{1}{2}$ miles per hour, but much greater when near the entrance of Campou River. The three islands, Pulo Bucalisse, Padang, and Rantow, which form Brewers Strait, and also Pulo Panjore, ought not to be approached but with great caution, at their eastern sides, as they are fronted by an extensive mud flat, with dangerous sand banks, in some places having only $1\frac{1}{2}$ fathom water on them. These form what is usually called the Sumatra Bank, or third bank in the Malacca Strait to the N.W. of the Carimons, which has been before alluded to. The Carimon Islands, which form the head of the Strait of Malacca, have been described on page 136.

CHAPTER IV.

THE STRAIT OF SUNDA.

THIS important and remarkable passage, the great portal of the Indian Archipelago, has been surveyed by the Dutch officers, Lieutenants Rietveld and Boom, in 1848, and their survey has been improved by the observations of many officers, especially by the late talented Melville Van Carnbee, of the Dutch navy, who drew up an excellent hydrographical description of Java, &c., which has been mainly followed hereafter.*

The Strait of Sunda is a singular break in the continuity of that great chain of volcanic mountains which runs from N.W. to S.E. through Sumatra, and is continued eastward through Java. This depression in the mountain chains is not very much below the sea level, for the general maximum depth of the strait is not more than from 30 to 50 fathoms. But this slight depression, geologically speaking, has produced a great contrast in the islands

* The fine surveys and charts of great portions of the Indian Archipelago, which have been executed by the Dutch officers attached to the Indian Possessions of that nation, have only been known and justly appreciated in this country within a few years. The "Commissie tot Verbetering der Indische Zeekarten" was instituted by the enlightened Governor General of Dutch India, Van der Capellen, in 1821, and since that period the commission has been sedulously and zealously occupied in surveying and collecting information in all the surrounding seas. Captain-Lieutenant Baron Peter Melville van Carnbee became the secretary to the Dutch Commission, in 1850, and among numerous other works he was the author of the "Zeemansgids voor de Vaarwaters om Java," which was soon translated into the French and English languages, the latter being done by Dr. Norton Shaw, Secretary to the Royal Geographical Society. Besides this, he drew up a fine series of charts from the many scattered surveys and observations made by the Dutch officers under the commission; these charts were published by the respected house of Wed. G. H. Van Keulen, of Amsterdam, and were afterwards copied in their main features by the English Admiralty, as the basis for all subsequent charts. Young Melville van Carnbee died in 1856, in his fortieth year, while engaged on the excellent "Algemeene Atlas Van Nederland's Oost Indie."

To the works above quoted, very much is owing in the subsequent pages.—EDITOR.



TREET, E. C.

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STRAIT OF SUNDA

H.W.F.S. at Revolution VII^h

Springe rise of 4^h stages not perceptible

on either side of it. Each has a distinct class of animal and vegetable life. Thus the elephant and tapir of Sumatra have no existence in Java. The wild hog and rhinoceros of Sumatra are of different species to those found in Java. The orang-outang is found in Sumatra, but not in Java. The birds are also quite different; many important families belong to each, without having them in common. These curious contrasts are also found to exist between the islands further to the eastward. These remarkable facts in the distribution of life on the earth have been much discussed by naturalists, especially by M. Temminck and Mr. A. R. Wallace.

The strait derives its name from the western portion of Java, which is peopled by the *Sunda* nation, who speak a different language, and are less advanced in civilization than the rest of the Javanese.

In its widest sense, the Strait of Sunda embraces a very large area. Between the western extremity of Java and the south-western end of Sumatra, the distance is 68 miles, and the bearing N.W. $\frac{3}{4}$ N. and S.E. $\frac{3}{4}$ S. ; and from this line to another at its N.E. limits, between St. Nicholas Point on Java, to the opposite side on Sumatra, the distance is 74 miles. The narrowest part of the strait is between Fourth Point on the Java side, and Hog Point in Sumatra, 13 miles apart. There are numerous islands in it, which separate the strait into several channels, of which that along the Java coast is the most used; the lofty and conspicuous island Krakatoa being the great land-mark from the westward, all the headlands being more or less grand in their character.

The Dutch nation holds the sovereignty of the shores on either side, and being the surveyors of the strait, have the right to give the names and orthography to the points and islands, but as their excellent and expressive language is not so generally used, it will be preferred to give these common names in an English form (adding the Dutch), and the spelling in the ordinarily recognized form for pronunciation.

THE JAVA COAST.

The south-eastern side of the Strait of Sunda is formed by that portion of Java which gives its name to it, as before mentioned. The state extends eastward to Cheribon, and includes Batavia, the capital, embracing nearly one-third of Java. It is a mountainous country, but containing some rich valleys, and is said to bear the same relation to Java proper that Wales does to England, or the highlands to the lowlands of Scotland. It is more thinly populated, and the people less advanced than in the rest of Java.

The volcanic ranges which traverse it, in continuation of that extending

throughout the length of Java, give it a peculiarly bold character. Many of the peaks visible from sea attain to great elevation. *Karang*, in the rear of Anjir, is the loftiest, 5,943 ft. ; and a few miles to the South of it is Pulusari, 4,183 ft. ; several others reach to between 2,000 and 3,000 ft. The peak at the southward of Krakatoa Island is 2,623 ft. ; and Bezee, to the North of it, is 2,600 ft.

The coast is deeply indented, and has some sheltering bays, but Anjir Roads is the chief stopping place. Here is a *Signal Station*, at which an officer will reply to and forward answers to signals to Batavia, &c., the telegraph system being perfect in the Dutch possessions. Lighthouses are shown on the chief points, and the following directions in connection with the chart will carry a ship through in safety.

Java Head, the western extremity of Java, and the S.W. point of the Strait of Sunda, is a noble promontory, a fitting portal to that great entrance to eastern countries. But as it is frequently prudent to make the land to the eastward of the strait in approaching it from the Southern Indian Ocean, the features of the southern coast of Java for a short distance will be briefly described first.

Trower Island, or *Pulo Tinjil*, is $3\frac{1}{2}$ or 4 miles in length, and its East end is about 35 miles East of the meridian of Java Head. It is surrounded by a reef. On the North and West sides of it there are from 13 to 19 fathoms water, and at the S.E. and South sides, at some distance, no bottom at 50 and 100 fathoms. A mile to the northward of the island there is a *rock*, on which the native proas have sometimes struck. Everywhere else round the island from 13 to 19 fathoms will be found, and at a short distance to the southward more than 100 fathoms.

Klapper Island, or *Breakers Island*, called by the Malays *Pulo Deli*, 8 miles distant from the nearest shore of Java, 13 miles West by South from Trower Island, and about 18 miles E.S.E. from Cape Sangian Sira, the S.W. point of Java. It is 148 ft high, covered with large trees, those along the beach being cocoa-nut, and is surrounded by a reef, which in many places stretches off a mile ; but on the N.W. side there is a good watering place in the S.E. monsoon, as boats can enter a little river through a channel with reefs on both sides, and ships may anchor in 18 to 24 fathoms, clay bottom, 2 miles distant from the island, close to those reefs which partially dry at low water. The depths are from 30 to 40 fathoms at 4 miles off the South shore of the island.

Sodon Point, on the South coast of Java, is, as before said, 8 miles North of Klapper Island. The head of Welcome Bay, on the North side of the island, reaches to within 3 or 4 miles of this southern coast.

Along the coast to the northward of Klapper and Trower Islands, as far as Cape Sangian Sira, there are rocks which in some places lie $1\frac{1}{2}$ and 2 miles off ; and no shelter whatever can be found there from S.W. and S.E.

gales. A shoal lies to the eastward of Sodon Point, about $1\frac{1}{2}$ mile from the shore. It bears N. $\frac{1}{3}$ E. from the East point of Klapper Island, and N.W. by W. $\frac{3}{4}$ W. from the West point of Trowers Island.

When making Java Head in hazy weather, the appearance of the land to the eastward of Cape Sangian Sira, between it and Sodon Point, bears much resemblance to the high land of the West point of Java, with the adjacent hills on Princes Island; and the low land in such circumstances not being distinguishable at a distance, the position of it is often mistaken for the entrance to Princes Channel.

From Java Head the coast runs S. by E. $\frac{3}{4}$ E. about $4\frac{1}{4}$ miles to Palembang Point, which is $1\frac{1}{4}$ mile northward of Cape Sangian Sira.

CAPE SANGIAN SIRA, the most southern point of this part of Java, is in lat. $6^{\circ} 52' S.$, long. $105^{\circ} 14' E.$ It is the S.W. point of an irregular mass of mountains, which rise abruptly from the sea to a height of 1,050 and 1,300 ft. on the eastern side, and to 618 and 1,400 ft. on the western side. From this cape, and $1\frac{1}{2}$ mile to the southward, several rocks project, some of which are above water. Captain Newby, in passing close round by Palembang Point, thought he saw a clear but narrow channel inside these terrific pinnacle-shaped rocks, which might be used by keeping the point on board, but it should not be tried. The soundings are very deep close to these rocks, and along the shore as far as Java Head there is no bottom with 100 fathoms; but as the breakers which line the whole coast seem to indicate that there are rocks under water, it will be advisable to give the shore a berth of at least 2 miles in passing.

From Cape Sangian Sira the soundings decrease in the direction of Klapper Island to 40 and 20 fathoms; while farther eastward, between this island and Trower Island, they decrease from 20 to 12 fathoms.

Palembang Point is the N.W. point of the promontory of which Sangian Sira is the South extreme. They are a mile apart, and the reef of pointed rocks around the land here comes close up. The coast to the northward, for a distance of $4\frac{1}{2}$ miles to Java Head, is formed by the steep-sided mountains before described, which are dark, covered with trees, some of which on the summits are very large. No signs of any inhabitants. Under these dark frowning hills is a belt of green herbage, and then a sandy beach of dazzling whiteness, with several detached steep rocks, some of which would look like a boat under sail.

JAVA HEAD.—The West point of Java is in lat. $6^{\circ} 46' 40'' S.$, long. $105^{\circ} 12' 22'' E.$ Being frequently the first land made after a long voyage across the Atlantic, and round the Cape of Good Hope, its lofty and majestic character strikes those who approach near it with greater force than even its natural features would command. Captain Newby was much struck with its grandeur. He says:—It is composed of a confused mass of cliffs jumbled together. Two hundred yards North of it is a splendid arch or chasm,

in a high detached rock, through which the surges roll their white foam. Through the arch on the main you behold the most luxuriant green vegetation, contrasting with the white surge, the sombre cliffs, and the variegated surface of the ocean. This arch resembled the cloisters of some ancient cathedral. Three hundred yards to the North of this first-named arch is another, but smaller one, of similar character. Through this is seen the white sand and shells on the beach, and between the water is of a light green shade; outside, between us and the arch, the water being deeper, is of a darker green. Sailing on, the projection, or point, called the *Capuchin*, appeared, and soon after the *Friar*, for which, as the wind was rather scant off, I hauled up, and the water being very smooth, I passed it at not more than one cable's length distance, at 5^b 15^m. I could not see any hidden danger or rock under water in my track. When we had passed the *Friar*, and neared Mew Island, he appeared conspicuous. But as the land between is very high, and very thickly wooded, the *Friar* could not be very well made out as seen from a vessel in the offing, unless she was well to the eastward. From W.S.W. it did not appear to me to be an island at all; there seemed to be dry rocks between it and the hill to the South, which connected the *Friar* with the higher land to the southward. Round the pitch of the *Friar* there is a very fine spacious-looking bay, called Mew Bay. There seems to be a low black detached rocky islet, a mile or so beyond the *Friar* to the S.E., but it is nearer the West than the East side very much. This bay seems very snug and convenient for anchoring in with a wind any way from the E.N.E. round by the southward to S.W.

FIRST POINT (*Eerste Punt*), and the *Friars Rocks*.—The coast between Java Head and First Point forms a bight, and is fronted by high rocks, stretching out a considerable distance in some places. First Point, or *Tanjong Along-Ajang*, the South point of entrance into Princes Channel, has a conspicuous rock lying abreast of it, called the *Friar* (*De Monnik*), before alluded to, which rises abruptly out of the sea, and is steep-to, so that with a steady wind a ship may pass close to it. Close to the northward of First Point there is another rock above water, which together with the former are properly called the *Friars*.

The **LIGHTHOUSE** on First Point was first illuminated in June, 1877. It is a stone tower, painted white, from which is shown a *revolving light*, exhibiting a flash of six seconds' duration once in every half minute. The light is elevated 305 ft. above the sea, and should be visible 25 miles off in clear weather.

PRINCES ISLAND (*Prinsen Eiland*), or *Pulo Panatan*, separated from the West part of Java by Princes Channel, is the largest island in Sunda Strait. Its greatest length, between the West and N.E. points, is 12 miles, and its breadth about 8 miles. It is of an irregular form, projecting to a point on the N.E. side, and having a large bay on the S.W. side, the horns of which

form the West and South points of the island. The middle and eastern parts of the island are hilly, the highest peak, 1,450 ft. above the level of the sea, being on the eastern shore; but in some parts, particularly at the West end, the land is level and low from the sea; all parts of the island abound in wood.

A ship in want of water may anchor on the eastern side of this island in 35 fathoms, soft ground, about half a mile from the shore, with the peaked hill bearing about N.W. by N. Here is a small sandy bay, and at its eastern part a run of fresh water, where the casks must be filled about 100 yards up, the higher the better, otherwise the water will be brackish.

It is, however, only in the N.W. monsoon that water can be procured here, for in the S.E. monsoon all the springs are dry from want of rain, and there is, moreover, no safe anchorage in this monsoon along the East side of the island, as it is a dead lee shore.

Kasuaris Bay, on the S.W. side of the island, is 4 miles deep, and has at its entrance soundings varying from 30 to 50 fathoms, decreasing inside to a convenient depth for anchoring; but, being open to all winds between the West and South points, it is not frequented, and cannot be recommended.

The Carpenters (*Timmerlieden*) are a large group of rocks about a mile in extent, projecting from the South point of Princes Island. Most of the rocks are above water; they are black and pointed, looking very dangerous, and the sea is usually breaking over them. There is no bottom with 50 fathoms a short distance from these rocks.

The West point of Princes Island is fronted by a reef to the distance of about $1\frac{1}{2}$ mile, several rocks of which are seen above water.

On the N.W. and North sides the island is steep-to close to the fringe of reef which edges those shores.

A fringe of reef extends from the N.E. point of the island, and along the shore on each side.

A similar fringe extends about a third of a mile off the S.E. point of the island; nearly 2 miles W.S.W. of which, close inshore, and near a conspicuous white rock, is a coral reef, upon which the sea is always breaking.

PRINCES CHANNEL, between the Carpenters Rocks off the South end of Princes Island, and the Friars Rocks off the First point of Java, is 3 miles broad at its narrowest part, and possesses the great advantage of affording anchorage to vessels when becalmed, which the Great Channel does not. Light baffling winds and calms are very common about the entrances to Sunda Strait, occurring even in the strength of the S.E. monsoon, and vessels, when not able to anchor, are liable to be set back by adverse currents.

The depths in this channel are much greater on the Princes Island shore than on the opposite coast. Close to the Carpenters there is no bottom

with 50 fathoms; with Peaked Hill, on the S.E. part of the island, bearing from N. $\frac{1}{2}$ W. to W. by N., there are 10 to 30 fathoms, coarse sand, shells, and coral, little more than a cable's length off shore; with the same hill bearing from N.N.W. to S.W. there are 36 to 44 fathoms about a mile distant from the shore. Towards Mew Bay the depths decrease to 20 fathoms and less.

Directions.—In the S.E. monsoon, when proceeding either way through Princes Channel keep closer to the Java coast than to Princes Island.

In the N.W. monsoon it often happens that vessels outward bound get very quickly to the westward by proceeding through Princes Channel, while those using the Great Channel are detained by heavy squalls and adverse currents. Indeed, instances have occurred in which ships have worked through this passage in a remarkably short time in a westerly gale, by carrying a heavy press of sail, and tacking between the squalls, at times when it was impossible for any ship in the Great Channel to beat against the current and heavy sea.

Proceeding through Princes Channel in this monsoon, keep near Princes Island and the Carpenters, especially when working out against westerly winds, for a current will then sometimes be found setting to the westward. It is moreover very important to keep close to the Carpenters when working out, to avoid being set upon the rocks near Java Head and Palembang Point by the heavy swell, for, being once outside anchoring ground, and in a calm, a ship would have much trouble to clear the coast of Java. The S.E. coast of Princes Island must not, however, be approached within a mile.

GREAT CHANNEL lies between the North point of Princes Island and the South point of Krakatoa Island, which are 23 miles apart; and although too deep for anchorage, it is much frequented, being the widest passage into the strait, and is considered to be, with the exception of the doubtful Hoedeken Rock,* clear of danger. If the strait is entered by this channel, keep Princes Island aboard, and when farther in the strait, keep on the Java shore.

MEW ISLAND (*Meeuwen Eiland*), or *Pulo Kanti*, lying about $2\frac{1}{4}$ miles eastward from First Point, is nearly 2 miles in extent North and South, and 1 mile East and West. The island is hilly, and abounds with wood. Between it and First Point, close inshore, is a small islet or rock above

* *Hoedeken Rock* is said to lie about 5 miles S.W. $\frac{3}{4}$ S. from Krakatoa. Captain Drury, R.N., is reported to have examined a rock S.S.W. of Krakatoa some years ago, and found it to be near the water's edge. The *Abdul Hassim*, drawing 14 feet, is also said to have struck upon a rock, from which the peak of Krakatoa bore N.E. $\frac{1}{2}$ N., distance from the nearest part of the island 6 miles. There is, however, reason to believe that no rock exists in this locality, for Mr. Richards, commanding H.M. surveying vessel *Saracen*, carefully sounded over it in 1854.

water, called the *Mew Stone*. The shore is rocky on the outside of Mew Island, but safe to approach. The soundings decrease gradually to 8 or 9 fathoms.

Between Mew Island and the main there is a narrow but safe channel, with depths from 10 to 5 fathoms, sandy bottom. When taking this passage, keep close in towards Mew Island, as a shoal, called the *Watson Bank*, lies near the Java shore. Sometimes the sea breaks upon this bank, but between it and Mew Island there are depths of 3, 5, and 10 fathoms, clay bottom.

To the eastward of Mew Island, on the Java shore, there is a good watering place in the S.E. monsoon; the water is excellent, and is poured by a cataract upon the beach. Large boats may approach this spot at high water through a narrow channel in the reef, and fill the cask by a hose. At low water they will require a great length of hose to reach the boats.

A little to the northward of the watering place lies a reef of coral, about a cable's length in extent, and about half a mile from the Java shore. Upon its shoalest part there is 1 fathom water, and all round from 5 to 6 fathoms. A ship standing in for the watering place, must steer between this reef and the island, or rather nearer towards the island, and anchor in 9 or 10 fathoms.

In the S.E. monsoon there is also a good anchorage a little farther out, with the North point of Mew Island about W. $\frac{1}{2}$ S., and the East point S. by W., in 16 to 19 fathoms water, sandy bottom.

Plenty of wood may be got upon Mew Island or the main land. Shore parties should be on the guard against any hidden assaults from the natives.

At Mew Bay it is high water, full and change, at about 6^h.

SECOND POINT (*Tweede Punt*, or *Tanjong Gukulang*, consists of a low foreland, somewhat broad in appearance, the western extremity of which lies about N.E. by E., nearly 9 miles distant from First Point, and its northern extremity—which is usually known as Second Point—about 3 miles farther to the north-eastward. It may be approached without danger to the distance of a mile or even half a mile, and in from 26 to 20 fathoms water, the reefs projecting a little way off shore.

From Mew Island towards Second Point reefs project half a cable's length from the shore, having very near them 5 to 6 fathoms water, which increases speedily to 10 and 20 fathoms; but with due care and attention to the lead, a ship may approach the shore in order to anchor. On the coast there is scarcely any population, but sometimes proas may be met with having turtle, fowls, and cocoa-nuts for sale.

WELCOME BAY (*Welkomst Baai*).—N.E. by E., distant 20 $\frac{1}{2}$ miles from Second Point is Third Point, and between is a deep bight, named Welcome Bay, which in the S.E. monsoon affords good shelter, but should be avoided in the S.W. monsoon. There is, however, good anchorage in the S.W.

monsoon, when the wind is not too northerly, behind Second Point in 9 or 10 fathoms water; but this anchorage should be approached with great caution, as the soundings decrease very suddenly near Second Point, and a shoal, with 12 ft. water on it and 6 fathoms close-to, extends half a mile off shore between Second Point and Tambing Point.

The West side of the bay takes from Second Point a direction about S.S.E. $\frac{1}{2}$ E. for a distance of 11 miles, but about the middle of it the beach forms a small bight, with 4 fathoms at its entrance, but only 1 fathom further in. The whole of this side of the bay is skirted by reefs, some parts of which are a mile distant from the shore.

Lieuts. Rietveld and Boom, D.R.N., surveyed Welcome Bay in 1841, and determined the positions of the shoals and islands given below. A large portion of the bay inside Panter and Rocky Ridge Reefs has not been examined, but it is supposed to be dangerous.

Two small islets, named *Andellan* and *Little Andellan*, lie contiguous to the S.W. shore of the bay, about 8 miles from Second Point, and 5 miles from Rocky Ridge. Three sand banks, each surrounded by a sunken reef, lie from half to three-quarters of a mile off these islands, in a N.N.E., East, and S.E. direction. Between these banks and Andellan are from 4 to 6 fathoms, mud; and between that island and the shore from three-quarters to $1\frac{3}{4}$ fathom. Near the head of the bay, to the eastward of a small islet named *Rongit*, is a fourth bank.

The distance across from the southern shore of Welcome Bay to the South Coast of Java is not more than 3 miles, and the sound of the surf on the South coast may be distinctly heard across the isthmus.

The eastern shore of the bay is 22 miles in length, from the head of the bay to Third Point, in a direction about N.N.E., and the general depths off it are 15 to 24 fathoms at some little distance from the coast. Several islets and dangers lie off this shore. *Baddu* (Baddoe) is a small islet, surrounded by a reef, lying about 5 miles from the head of the bay, and about $1\frac{1}{2}$ mile N.W. of a point named *Tankyngi Parrie*. Between this point and the islet are many coral rocks, for the most part dry at low water, and with depths of 7 to 9 fathoms between them.

A large coral rock above water, usually covered with a heavy surf, and appearing of a bright white colour, lies W. $\frac{1}{2}$ N., about $1\frac{1}{2}$ mile from Baddu; and near it appear to be several reefs. Between the rock and the island are 6 to 12 fathoms water.

Five or 6 miles north-eastward of Baddu is *Plaggan Point*, or *False Hook*, with some islands off it, the southernmost of which is called Mangir, and the others *War*, *Umang* (Oemang), and *Sumur* (Soemoer). These islands, as well as Plaggan Point, are surrounded by reefs, a cable in breadth, but at a mile outside there are 15 fathoms, over mud bottom.

Rocky Ridge is an extensive reef mostly above water, and always covered

by breakers, by which it may be distinguished at a great distance. It lies about halfway between the western shore of the bay and the Panter Reefs; and from it Second Point bears N.W. by W. $\frac{3}{4}$ W., the South point of Baddu S.E. by E. $\frac{3}{4}$ E., and the East point of Andellan S. $\frac{1}{2}$ E. That part of it which remains dry at low water is about 100 yards in length, and the breadth of the surrounding reef the same. The soundings round it are 10 and 12 fathoms, increasing at some distance to 18 and 19 fathoms.

Panter Reefs are the outermost of the known dangers which encumber Welcome Bay, and they lie nearly midway between Second Point and Plaggan Point. From their North extremity, in 11 fathoms, Second Point bears W. $\frac{3}{4}$ N., Third Point N E. $\frac{1}{2}$ N. 16 miles, the East point of Andellan Island S. by W. $\frac{1}{4}$ W., and the S.W. point of Baddu Island S.E. $\frac{1}{2}$ S. They consist of four different patches, lying in a N.N.E. and S.S.W. direction from each other, the whole being from half to three-quarters of a mile in extent. The shoalest patch has $1\frac{1}{2}$ fathom water, rocky bottom, but between and close round them are 9 and 10 fathoms, mud.

East and West of these reefs are 17 and 18 fathoms, and to the northward 20 and 25 fathoms.

Welcome Bay appears to be full of dangers not surveyed, and should be entered with *extreme caution*.

THIRD POINT (*Derde Point*), or *Tanjong Lussong*, like Second Point, is very low, although sharper, and fronted by rocks to the distance of 2 cables, from which the depths increase to 10 and 18 fathoms. The peak of Krakatoa Island bears N.W. by N. from it, and is distant about 21 miles.

PEPPER BAY (*Peper Baai*).—N.E. by E. $\frac{1}{2}$ E. 11 miles from Third Point is *Papolle Island*, and between is Pepper Bay, which is formed by the coast trending away from Third Point to the southward for a distance of nearly 5 miles. Its shores are fronted by reefs, which near the points project about half a mile, increasing their distance from the shore towards the depth of the bay, where they extend $1\frac{1}{2}$ mile. The bay is also encumbered with two dangerous reefs known as the Coral Bank and Paniang Reef. The soundings in the bay generally decrease uniformly from 14 to 10, 5, and 4 fathoms; the latter depth will be found 2 miles off shore. In the eastern monsoon there is safe anchorage N.E. of Lawvengan Isle, in 6 or 8 fathoms, soft bottom.

Coral Bank.—Nearly 2 miles East from Third Point is a coral bank, the greater part of which is above water, and readily distinguished by its bright white colour. The direction of this bank is S.E. by E. and N.W. by W., about 3 cables in length, and from it Third Point bears W. $\frac{1}{4}$ S., the N.E. point of Lawvengan S.E. $\frac{1}{2}$ E., and the West point of Papolle N.E. by E. Between this bank and Third Point there is a channel of 4 to 9 fathoms water, and the depths increase quickly from 7 to 15 fathoms at the distance of a mile.

Lawvengan Islet, lying in the depth of Pepper Bay, E. by S. $\frac{3}{4}$ S., distant $3\frac{1}{2}$ miles from Third Point, is about three-quarters of a mile long, a N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E. direction, a quarter of a mile broad, and is surrounded by a reef, which projects farthest at the North side, where it reaches the distance of $1\frac{1}{2}$ cable's length.

Three-quarters of a mile to the north-westward and to the westward of Lawvengan Islet are two reefs, partly dry at low water, and usually breaking. To the southward, and mid-channel between Lawvengan Isle and the shore, is a reef with only 3 ft. water upon it, between which and the island there is a narrow channel with 3 and 4 fathoms; but between it and the shore are several small coral reefs that dry at low water.

Paniang Reef is a ledge of rocks, the N.W. point of which bears W. by S. $\frac{3}{4}$ S. $1\frac{1}{2}$ mile from the N.W. point of Papolle Island. It is a mile long, in a N.N.W. and opposite direction, and half a mile in breadth, and the shoalest water upon it is 3 ft., and on some parts from 1 to 3 fathoms are found. This ledge is very dangerous, as the sea does not often break upon it, and it cannot be approached by the lead, the depths very near it being 6 and 7 fathoms; but by keeping a good lookout it may be distinguished by the light colour of the water, and its brown patches.

Between Paniang Reef and Papolle Island, the soundings are 7 to 4 fathoms, mud bottom; and on the East and S.E. sides of the reef 5 to 3 fathoms, towards the shore.

Papolle Island, small, round, and about half a mile in diameter, lies within a mile of the shore, with which it is connected by a reef; there is, however, a channel of $1\frac{1}{2}$ fathom through this reef, fit for the navigation of proas.

Tyringin or Tjeringie Reef, lying 5 miles North of Papolle Islet, and two-thirds of a mile off the shore near Tjeringie, is of coral, partly above water, and generally breaks. It is half a mile in extent N.N.E. and S.S.W., and very steep, having close outside of it 6 fathoms water, increasing to 9, 12, and 15 fathoms at 2 miles distance from the shore.

Between this reef and a small rock near the shore there is a channel of 3 fathoms, often used by large proas.

Anchorage.—Supplies may be obtained at Tjeringie, and a convenient anchorage will be found to the northward of Tjeringie Reef, at $1\frac{1}{2}$ mile off shore, with Papolle bearing S. by E., and the flagstaff at Tjeringie E. by S. or E.S.E., in 7 fathoms, clay bottom.

The **COAST** from Tjeringie runs N. by E. and N.N.E., and may be approached, with due attention to the lead, to 2 miles distance, in 18 fathoms, without danger of striking upon the Catharine Reef. The general appearance of the coast is low, though occasionally interrupted by hills and conspicuous rocky points.

Catharine Bank, lying about 4 miles to the southward of Fourth Point,

and half a mile off shore, is a quarter of a cable in extent, N. by E. and S. by W., with some rocky points even with the water's edge, and in other places only half a fathom water; with a little breeze the sea breaks upon it. From its outer edge Fourth Point bears N.N.E. $\frac{1}{2}$ E., Krakatoa Peak West a little southerly, and the West point of Thwart-the-way N. $\frac{1}{2}$ W.

Outside this reef are 4 fathoms water, increasing to 10, 14, and 18 fathoms, the latter depth being within a mile of it; the channel between it and the shore has $3\frac{3}{4}$ and 4 fathoms, and is used by proas.

Directions.—With a steady and commanding breeze a ship may steer N.N.E. from Third Point for Thwart-the-way, which is distant 30 miles; or a N.N.E. $\frac{1}{2}$ E. course for 26 miles, which will place her 2 or 3 miles off Fourth Point, when she may either proceed on her voyage or haul in for Anjer Road. Very often, however, the winds become light and variable there, and she may be compelled to anchor, in which case these courses would lead too far from the land. For these reasons it is better to keep on the Java shore, avoiding, however, the dangers in Pepper Bay, which should not be approached under a depth of 14 fathoms.

When the current is running to the westward in the middle of Sunda Strait, an eddy will be experienced near the land, besides which, a vessel may be anchored anywhere along the shore, except near Fourth Point, where the bottom begins to get foul and rocky. When beating up, therefore, with a contrary wind, it is advisable not to keep too far out in the offing, in order to make the eddy available, and not to lose favourable anchoring ground, and perhaps be compelled to anchor in deep water.

Along the coast to the northward of Tjeringie there are numerous villages (campongs), the inhabitants of which frequently come on board ship with fruit, fowls, eggs, &c., and often with turtle.

FOURTH POINT (*Vierde Punt*), or *Tanjong Tykorang*, bearing N.N.E. $\frac{3}{4}$ E., distant nearly 27 miles from Third Point, is low, but easily discerned from its numerous cocoa-nut trees. From it the nearest point of Thwart-the-way bears N.N.W. $5\frac{1}{4}$ miles, and Krakatoa Peak W. by S. nearly 27 miles.

LIGHT.—In 1865 a stone lighthouse was erected on Fourth Point, near to the old tower. It is coloured white, 35 feet high, and exhibits, at 151 feet above the level of the sea, a *fixed* white light of the second order, visible in clear weather at 20 miles off. A second light, visible 8 miles off, is shown in the direction of the *telegraph cable*, and vessels are warned not to anchor with both the lights in sight, or in the day time with the lighthouse bearing between S.E. $\frac{1}{4}$ S. and E. by S. $\frac{3}{4}$ S.

A *signal station* is attached to the lighthouse, from which signals by the Commercial Code will be answered or transmitted.

Caution should be observed in approaching or rounding Fourth Point, for a reef projects from it more than half a mile, with soundings of 20 fathoms

close-to. Outside, or to the northward, the depths increase quickly to 25 fathoms, and at 2 or 3 miles off the point to 30 fathoms. The point should not, therefore, be approached any nearer than $1\frac{1}{2}$ mile when rounding it. The telegraph cable between Fourth Point and Anjer is marked by three white *buoys*.

ANJER.—At 2 miles E.N.E. from Fourth Point is the flagstaff at Anjer, in lat. $6^{\circ} 3' 10''$ S., long. $105^{\circ} 54' 50''$ E. The town is not easily perceived in coming from the westward, being situated in a bay where the houses are scattered amongst the cocoa-nut trees, and nearly obscured by them, and by a spur of a chain of hills inland. The easternmost of these is a sharp peaked hill called Anjer Peak, directly over the town, and is on with it bearing S.S.E.

A *red light* is shown on the extremity of the western pier of the boat creek at Anjer Point. It is elevated 23 ft., and visible 4 miles off.

The Road or anchorage is N. by W. from the fort in from 12 to 19 fathoms water, soft ground. From a position in 16 fathoms, three-quarters of a mile off shore, the flagstaff of the fort bears S.S.E., Fourth Point S.W. $\frac{1}{4}$ S., the Cap N.N.E. $\frac{1}{2}$ E., and the Button N. $\frac{1}{2}$ E.; and from thence the soundings decrease uniformly to 9 and 8 fathoms at about a cable's length from the reef which fringes the shore. This is but an indifferent roadstead in the N.W. monsoon, and landing is dangerous on account of the high surf. At this season the anchorage near North Island, on the Sumatra shore might be found more convenient.

In the S.E. monsoon, ships, both outward and homeward bound, generally call here for water and refreshments, unless they are content to purchase the latter from some of the numerous native boats usually to be met with on the look out for vessels passing through the strait. Buffaloes, poultry, vegetables, and frequently hogs, sheep, and turtle are to be procured here: water may be had by applying to the shore boats.

There is a *signal station* at Anjer for communicating with passing vessels. A *telegraph cable* crosses the strait from Anjer round the West end of Thwart-the-way, close by Hog Point, and up the eastern coast of Lampong Bay, to the coaling station near Telok Betong. Vessels should avoid anchoring in its vicinity.

Light.—Two lights, each elevated 35 ft., are exhibited on the piers forming the boat creek at Anjer Point.

Caution.—Ships should approach the anchorage of Anjer Road with great caution, especially at night, paying particular attention to the lead. They should not attempt to bring up in less than 15 or 13 fathoms, or they will probably get too near the reef fronting the shore, very close to which are 8 and 7 fathoms water.

“In weighing from Anjer Road with a westerly wind and flood tide, a vessel should cast as quickly as possible with her head off shore, and shoot

well into the strait, where she will have room and time to pick her anchor up; it being dangerous to keep a ship drifting in the road while heaving it close up, in consequence of a steep rocky point to leeward, called Lenning. A large ship was recently totally lost upon it, having drifted on while getting her anchor to the bows.

“Ships have frequently found themselves in dangerous proximity to this reef from anchoring in too small a depth of water, and with no room to veer in the event of sudden and violent squalls, which, as in most tropical countries, are very common in this strait.”—*Capt. J. B. Caldbeck.*

THWART-THE-WAY (*Dwars in den weg*), or *Pulo Renjang*, lying in the middle of the narrowest part of Sunda Strait, is 450 ft. high, and easily recognized by its irregular shape. It is $2\frac{1}{4}$ miles long N.N.W. and S.S.E., and very steep all around, except at its southern extremity, where a reef projects 2 or 3 cables' lengths, on which a rock above water is visible. *Capt. J. B. Caldbeck* states that the reef projects a greater distance out than is generally supposed from the southern end of Thwart-the-way; and that at low water the sea breaks more than a mile from the island. The highest part of the island bears N. by W. $\frac{3}{4}$ W., $6\frac{1}{2}$ miles from Fourth Point, S.W. by W. $\frac{3}{4}$ W. from St. Nicholas Point, and N.E. by E. $\frac{3}{4}$ E. from Krakatoa.

The West side of the island forms a small bay, in which there is temporary anchorage in 16 or 17 fathoms pretty close to the reef, with the N.W. point bearing North to N.N.W., and the South point from E.S.E. to S.E. by E. A 5-fathom patch lies about a mile off this part of the island, with irregular depths, 10 to 26 fathoms, around it.

CHANNELS.—The channel between Thwart-the-way and Java is the most convenient for sailing vessels, owing to the depths of water being but from 20 to 30 fathoms, whereas the channel between Thwart-the-way and Sumatra has 40 to 50 fathoms. The latter channel, described hereafter, is moreover encumbered with the Stroom Rocks, in dangerous proximity to which ships are liable to be set by rapid currents, and unable, from the great depth of water, to bring up by anchoring.* The narrowest part of the channel between the rocks off the South point of Thwart-the-way and the reef off

* “With regard to the respective merits of these channels, being bound either way through the strait, the preference may be decidedly given to that between Anjer and Thwart-the-way, in consequence of the great rapidity and uncertainty of the tides in the neighbourhood of the Stroom Rocks, rendering their proximity very dangerous, and unless in a strong breeze a ship is almost unmanageable. The depth of water on the Stroom side is almost double that on the Anjer shore, except in a S.W. line from the Button to Thwart-the-way. Instances have lately been known of ships which, being drifted dangerously close to the Stroom Rocks, let go their anchors and run their cables out to the clinch; they were of course still whirled on until by a lucky chance they barely went past the rocks and no more.”—*Capt. J. B. Caldbeck. Naut. Mag., 1843.*

Point is a little more than 4 miles; and the distance is the same between the S.E. end of Thwart-the-way and the Cap.

The Cap (*Brabands hoedje*), or *Pulo Ular*, is a small round-shaped island, only about a cable's length in diameter, lying N. by E. 3 miles from Anjer, and about E.S.E. 4 miles from the S.E. end of Thwart-the-way.

A shoal is said to lie between the Cap and the main land of Java, from which Fourth Point bears S.W., and the Cap N.W. by W. $\frac{1}{3}$ W.

BROUWERS SAND is a dangerous bank, lying between the Cap and Merak Island, nearly 2 miles off the Java shore. It is composed of very hard sand, and extends nearly 3 miles along the coast in a N.E. $\frac{3}{4}$ N. and opposite direction, its breadth being only 2 cables. There are three shoal patches on the bank, the least water being $1\frac{1}{2}$ fathom at low tides, and the general depths $3\frac{1}{2}$ or 4 fathoms. Its southern limit is $2\frac{1}{4}$ miles N.E. from the Cap; and its northern end forms with Merak Island a channel 2 cables wide, with depths of 18 to 10 fathoms water.

Between this bank and the shore there is a channel a mile wide, with 6 to 10 fathoms water, which increases in the direction of the Cap to 15 and 20 fathoms. But in this channel a rock called Kroenjo, which partly dries at low water, lies at $1\frac{1}{2}$ or 2 cables off shore, with the Cap bearing S.W. by W. $\frac{1}{3}$ W., the Button N.W. $\frac{1}{3}$ N., and the West point of Merak Island N. $\frac{3}{4}$ W. To avoid it, when standing in shore, the Cap should be kept inside of Fourth Point, for the Cap in line with Fourth Point leads just outside the edge of the bank.

GREAT MERAK ISLAND, or *Pulo Merak Besar*, lying N.E. $\frac{3}{4}$ N. $5\frac{1}{2}$ miles from the Cap, is of considerable height, nearly round, and about half a mile in diameter. The island is bordered by a reef, which on the N.W. side projects nearly a third of a mile.

Little Merak, or *Pulo Merak Ketchil*, lies near the shore, abreast the North end of Brouwers Sand, about half a mile to the south-eastward of Great Merak. It is connected to the main by a reef of rocks, which is just under water, and consequently cannot be passed by laden boats.

MERAK HARBOUR is between Great and Little Merak Islands and the main coast of Java. It is nearly half a mile in extent, but in mid-channel between the islands there is a rocky bank called *Tarremboe*, which partly dries at low water. The harbour may be entered by the channel on either side of this bank, as they carry from 5 to 10 fathoms water. The channel into the harbour North of Great Merak is the best, as it is more than a cable in breadth, and carries 6 to 14 fathoms. Entering by the southern channels, keep nearer to the Merak Islands than to the Tarremboe Bank; entering by the northern channel, keep Great Island shore aboard.

The anchorage with S.W. winds is East from the highest part of Great Merak, and North of Tarremboe Bank, in 6 or 11 fathoms water, soft ground. The Java shore is steep-to. Sometimes a heavy swell sets into the harbour,

for which reason it is not to be considered safe for ships in the N.W. monsoon, but small vessels will always find good shelter under Great Merak.

The **COAST** from Merak Island takes a north-easterly direction for about $4\frac{1}{2}$ miles to St. Nicholas Point. About midway between is a small islet, named Tempoza, lying close in shore. A reef fronts this coast, extending a third of a mile from it, and passing just outside Tempoza. Close to this reef are depths of 10 and 15 fathoms. The shore should not be approached nearer than half a mile, or in less than 20 or 18 fathoms water. The soundings increase regularly from the shore to 30 fathoms; at a distance of 4 miles there are 40 to 50 fathoms.

The **BUTTON** (*Toppers hoedje*) is a high and steep little island covered with trees, and about the size of the Cap, lying well out in the fairway of Sunda Strait, 5 miles to the north-eastward of Thwart-the-way. It has 34 and 30 fathoms close-to, and bears from St. Nicholas Point W. by S., distant nearly 7 miles, and from Hog Point E. $\frac{1}{4}$ N., $12\frac{1}{2}$ miles.

The *Anna* anchored, to wait a tide during the night, in 28 fathoms, E. 3° S. from the Button; and on another occasion she anchored for the night in 37 fathoms of water, with the Button bearing S.W. $\frac{1}{2}$ S.: here, however, a hard bottom was found.

ST. NICHOLAS POINT, in lat. $5^{\circ} 52' 33''$ S., long. $106^{\circ} 2' 10''$ E., is the extreme end of the high bold promontory forming the northern point of Java. Dangers extend about a third of a mile off the point, and close to them are 11 fathoms, and 32 to 35 fathoms at a distance of from 1 to 2 miles.

Directions.—When proceeding to the northward from, or being abreast of, Anjer Road, steer to pass outside the Cap and inside the Button, at any convenient distance from either, taking care not to borrow too close to Brouwers Sand in passing. When clear of that shoal and the Button, steer about N. by E. for the Two Brothers, if bound to Banka Strait; or to pass St. Nicholas Point at about 2 miles if bound to Bantam or Batavia.

THE COAST OF SUMATRA.

The western coast of Sumatra, terminating at the N.W. point of the Strait of Sunda, is described in our "Directory for the Indian Ocean." The deeply indented southern coast of this great island forms the northern side of the strait.

It is occupied by the *Lampungs*, or *Lampongs*, a distinct people from the other nations of Sumatra, resembling in this respect the people of Java on the other side of the strait, and is, like them, subject to the Dutch Government. The geologic formation is of the same character as that of the Sunda country of Java, a mass of volcanic mountains, some of which rise to great

elevation, as those of Lampong and Tanjamus, 7,500 ft. The people are, compared with the rest of the Sumatrans, rude and unpolished, though having a written language. Their country is far from fertile, and much of it incapable of being cultivated. The chief product for exportation is black pepper, next to this are rattans and dammer or resin. It was formerly the dominions of the King of Bantam. It has been surveyed by order of Admiral E. Lucas, by Lieutenants J. A. G. Rietveld and E. H. Boom, 1841. The correct Dutch orthography can scarcely be followed, as many of the names have for so many years been recognized as they will be given, that it has been thought advisable to retain them.

The South coast of Sumatra, between Flat Point on the West and Hog Point on the East, a distance of 70 miles, is indented by two large bays, named Keyser and Lampong, the shores of which are fronted by numerous islands and rocks.

FLAT POINT (*Vlakke Hoek*), in lat. $5^{\circ} 59' S.$, long. $104^{\circ} 32' 37'' E.$, is the southern extremity of Sumatra, and the north-western boundary of Sunda Strait. It is properly the western extreme of the low projecting tongue of land which separates Keyser Bay from Blimbing Bay, and the East point of which is usually, though improperly, called *Chinna Point*, its correct name being *Rada*, another point 3 miles more to the westward being Chinna Point. *Rada Point* bears East a little northerly, and is distant 9 miles from Flat Point. A small reef fringes the shore about Flat Point, but at a mile off shore are 7 to 10 fathoms.

At $2\frac{1}{2}$ or 3 miles S.W. of Flat Point there is a narrow bank, with 8, 13, and 15 fathoms water on it, about 5 miles in length, W.N.W. and E.S.E., and about a mile in breadth, partly consisting of reddish sand. The soundings outside this bank increase rapidly to 30, 40, and 50 fathoms, and inside of it there is a channel, about $1\frac{1}{2}$ mile wide, with 14 and 15 fathoms.

LITTLE FORTUNE ISLAND (*Klein Fortuin Eiland*), or *Pulo Batu Ketchil*, lies in front of Blimbing Bay, just outside Sunda Strait, N.W. by W. 9 miles from Flat Point, and about 5 miles from the main; it is low, woody, about a mile in diameter, and surrounded by a reef also a mile in extent.

BLIMBING or **Billimbing Bay** is inside Little Fortune Island, and northward of Flat Point. At its entrance ships may anchor in 7 or 8 fathoms, and find a good berth with S.E. winds, but not with those from the N.W. Small vessels will be sheltered from all winds by anchoring further inside in 3 fathoms, behind the projecting reef.

There is also anchorage off the East side of Little Fortune Island, in 9 or 10 fathoms. In some charts two reefs are placed in this bay close in shore; it is very probable they do not exist, but it will be advisable to be careful.

On the East side of this bay is a small river, but its water is brackish ; a fresh-water spring, however, may be found inside the S.W. point, from which a reef projects a quarter or half a mile to the northward.

Approaching Sunda Strait by night, the soundings will be a good guide in passing Little Fortune Island and Flat Point. At 6 miles off shore the depths are 40 and 30 fathoms, and, with a commanding breeze, ships may venture into 20 or even 15 fathoms ; but when too dark to distinguish the land, it is advisable not to shoal to less than 20 fathoms.

KEYSER or SAMANGKA BAY runs inland in a north-westerly direction about 30 miles, and is about 20 miles wide at entrance. Its western shore is steep, affords no shelter from south-easterly winds, and has 20 or 30 fathoms water within half a mile of it.

Tampang Bay, just round Rada Point, on the western side of Keyser (properly Keizers) Bay, is only an open bight, but has good anchorage ground in depths from 12 to 15 fathoms, a mile off shore. A ship will be exposed here to south-easterly winds, and will have much difficulty, on account of the rocky shore, in getting water from the shallow rivulets that discharge themselves into the bay.

The village of *Borne* is in the N.W. part of Keyser Bay, at the mouth of Samangka rivulet, the water of which is good, but boats will find it difficult to enter. The land is low, and fronting the sea marshy. The best anchorage is East, or E. by N. from the mouth of the rivulet, 1 or 1½ mile distant from the shore. Ships lie here usually without danger from south-easterly winds, which seldom throw a very high swell so far up the bay. Near *Betong Point*, the southern extremity of the bay near Borne, there is a rocky shoal which projects more than a mile in the offing, with 10 fathoms very near it.

The eastern side of Keyser Bay, North of Kalang-bayang Harbour, is not so steep as the western side, and affords good anchorage about 2 miles off, in 20 or 30 fathoms ; but it is also exposed to south-easterly winds.

KEYSER ISLAND, or *Pulo Labuan*, lying nearly in the middle of the entrance of Keyser Bay, is high and steep-to all round, and affords but one spot fit for anchorage, a very indifferent berth in the western monsoon, which is on the N.E. side in 25 to 30 fathoms, sand, and very near the shore. There is fresh water, but the high surf renders landing very troublesome. The island is inhabited, well cultivated, and produces large trees fit for masts.

Kalang-Bayang Harbour, or *Koloembyan Bay*, on the eastern side of Keyser Bay, and about East from the North point of Keyser Island, is small, but safe, and affords good shelter from all winds, with sufficient depths of water for large ships. It may be easily recognised by the high and rocky island of Eyoe, which lies about a mile outside, and can be seen 15 miles off. Half a mile north-westward of Eyoe there is another island, or rather rock, called

Pulo Klappa, with a single cocoa-nut tree upon it. There is a safe channel with 25 fathoms water between these islands.

This harbour has been said to be well adapted for a fleet in want of refreshments, as every supply may be obtained; but the Java Guide says that refreshments are very scarce. Water may be obtained from a small rivulet in the north-eastern part of the bay.

In the N.W. monsoon, enter the harbour by the western passage between *Pulo Klappa* and the North point called *Tanjong Napal*, and when the latter bears about West, or W. by S., anchor near the eastern beach in 10 fathoms, soft ground, or anywhere in the harbour, there being no hidden danger.

In the S.E. monsoon, steer in about N. by E., between *Eyoe* and *Klappa* Islands. With a commanding breeze a vessel may pass eastward of *Eyoe*, between it and *Pulo Batu Kabu* on a N.N.W. course. These channels lead close to the *Rover Rocks*, which are, however, easily avoided, and left to the eastward, as most of them are above water.

Kiloang Bay lies 5 miles to the south-eastward of *Kalang-bayang*, and also affords safe anchorage. It may be known by *Tongkalie Island*, which is visible 12 miles off, and lies off the East point of the bay, being separated from the main by a small channel only fit for boats. This bay, as well as *Kalang-bayang Harbour*, contains all sorts of wood.

Coming from the westward or southward with a leading wind, steer for *Tongkalie* till it bears East, distant 2 or 3 cables' lengths, when three groups of black rocks will be seen, the southernmost of which bears N.N.W. from *Tongkalie*, and S.W. from the others. Steer N.E. and E.N.E. past these rocks in from 30 to 20 fathoms, for the eastern side of the bay, which is very high, till *Kiloang Island* bears West, where a good anchorage may be taken in 13 fathoms between it and the beach, and sheltered from all winds. *Kiloang Island*, which is small and not very high, lies near the eastern beach of this bay, with some rocks at its northern and southern extremities, a large reef to the eastward, and a smaller one on its western side. Although the bay is spacious, yet pass close to the westward of *Tongkalie*. Everywhere else in the bay anchoring ground may be found in 16 to 18 fathoms, but accompanied by a heavy swell.

MOUNTAINS.—The land of *Sumatra*, eastward of *Kalang-bayang Harbour* and *Kiloang Bay*, is very high, consisting of the *Kalang-bayang* or *Kamantara Mountains*, 3,418 ft. high; and 3 miles farther to the northward the *Ratth Mountains*, the southernmost peak of which is 5,097 ft. above the sea. More westerly, and not far from the shore of *Keyser Bay*, the *Lampong Mountains* rise to the height of 6,560 ft., and *Joukamoe*, or *Keyser Peak*, situated 11 or 12 miles farther to the north-westward, and near the head of the bay, reaches to 7,412 ft.

Pepper Bay is on the North shore of *Lagundy Strait*, on the West side of *Tikus Point*, the S.W. point of entrance of *Lampong Bay*. It has a huge

three-cornered rock in the middle, and is very limited ; but the native proas row up behind the high western beach, where there are 18 fathoms water close in.

LAMPONG BAY, formed between Tikus Point on the West, and Rajah Bassa on the East, is very extensive, being about 20 miles wide at entrance, and stretching northward into the land nearly the same distance. At its entrance the Lagoendy Islands, hereafter described, extend 8 miles to the eastward from Tikus Point. Other islands line the western shore of the bay inside, between which and the main there are several good roads or places of shelter. In every part of the bay, from North to South, will be found from 10 fathoms, mud, to 20 fathoms, clay bottom.

If a vessel keep outside the islands on the western shore of the bay there are but *two dangers*, both of which may be easily avoided. The first is a sandbank, dry at low water, surrounded by a reef, which rises from 17 fathoms, mud, and bears E.S.E. $1\frac{1}{2}$ mile from Kalagian, and N.E. $\frac{1}{4}$ N. 2 miles from Little Pokowang. The second is a reef with 2 and $1\frac{1}{2}$ fathoms upon it, bearing S.E. $\frac{1}{2}$ S. $1\frac{1}{4}$ mile from the easternmost of the Choondong Islands.

Pedada Bay, the first bight to the northward of Tikoes Point, on the western side of Lampong Bay, is $1\frac{1}{2}$ mile wide at entrance, and $3\frac{1}{2}$ miles deep.

When running into this bay in the direction of the southern end of the Kalang-bayang Mountains, on a W. $\frac{1}{2}$ N. course, the soundings will be 20 to 15 fathoms, clay and mud, and the three small islands of Pedada, Penarian, and Lalanga will be seen. *Pedada* is the easternmost and highest, but N. by E. from it half a mile there are two detached reefs, usually covered with breakers ; and a third reef N.E., which bears W. by S. from the North point of the bay. Keeping this last reef on the starboard bow, and the other two on the port bow, will lead to an anchorage in 15 fathoms water, very near the village of Pedada, bearing W. $\frac{1}{2}$ N. This village is to the westward of *Lalanga Island*, and stands on a clear fresh-water stream. The high rocky islet of *Klappa* is connected with Pedada Point by three groups of rocks above water, leaving, however, between each of them a passage for small craft. North-eastward of Klappa lie also three patches of rock, with 17 and 16 fathoms, clay, between them ; to avoid them, keep Lalanga Island to the westward of North. This small island is also high, with a reef extending about 2 cables from its N.E. point.

Poono Bay, lying 4 or 5 miles to the northward of Pedada Bay, is 2 miles wide and 3 miles deep, with 10 to 7 fathoms water. Across the entrance lies *Pokowang*, the largest island in Lampong Bay except Lagoendy, with a peak on its northern side, and to the eastward a small island, to which it is connected by a reef.

Poono Bay may be approached on either side of Pokowang. When

taking the northern passage, which is preferable, the white coral reefs are seen at some distance, but avoid the reef projecting 3 cables' lengths N.E. from the island, with 15 fathoms close to it. There is also a detached coral reef close to the N.W. point of Pokowang, which must be kept on the port side, while the four coral reefs, lying mid-channel N.W. and W.N.W., from the centre of Pokowang, should be kept on the starboard side.

Rateh Bay comes next to Poondo Bay. It is 3 miles in extent each way, with 16 to 18 fathoms, mud bottom, and at the entrance lies Kalagian Island, which is high, and has a small island separated from its South point by a boat channel of 3 to 8 fathoms water.

Not quite a mile S. by E. from Kalagian lies a *coral reef*, showing at low water like a black speck, and bearing W. by N. $\frac{3}{4}$ N. $1\frac{1}{2}$ mile from the above-mentioned coral reefs, between which is 17 and 14 fathoms, mud.

Ratteh Bay may be approached on either side of Kalagian; and the two reefs, which dry at low water, to the westward of the island, may be discerned at some distance, and consequently easily avoided.

Mahitam Island lies off the North point of Ratteh Bay, with which it is connected by a reef. There is good anchorage on its North side, in 13 fathoms, mud bottom.

Tagal Island, flat-topped and conspicuous, bears N.E. $1\frac{3}{4}$ mile from Mahitam, and about W. by S., $3\frac{1}{2}$ miles from the Choondong Islands, and is visible throughout the whole of Lampong Bay. When coming in from the eastward, a vessel may steer for it on a N.W. bearing, and pass it in 15 fathoms; if entering from the southward it is a mark for Lagoendy Strait.

In the bay north-westward of Tagal there are the two villages, *Ringong* and *Oerong*; and near the South point of the bay is the small island Laho, connected to the shore by a reef, and throwing out another to the northward.

Tankel Island is 3 miles North of Tagal. The North side is low, but the South side high.

The *Head of Lampong Bay*, northward of Tankel, narrows, so as to be scarcely 4 miles wide, but it contains four islands:—*Pomogotang*, $1\frac{1}{2}$ mile North from Tankel, is all sand, but has some trees, and is surrounded by a large reef. *Little Pomogotang* is a bank without trees, 1 mile W.N.W. from the former, and also begirt by a broad reef. *Koeber Island*, lying S.W. from Pomogotang, is separated from the main by a 5-fathom channel, and a reef runs out 2 cables' lengths from its eastern side. A black beacon *buoy* marks the eastern side of a reef; it lies N. 39° E. from Koeber Island, and South from a white beacon buoy, with the harbour office at the mouth of the river, N. 43° W., and the foot of Mount Apen N. 7° E. The fourth is the low island of *Passarang*, in Telok Betong Road, S.E. from the river. Besides these islands there are some coral reefs.

Telok Betong, situated in the north-western part of the bight, is the chief town of Lampong Bay. Its population consists of natives of Sumatra and

Bugis, with a Regent from the Dutch Government as their chief. They trade with the Javanese in Lampong tobacco, which is highly esteemed. A *telegraph cable* connects Telok Betong with Anjer. The Dutch Government have a coal store at or near here, but fresh provisions are reported as difficult to be obtained. A *red light*, elevated 39 ft., is shown from an iron column.

The eastern side of Lampong Bay, between Telok Betong and the Choondong Isles, is high, free from danger, and may be approached in safety to 14 and 15 fathoms, close to. From the Choondong Islands to Rajah Bassa the coast, at 2 or 3 cables' lengths distance, is fronted by a line of rocks.

The Choondong Islands are three in number, of which the northernmost is a steep rock, and the two others are larger, but not so high. A detached 6-ft. reef is reported $1\frac{1}{2}$ cable E. of the southernmost of the Choondong Isles.

To the northward of the Tiega Islets the Sumatra coast forms a deep curve, called *Blantong* or *Lobogh Bay*, with 4 or 5 fathoms, mud, and a salt-water river. The points of the bay on each side are covered with rocks and a high surf.

Tiga or *Tiega Islets*, three rocky islets lying 3 miles off shore, appear as one when coming from the eastward, and do not begin to open until Rajah Bassa Road is approached.

Rajah Bassa Road.—The land forming the south-eastern part of Lampong Bay is high, and rises to two conspicuous peaks, 3 or 4 miles inland, named *Rajah Bassa Mountains*. The height of the N.W. peak is 4,398 ft., and that of the S.E. peak 4,093 ft. Rajah Bassa Road, which lies directly off the high land, was frequently visited by the China ships, it being an excellent place to obtain good water with facility, and other refreshments, although Anjer is still better.

There are three villages on the shore of Rajah Bassa Road. The first is *Kalinda*, bearing N.N.E. $\frac{3}{4}$ E. from the Tega Islets, and having in front of the white sandy beach some large rocks above water, between which are the openings that make it easy to land. The anchorage is in 7 to 10 fathoms, mud, West from the village, and a mile off shore. The second village is *Tyanti*, which lies E.N.E. from the largest Tiga Islet, and abreast that part of the road where is the best anchorage, and the best watering places. The third village, called *Rajah Bassa*, is just to the northward of Cocoa-nut Point, and about East from the Tega Islets; it is the largest one of the three, but the watering there is very difficult, at least much more so than at Tyanti, and the landing dangerous with westerly winds.

KLAPPA, or *Cocoa-nut Point*, or *Rajah Bassa Point*, is low, covered with cocoa-nut trees, and bears N.W. by W. nearly 8 miles from Hog Point, and E. by S. $\frac{1}{4}$ S. from the Tiga Islets. Between Cocoa-nut and Hog Points the coast curves in to the north-eastward 2 miles, and at the bottom of this bight are the two small *Bight Islands*, surrounded by reefs.

About $1\frac{1}{2}$ mile north-westward of Hog Point, and about $1\frac{1}{4}$ mile off shore,

is the *Tims Klip* or *Collier Rock*, 6 or 7 ft. above water, and 56 ft. in circuit. It is fringed by a reef, which on the N.E. side projects about 50 ft. Another rock above water lies about a cable's length westward of Hog Point, with deep water all around it.

The **LAGUNDY** or **LAGOENDY GROUP**, lying in the S.W. part of the entrance to Lampong Bay, consists of seven islands, viz., Lagoendy, Round, Saka, Soengal, Tims, Sussarat, and Mangoman. They are uninhabited, but produce good timber, deer, and wild hogs. Along the southern shores of the first four islands the sea in the western monsoon is very violent.

Lagoendy, the largest island of the group, is nearly 5 miles in length, E.N.E. and W.S.W., and close to the southward of its West point are two high, round-shaped rocks, covered with verdure, N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W. from each other, with a boat channel between them. On the S.E. side of Lagoendy there is another rock or islet of the same character.

On the North side of Lagoendy there is a small but safe bay, *Nangga Harbour*, with depths of 15 to 7 fathoms. In the middle of the entrance is the small island *Patappan*, behind which a ship may find good shelter from wind and sea. There is room for ten or twelve ships, and fresh water is found on Lagoendy, S.E. from Patappan.

Mangoman Island, lying a little outside Nangga Harbour, has 15 to 22 fathoms, clay, all round it, except on its eastern side, where there are only 10 to 15 fathoms. When coming from the eastward or northward, a mistake may occur between this island and Patappan, but the latter is lower and smaller than Mangoman.

LAGOENDY STRAIT, between Tikoes Point and the Lagoendy Islands, is 2 miles wide, and may be recommended to ships working out of Lampong Bay in the N.W. monsoon. About mid-channel is the high island of *Sussarat*, with 10 fathoms, sand, close-to, and 30 fathoms farther off. Near its West point there are some rocks, but they are high above water. Although this island is in the middle of the channel, yet in a calm ships need not be alarmed by the current which seems to set towards it. The passages on either side of Sussarat are equally good.

A *Coral Reef*, carrying only 2 fathoms water, and having 13 fathoms around it, lies northward of Mangoman Island, and from its N.E. side the highest point of Sussarat bears S.W. by W. $\frac{1}{4}$ W.; the West point of Lagoendy S.W. $\frac{1}{4}$ S.; the North point S.E. $\frac{1}{4}$ E.; and the middle of Mangoman S. $\frac{1}{2}$ E. The reef is about 75 yards long, and cannot be distinguished by discoloured water.

A rock awash, which breaks in moderate weather, has been discovered in Lagoendy Strait, S. 24° E. from Tanjong Blantong (?).—*Naut. Mag.*, June, 1877, pp. 622-3.

Round Island lies off the East end of Lagoendy, its length being about $2\frac{1}{2}$ miles, N.W. and S.E., and its breadth nearly a mile. *Saka* lies about

one-third of a mile off the S.W. point of Round Island; and *Soengal* about the same distance off the S.E. point.

The passage between Lagoendy and Round Island cannot be recommended, nor that between Round Island and *Soengal*, for although the water is everywhere deep, the ground is foul and the current strong.

Tims Island, lying 3 miles eastward of *Soengal*, is very small and low, consists chiefly of red clay, and is surrounded by a broad reef with heavy breakers; but the channels on either side of it are quite clear.

KRAKATOA ISLAND (or *Krakatou*). lying in the middle of Sunda Strait, is about 5 miles in extent N.N.W. and S.S.E., and 3 miles broad. Its fine conical peak, rising boldly up to the height of 2,623 ft., may be seen at a considerable distance, and serves as a fairway mark for ships entering the strait from the westward. It is in lat. $6^{\circ} 9\frac{1}{2}'$ S., long. $105^{\circ} 27' 20''$ E. A range of high land runs from the peak in a northerly direction for $1\frac{1}{4}$ mile, when it turns to the north-westward, and, gradually diminishing in height, disappears at the N.W. point of the island; the outline of the range is marked by several prominences or peaks. The North coast of the island consists of rocky hills, without any vegetation whatever. The West and South coasts also consist of a steep and rocky shore, and it is only on the eastern coast that there is any level land.

There is a small spring of fresh water on the N.E. side of Krakatoa, opposite the South end of Lang Island, but it can only be approached by boats at high water, and ships should not depend upon watering there. A short distance to southward is a hot spring, in which the thermometer rose to 154° .

A bank of soft mud extends from the East side of Krakatoa and Lang Island about 3 miles, with the peak bearing W.S.W. to S.W. by W., affording excellent shelter from westerly gales, by anchoring in from 20 to 23 fathoms about $1\frac{1}{2}$ or $2\frac{1}{2}$ miles off shore. The peak bearing S.W. by W. is the best berth; but a ship should not anchor with the North end of the island to the southward of West, or she will be exposed to a heavy sea rolling in from the westward between Krakatoa and Pulo Bezee, during a westerly gale.

A submerged rock, hereafter described, is marked on the chart nearly East from the peak of Krakatoa, and a quarter of a mile off shore.

On the 21st February, 1829, the Russian corvette *Moller*, commanded by Captain Lütke, although only drawing 14 ft., touched on a coral patch, said to lie $1\frac{1}{4}$ mile from the nearest point of Krakatoa, and S.E. from the isle lying off its N.E. point; but the description of its position, being rather ambiguous, is not satisfactory.

Verlaten (or *Forsaken Island*), 2 miles long, and half a mile broad, lies close off the N.W. end of Krakatoa, from which it is separated by a narrow channel with numerous reefs, which make it dangerous for boats to pass through. A white rock 60 ft. high, and another rock 80 ft. high, lie about

three-quarters of a mile off its S.W. end; and about a mile East of that end of the island, between it and Krakatoa, is a rock or islet, with a rock awash a short distance to the southward of it.

Lang Island, about $1\frac{3}{4}$ mile long North and South, and about half a mile broad, is separated from the N.E. side of Krakatoa by a channel barely 2 cables wide at its narrowest part. A reef stretches out from its N.W. side nearly half a mile, and encircles its North and East sides at an average distance of half a mile, terminating off its South point. The West side of the island is bold and cliffy, with deep water close to. The *Polish Hat* (*Poolsche hoed*) is a round islet, lying off the West side of Lang Island, between it and Krakatoa; a reef projects about half a cable's length from its N.E. side.

The Channel between Lang Island and Krakatoa is from one-half to one-quarter of a mile wide. The shore of Krakatoa, forming the West side of the channel, is fringed with a reef extending about a cable's length from it, except at the point nearest Lang Island, where it projects only about a quarter of a cable. The soundings in the channel are deep, 30 and 28 fathoms, but they are very irregular, decreasing towards the Polish Hat from the southward.

A *shoal* lies a mile S.S.E. from the South point of Lang Island, and about a quarter of a mile from the shore of Krakatoa. It extends about $1\frac{1}{2}$ cable in the direction of the channel, and has a rock which is sometimes awash, and others just under water, upon it. The West extreme of Lang Island in line with the East extreme of Krakatoa leads between this shoal and the reef extending off to the S.E. point of Lang Island, although it passes very close to both.

BEZEE, or *Tamarind Island*, bearing about N. by E., nearly 12 miles from Krakatoa Peak, is nearly 3 miles in extent North and South, and $3\frac{1}{4}$ East and West. This island has also a high peak, named *Sebezee*, sharper than that of Krakatoa, and resembling a sugar-loaf, which rises abruptly to a height of 2,825 ft. from the southern extremity of the island, and slopes gently down to the northward. A reef projects about a third of a mile from the West side of the island, some rocky points of which are visible above water; and off the N.E. side there are three small islets called *Huisman*, *Little Tamarind*, and *Gorts*, all of which are surrounded by small reefs having banks between them; the islands and reefs extend a little over half a mile from the shore. Bezee Island produces a certain quantity of pepper, and is inhabited by natives belonging to the villages in Lampong Bay. The village is on the East side, opposite Little Tamarind Island.

All around this island there is good anchorage in 15 to 25 fathoms water; and at a mile from the N.E. side there is an excellent roadstead, even in S.W. gales, with 13 fathoms water.

Bezee Channel, between Krakatoa and Bezee, is 7 miles wide, and frequently used by ships working out in the N.W. monsoon, in preference to

the Great channel, because here they have regular soundings from 18 to 30 fathoms, and may anchor when convenient.

Boom Rock, lying nearly half a mile off the South point of Bezee Island, is a few feet above water.

Hindostan Rock is the only known danger in this passage. A ship of that name is said to have struck upon it in 1791, and found on its summit, which was only 6 or 8 ft. in diameter, 15 ft. water, and 10 fathoms close-to. Krakatoa Peak bore from it S. by W. $\frac{1}{3}$ W.; the West extremity of Verlaten Island S.W.; the East extreme of Lang Island S. $\frac{1}{4}$ W.; Bezee Island from N.E. to N. $\frac{1}{4}$ W.; the peak of Keyser Island W. by N.; and the Zeeklip W. $\frac{1}{2}$ N., well open to the southward of Keyser Island.

Lieutenants Rietveld and Boom tried to discover this rock, but without success, though they found a shoal with $5\frac{1}{2}$ fathoms least water, consisting of hard rock and coral, and having all around 6 to 13 fathoms, soft mud and clay, and at some distance 19 fathoms. From this shoal Krakatoa bore S. by W. $\frac{1}{3}$ W.; West extremity of Verlaten Island S.W.; South point of Zeeklip West; and the angle between the two extremes of Bezee Island was $68^{\circ} 30'$. Some of these bearings agree exactly with the former, and it is more than probable that it is the same rock; but, if not, the true Hindostan rock must be very near to this shoal, possibly a little to the north-eastward or eastward of it. To avoid the Hindostan rock or rocks, keep at least 2 miles from the South side of Bezee Island. The best mark for proceeding through this channel, is never to bring Gap Rock open to the southward of Keyser Island, W. by N. Between Hindostan Rock and Boom Rock there are 10, 16, and 20 fathoms water, rocky bottom; but between this latter rock and Bezee there are 8, 9, 13, 11, and 8 fathoms, with foul bottom. Lieut. Rietveld saw here different patches of light-coloured water, owing, apparently, to an eddy current, and although they much resemble sunken rocks, all the casts of the lead indicated 16 to 19 fathoms.

Zee-Klip (*Sea Rock*), bearing W. by S. 6 miles from Sebezee Peak, consists of three pyramidal rocks very near each other, and showing above water; the southernmost is the largest, and is often called the *Gap Rock*, on account of a cleft in it. They are visible at a considerable distance, bearing N. $\frac{1}{2}$ E. and S. $\frac{1}{2}$ W. from each other, and are connected under water by reefs, upon which the sea continually breaks. They are steep-to and inaccessible; and near them are 26 and 30 fathoms, mud and clay.

SEBUKO ISLAND (or *Seboeko*), N.N.E. a mile distant from Bezee, is not so high as the latter, and consists mostly of craggy hills. It is inhabited by natives of Rajah Bassa, who cultivate some pepper plantations. Its extent is $3\frac{1}{2}$ miles North and South, and about 3 miles East and West.

Close to the East side of Sebuko is *Beschutter Islet*, which is high on the East side, has a reef on its South side, and forms with Sebuko a small bay, with 15 to 19 fathoms water, affording good anchorage for proas. A coral

rock, lying mid-channel between the East point of Sebuko and North point of Beschutter, renders it dangerous to enter this little bay from the northward with westerly gales; but there is a good road for large vessels in 11 and 13 fathoms, 1 or $1\frac{1}{2}$ mile from Sebuko, near the East side of Beschutter.

Reefs project from the numerous points of Sebuko, and in some places they either show above water, or the sea breaks over them, but they do not seem to extend far off, except from the West point, from which a reef stretches off nearly 2 miles; it is very steep-to, but not dangerous, because the westernmost rock on it rises to a considerable height out of the water, and has a slight resemblance to Zeeklip. This rock lies W.N.W. from the South point of Sebuko; S.W. by W. $\frac{1}{2}$ W. from its N.W. point; N. $\frac{1}{3}$ E. from the West point of Bezee, and $1\frac{3}{4}$ mile from the West side of Sebuko.

The Channel between Sebuko and Bezee Islands is not quite a mile wide, with soundings from 19 to 23 fathoms, hard sandy bottom; the passage northward of Sebuko, between it and the Tega Islets, is $1\frac{1}{2}$ or 2 miles wide, and has 20 to 34 fathoms. A sandbank lies West $1\frac{1}{2}$ mile from Tiga Isles, and N. by W. from the North end of Sebuko.

HOG POINT, or Varkenshoek, *Tanjong Toka*, bearing S.E. by E. $7\frac{1}{2}$ miles from Cocoa-nut Point, is the south-eastern extreme of Sumatra, and between narrowest part of Sunda Strait, across which the Telok Betong *telegraph cable* is carried to Anjer. The point has a round hilly appearance, and is easily distinguished when approaching it from the eastward; but, coming from the westward, it has been mistaken for one of the Zutphen Islands. The soundings a mile distant from it are from 40 to 60 fathoms.

it and Fourth Point on the Java coast, which bears S.E. $\frac{1}{4}$ E. 13 miles, is the

The **ZUTPHEN ISLANDS** front the coast of Sumatra to the north-eastward of Hog Point. Four of them are large, and the remainder are very small, the whole extending N.E. and S.W. about 4 miles, and within $2\frac{1}{2}$ miles of the main. There are several shoals in the passage between them and the coast, amongst which there is said to be anchorage in some places. This passage is generally used by proas, and might be taken by large ships with a commanding breeze, there being sufficient depth of water, but great caution is recommended. The islands are steep-to on their South side, having 40 and 50 fathoms water very near them.

Kandang, the south-westernmost island of the Zutphen Group, is about a mile long N.E. and S.W., and half a mile broad, of considerable height, and covered with large trees. Off its N.W. side are two coral rocks, visible above water, and steep-to on their western sides. Near these rocks, on the N.W. side of Kandang, there is a small bay that affords a safe anchorage to proas in 11 or 12 fathoms water, close in-shore, and even large vessels would find safety there; very often it is frequented by pirates.

High and Hout Islands (*high and woody islands*), lying to the eastward of

Kandang, are of considerable height, rocky, and covered with trees. They are about half the size of Kandang, the three islands being separated by narrow channels. Between Kandang and High Island is a small islet, with some cocoa-nut trees upon it.

A reef of rocks lies 2 cables' lengths from the N.E., East, and S.E. sides of Hout Island, with 10 or 12 fathoms in the narrow gut between it and the island. The soundings eastward and south-eastward of Kandang, and High and Hout Islands are very deep, there being 40 to 50 fathoms a short distance off them.

Cocoa-nut Island, lying westward of Kandang, is small, very low, and surrounded by a reef, which is very steep-to. *The Brothers*, two small islands lying to the northward of High and Hout Islands, are low and sandy, covered with small wood, and surrounded by a narrow but steep reef, with 15 and 18 fathoms water close-to.

Remoa Island, the northernmost and largest of the Zutphen Islands, is also the highest, being elevated 300 or 400 ft. above the sea. To the N.W. there is a low neck of land, which at 2 cables' lengths from the ground begins to rise; the South end is the highest. Part of the low neck is a sandy beach, which affords a good place for boats, it being very difficult to land anywhere else. Remoa is covered with trees, large and small, as also are the other islands belonging to this group.

The South side of Remoa is fronted by a reef, partly above water, with a very narrow channel between it and the island; it is called *Boompjes Reef*, and carries some small brushwood; from its South point the N.E. point of Thwart-the-way bears S.E. $\frac{1}{2}$ E.

Fatal Islet and Reef.—Close to the N.E. point of Remoa is a high rocky islet, called Fatal, and from thence a reef projects to the North and N.W., on which is a separate coral rock, dry at low water, and all stretching off about half a mile, with depths of 11 and 12 fathoms close to them, so that the lead gives but little warning. From the northern point of this reef the North point of Fatal Island is on with the Button; and from its western edge the West point of Remoa is on the West point of Kandang Island. *Toempal Island*, lying westward of Remoa, is small, very low and woody, and surrounded by a reef, which is steep-to.

South of Toempal, and nearly in mid-channel, are two steep *coral rocks*, with 2 or 3 ft. water upon them at ordinary tides, and sometimes dry. They lie in the line of the Boompjes Reef and the N.E. point of Thwart-the-way in one, S.E. $\frac{1}{2}$ E. A little further South lies a small but steep coral rock, sometimes dry at low water, from which Boompjes Reef is on with the North point of the Button, E. by S.

On account of the rapid currents experienced at times near the Zutphen Islands, in the westerly monsoon, ships ought not to approach their South

and S.E. parts nearer than $1\frac{1}{2}$ or $1\frac{1}{4}$ mile, particularly in passing Hout Island, where the current runs with great velocity, sweeping to the S.W. and W.S.W. round Hog Point.

Lieut. Prins, in 1844, discovered an excellent anchorage for a dozen or more large vessels between Hog Point and the Zutphen Islands. He says, if in either of the monsoons a vessel cannot beat through, or is detained by calms or currents, she may bring Kandang Island to bear N.E., and Sindo Island North, and to the westward of that line she may choose her berth in from 30 to 5 fathoms, sand; and from thence the land wind will enable her on the following morning to pursue her voyage. Moreover, just to the westward of Sindo there is a small river, with good water, near Pagatan village.

Vessels are strongly advised not to try the intricate and dangerous passage inside the Zutphen Islands, especially as there is no reliable chart of it yet published.

The Channel between Thwart-the-way and the Zutphen Islands is but $3\frac{1}{2}$ miles wide, and encumbered with two dangers, viz.: the Stroom Rocks off Thwart-the-way, and the Winsor Rock off the Button. Owing to the great depth of water in it, 40 to 50 fathoms, it is not so convenient as the channel between Thwart-the-way and Java, where the depths being only 20 to 30 fathoms, much greater facility is afforded for anchoring in calms. The channel between Thwart-the-way and Sumatra is much frequented in the westerly monsoon by ships bound to the westward.

STROOM ROCKS, lying N.N.W. $\frac{1}{3}$ W., $1\frac{1}{2}$ mile distant from the West point of Thwart-the-way, are a group of three or four rocks very near each other, with some of their tops visible above the sea at high water, and then only discernible in fine weather at a short distance; at other times they may be seen at a considerable distance by the breakers on the reef which connects them under water. They are steep-to, having 40 and 50 fathoms very near them.

The currents which meet about here from the North and East are very strong, and with the opposite wind there is, near these rocks, such a boiling and eddying of the water all around, that it almost appears as if they are connected to Thwart-the-way, the light-coloured patches between them appearing like rocks under water.

Winsor Rock, on which the American ship *Claudius*, Capt. Winsor, struck in May, 1837, was examined by Lieut. B. G. Escher, D.R.N. From it the middle of the Button bears S.E. by E. $\frac{2}{3}$ E., distant $1\frac{1}{2}$ mile; the S.E. point of Thwart-the-way, S.S.W. $\frac{1}{2}$ W.; its N.W. point, S.W. $\frac{2}{3}$ W.; and the South point of the southernmost Zutphen Island is just in one with the northernmost visible point of Bezee Island. The least water on it is 16 ft., the depths increasing suddenly in every direction. Other rocks were seen in the eddy on the lee side of the rock.

The COAST of SUMATRA from the Zutphen Islands runs N.N.E. $\frac{1}{2}$ E. for the distance of 3 miles to a point, not named on the charts, where it trends away to the northward. This part of the coast is fronted by rocks.

Pulo Logok is a small but very high island, lying 1 mile North of the above-mentioned point, and 4 miles N. by E. from the Zutphen Islands; the coast near it is rocky and steep. Lieut. Kolff found there 15 and 20 fathoms hard sand; but further to the southward towards the steep point near the Zutphen Islands, a mud bank projects from the shore; the lead is there a sure guide, for the bottom in 9 and 10 fathoms is hard, while in 7 and 6 fathoms it becomes soft.

The Sisters (*De Gezusters*) are three small islands, lying about N. by E. 3 to $4\frac{1}{2}$ miles from Logok Island. S.E. nearly a mile from them is a small reef with only 2 fathoms water, on which a ship was aground, with North Island bearing N. $\frac{1}{4}$ E., and the middle of the Sisters W.N.W. Another in the same predicament had the East point of North Island N. by E., and the outermost Sister N. by W. $\frac{1}{4}$ W. to N.W. It is, therefore, advisable to give the Sisters a berth of 2 miles, where irregular soundings of 16, 12, and 8 fathoms will be found.

North Island, in lat. $5^{\circ} 40\frac{1}{2}'$ S., long. $105^{\circ} 50'$ W., is small, bushy, and a full mile distant from the coast of Sumatra. There is a small islet, called *Sina*, at its southern extremity; and extending to the S.E. of it is a shoal of $3\frac{1}{2}$ fathoms water. The island therefore requires a berth of at least $1\frac{1}{2}$ mile; its North and S.W. sides are steep-to.

Lieut. Riddle, R.N.R., recommends North Island as a suitable stopping-place during the westerly monsoon. He anchored his vessel in 13 fathoms, with North Island bearing N. by E. 2 miles distant, and found a deep ship channel between the island and the main; but a spit, steep-to, extends 100 or 200 ft. from the N.W. end of the island. Between *Sina* Island and North Island is a narrow and deep channel, bounded on either side by coral reefs. The natives of North Island were friendly, and showed where the best water could be obtained: **this was easily shipped**, while at the same time at Anjer the surf was too violent to allow boats to come off with water.

Between North Island and the Sisters the coast bends in a little, and is edged by a mud bank; so that 2 miles from the shore will be found good soft ground for anchoring, in 8 to 12 fathoms, with North Island bearing N. by E. Small vessels will find good anchorage between the Sisters and the main, in 2 or 3 fathoms water. Abreast of the Sisters there is a fresh water spring, but Lieut. Kolff found its contents detrimental to the health of his crew, although it was clear, and free from any unpleasant taste.

The Winds experienced in the Strait of Sunda have been briefly described on page 14.

The Currents are also described on page 27.

DIRECTIONS.—The brief instructions for passing along either coast of the

strait, before given, will be sufficient for passing it with a fair wind. The following is for the return voyage.

WORKING OUT OF THE STRAIT IN THE NORTH-WEST MONSOON.—The best way is to pass between the Zutphen Islands and the Stroom Rock, and give the Zutphen a berth of at least $1\frac{1}{4}$ or $1\frac{1}{2}$ mile on their eastern side, and beat up by short tacks along the coast of Sumatra between them and Hog Point. Afterwards, passing either North or South of the Tega Islets, as the strong currents and hard squalls may allow, try to get westing in Lampong Bay, to the northward of Tims Island, and to pass between it and Soengal, or through Lagoendy Strait. In this manner a ship will make a quick passage through the strait, if the wind be not too variable, besides having the advantage of anchoring behind Sebuko Island, or in Lampong Bay, if the currents or winds are too strong.

There are, however on record many instances of vessels having beaten out of the strait along the coast of Java, during the western monsoon, with more ease and celerity than could have been effected by stretching into Lampong Bay, in consequence of the westerly current having at those times developed its chief strength along the former side of the strait.

It has been generally supposed that the currents at both ends of Java are regulated by the monsoons; but, according to Captain M. H. Jansen, of the Dutch Royal Navy, who has had great experience in the Indian Archipelago, it appears that most part of the year a westerly current sets out of Sunda Strait. It is much to be wished that this important element in Indian navigation should no longer be left a matter of doubtful opinion.

Some remarks on this subject will be found on page 54.

CHAPTER V.

EAST COAST OF SUMATRA AND BANKA STRAIT.

The **EAST COAST** of **SUMATRA**, between Sunda and Banka Straits, has never been regularly surveyed. The coast is generally low, and covered with wood to the water's edge, and does not therefore present much variation in aspect. It is fronted by some very extensive shoal banks, which in some places project 14 or 15 miles from the shore, but their exact boundaries are uncertain.

The **Winds** of the Java Sea are described on pages 14—16 *ante*.

The **Currents** in the Java Sea are for the most part influenced by the prevailing monsoon. They incline to the northward or southward, according to the influence of the currents of the straits of Sunda, Banka, and Gaspar; for during the western monsoon they run to the eastward, or more southerly according to the set of these which come from the straits; and in the eastern monsoon they run to the westward or more northerly from a similar cause. Through a succession of tides which were observed, chiefly during the eastern monsoon, it was found that those which followed the direction of the monsoon were stronger and of longer duration, so that a daily allowance from 8 to 12 miles may be made in the eastern monsoon, and from 20 to 24 miles in the western monsoon.

The **COAST** trends from abreast North Island with a slight curve inland, nearly North for 13 miles, to a point at which is the entrance of a small river named *Nihoung*. Two other rivers, the Sakampang and the Niale, also appear on the chart of this part of the coast. From the Nihoung River, the coast line runs nearly straight, N. by W. for another 13 miles, where it forms a small bay, and from thence it assumes for a distance of 20 miles a rather irregular outline, in a general direction about N. by E. $\frac{3}{4}$ E. to Tanjong Supong.

Mount Imbong, in lat. $5^{\circ} 20\frac{1}{2}'$ S., generally described as, and sometimes named, *Knob Hill*, is the most prominent hill on the coast near the Brothers,

but the latter name tends to mislead. It is of low elevation, of very gradual ascent, and clothed with trees. There is a hill to the N.W. of it, of hummock form.

SHAHBUNDAR BANK and SHOALS.—Abreast of Mount Imbong and of Tanjong Supong, the bank fronting the Sumatra shore projects about a mile only; but between these points it stretches 10 miles in the direction of the Two Brothers; the channel between the bank and those islands being about 6 or 7 miles wide. Upon the outer edge of the bank are several shoal patches, upon one of which the Dutch ship *Shahbundar* narrowly escaped destruction. As the depths decrease gradually towards this bank, the lead, if attended to, will indicate its proximity.

From Tanjong Supong to a point $1\frac{1}{2}$ mile north-eastward of the river named *Kali Saputi*, the bearing is North a little easterly, and the distance 13 miles, the coast between forming a bight $3\frac{1}{2}$ miles deep. From thence the coast line runs N. $\frac{1}{2}$ W. for 11 miles, and then a little more westerly for 11 miles further, to the large river *Kali Tulang Bawang* or *Toelang*. The bank, fronting the coast between Tanjong Supong and the entrance of the *Kali Saputi*, extends a little more than half a mile from the shore. The *Kali Saputi*, the mouth of which is in $4^{\circ} 44' S.$, may be approached as near as 3 or 2 miles out.

Tulang Bank.—Northward of the *Kali Saputi*, the extensive hard sand-bank of *Tulang* projects as far as 14 miles from the shore; but its South side, bending in to the northward, forms a kind of bay.

Kali Tulang Bawang.—The mouth of this river, in $4^{\circ} 21' S.$, may be closely approached. Near its entrance there is a small village; and three days' journey up the river, according to the natives, is a town called *Mangala*, where the Rajah resides. Pirates sometimes hide themselves there.

The *Coast* from the *Kali Tulang Bawang* to *Tree Island*, 37 miles to the North, curves inland 3 or 4 miles, and about the middle of it is the mouth of the *River Masudyi*. *Tree Island* is in about lat. $3^{\circ} 41' S.$, and close to a point of land, to which it is joined at low water. From thence the coast curves round to a point N. by E., distant 17 miles; from which *Lucipara Point*, at the entrance of *Banka Strait*, bears about N.E. by N., distant 15 miles, the coast between forming a bight 3 miles deep.

Between the *Toelang* and the *Mesudji Rivers* the bank extends from the shore about 3 miles only, but a little northward of the latter it again projects to the distance of 14 or 15 miles; from thence it edges away towards the coast in a N. by W. direction to about 7 miles northward of *Tree Island*, where it approaches the shore within 3 miles; it then runs N.E. for 16 or 17 miles, where its edge is 11 miles distant from the land; here it falls back again towards the coast, and takes a northerly direction to *Lucipara Point*, from which it projects but 2 miles. On this bank between the *Mesudji*

River and Lucipara Point, are many *dangerous*, and occasionally dry patches.

Some of the dangers supposed to exist between the Thousand Islands and the Sumatra shore, known as the Dolphin, Antelope, Banterer, and Paulowna, were searched for in vain by Commander C. Bullock in H.M.S. *Serpent* (1865), and expunged from the chart. The position of the Lynn Bank, as well as that of the Coventry Reef, both of which uncover at low water, were accurately determined. The positions of several other dangers in this route were also rectified, but as no complete survey has been made, vessels navigating this locality are recommended to proceed with caution.

Jason Rock, searched for in vain by Commander Buckle in 1865, was found about 2 miles out from its original position in 1870 by the master of the English ship *Tewkesbury*. It is described as 40 ft. in diameter, with 12 ft. least water and 10 fathoms around it. The Netherlands Government steamer *Borneo* afterwards examined it, giving the following bearings:—North Watcher, N. 40° E.; Pulo Doea, S. 89° E.; and W. Island or Pulo Pablokan, S. 62° E.

Helens Rock.—The barque *Helens*, Captain Inkster, on a voyage from Bangkok to Melbourne, struck on a rock 6 miles E.N.E. of the position assigned to Jason Rock. The lead was immediately hove, and got 5½ fathoms in starboard gangway, and suddenly deepened to 10 and 15 fathoms. The bearing of several islands were as follows:—North Watcher, N. by E. ¾ E.; West end of North Island, just open to the westward of Doea Island; Rangat, S.E. by S.; Peblakan, S. ¼ E.

WEST ISLAND, or Pulo Peblaken, in lat. 5° 28½' S., long. 106° 23' E., is a quarter of a mile in length, and low, but the trees on it may be seen 13 or 14 miles from a vessel's deck. It is steep to on all sides at half a cable distant, except round its N.E. sandy point, off which a coral reef extends a quarter of a mile.

COVENTRY REEF, of coral, dries at low water, and was seen always to break in the calmest weather. The shoalest part is S.S.W. 1 mile from West Island, and is about a cable in extent, but it appeared to shelve off to the S.W. for a quarter of a mile, which would agree with the account given at the time of its discovery by the *Caroline Coventry*, in 1858. It is probably the same as that stated to have been seen by the *Anna Paulowna*. Pulo Doea kept open West of West Island will clear it to the westward; and Pulo Gosong Rangat in line with any part of North Island will clear it to the eastward.

NORTH ISLAND and **PULO DOEA**, the two north-westernmost of the Thousand Islands, stand out very conspicuously from the group. They lie respectively N.E. by E. ¼ E. 6¾ miles, and N.E. ½ E. 6 miles from West Island. In the channel 1 mile wide between them, Mr. Ross, proprietor

of the Keeling Islands, reported a detached reef, which was seen breaking from the mast-head of the *Serpent*. It lies nearer to North Island.

The **NORTH WATCHER** and **LIGHTHOUSE**.—The North Watcher is a narrow island, half a mile in length, the N.E. part covered with high trees, the S.W. part with low trees, visible in clear weather 18 or 20 miles off. A coral reef, with only 6 ft. water in some places, stretches about half a mile round the South end of the island, with a rock in one place above water.

The *lighthouse* on the North Watcher is a white iron tower, in lat. $5^{\circ} 13' 30''$ North, long. $106^{\circ} 26' 30''$ East. The light, first exhibited in June, 1869, is a bright light, *revolving* once in every minute, elevated 159 ft., and visible 20 miles off.

The *wreck* of the *War Eagle* was reported in the last edition of this work to lie S.W. by W. 5 miles from the S.W. point of the North Watcher, in 12 fathoms, mud bottom, her topmast heads showing above water. A blue flag was placed on the main topgallant mast-head. She is alleged to have struck on a reef 2 miles to the N.W. of the North Watcher, for which a Netherlands vessel was sent to search.

OMEGA ROCK, on which the American ship *Omega* struck in 1835, lies about E. by S., distant three-quarters of a mile from the North Watcher. According to her captain, it is composed of coral, about 150 to 200 yards in extent, N.N.E. and S.S.W., and about 60 or 70 yards broad, is steep-to, and has not more than 9 to 12 ft. on the shoalest parts. It should be given a wide berth by a vessel passing eastward of the North Watcher, from which it is separated by a narrow channel with 11 and 12 fathoms water.

EDELING SHOALS.—Between Pulo Doea and West Island lie some patches of rocky ground, named the Edeling Shoals, to avoid which it is recommended that vessels of heavy draught should not pass eastward of a line joining the two islands, unless South of Pulo Gosong Rangat, the small island surrounded by a sand beach, which lies $2\frac{3}{4}$ miles E.N.E. of West Island.

These shoals consist of two coral patches East and West of each other, and half a mile apart. On the eastern shoal there may be as little as 3 fathoms at low water; on the western, $4\frac{1}{2}$ fathoms. They lie directly between Pulo Doea and Rangat; from the latter they bear N.E. $\frac{3}{4}$ N., and N.N.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ and $1\frac{1}{2}$ mile respectively. There were found two other patches of 9 fathoms, and so many indications of sandstone bottom, that vessels should approach this vicinity with caution.

E. $\frac{1}{2}$ N. from the South point of Peblakan or West Island, distant about $3\frac{1}{4}$ miles, is a reef of coral and stone; this reef extends about 1 cable North and South, and $2\frac{1}{2}$ cables East and West. There is about 4 ft. water over the shoalest part, and from 4 to 5 fathoms around the reef; from it the extremes of Rangat Island bore N.W. $\frac{1}{4}$ N. and N.W. by N. respectively.

A reef also, on which the sea breaks heavily, extends a distance of about 2 cables (by estimation) from the North and N.E. sides of Rangat Island.

The **TWO BROTHERS** are low islands, which together extend 1 mile in a N. $\frac{1}{4}$ E. direction. The North Brother is small and round, with high trees; the South Brother is 4 cables long, and two of its trees are very high and conspicuous, and may be seen in clear weather 20 to 23 miles off. Broad coral reefs surround the South Brother; round the North Island they are narrower. There is a passage between the islands 2 cables wide, carrying 7 to 5 fathoms over an apparently regular bottom. To the East of the islands is good anchorage in 9 to 10 fathoms. The South point of the South Brother is in lat. $5^{\circ} 10' 25''$ S., long. $106^{\circ} 6'$ E.*

SWALLOW ROCK.—In April, 1866, Mr. Wilds, Master Commanding H.M. surveying vessel *Swallow*, succeeded in finding the rock marked on former charts at about 8 miles S.S.W. of the Brothers. Its position is in lat. $5^{\circ} 17' 40''$ S., long. $106^{\circ} 3' 50''$ E., the South Brother bearing N. 17° E. (true), distant $7\frac{3}{4}$ miles. There are only 22 ft. water on the rock, and vessels of heavy draught should be careful to give it a wide berth, as there was neither ripple, break, or swell over it to indicate its position. At half a mile S. by W. $\frac{1}{2}$ W. from the rock, soundings in 5 fathoms were obtained on a small patch of sand and shells, with 9 fathoms between it and the rock. The depths around the rock and patch were 9 to 10 fathoms, sand.

LYNN BANK is composed of coral, a cable's length in extent, N.N.E. and S.S.W., and half a cable in breadth, carrying general depths over it of 3 to

* **DOUBTFUL DANGERS.**—The dangers said to lie in the track of vessels sailing direct between Sunda Strait and the North Watcher were searched for by the *Serpent* during several days. The hand and deep-sea leads were kept constantly going, and the sharpness of the mast-head man's eyesight was stimulated by the offer of a reward for their discovery.

A short time was also devoted to the Antelope and other shoals, reported to lie South and S.S.W. of the Brothers, but nothing was seen of them. A 9-fathom bank of fine speckled sand was found $2\frac{1}{2}$ to $3\frac{1}{4}$ miles S. $\frac{1}{2}$ E. of the South Brother. This bank, which showed of a pale green colour, visible 2 miles, would prove at times a convenient anchorage; the Brothers just touching lead over the shoalest part. There are not more than 10 fathoms between this and the Brothers.

The Dolphin Rock, on which the ship *Dolphin* was said to have been aground, was searched for by the *Serpent* during part of two days. It was described as nearly even with the water's edge, and to lie about 6 miles S.S.E. from the South end of the Two Brothers, but it does not appear ever to have been seen by any other vessel. The distance from the Brothers is precisely that of the Lynn Bank, and a change in the bearing from S.S.E. to E.S.E. (such an error being not an uncommon one), would make it the Lynn. If it were not for some indication of sandstone bottom, no credibility need be attached to the statement which records its existence.

Pruisen Bank, sometimes placed in lat. $5^{\circ} 17'$ S., long. $107^{\circ} 9'$ E., does not exist, nor does there appear to be any authority whatever to place it in that position.

4 feet, with some rocks that dry at low water. There are 8 fathoms close to the rock, deepening to 13 and 14 fathoms at a cable's distance. It is in lat. $5^{\circ} 12' S.$, long. $106^{\circ} 12' E.$, and from it the North extreme of the North Brother bears N. $68^{\circ} W.$ $6\frac{1}{2}$ miles, and the South extreme of the South Brother, N. $77^{\circ} W.$

These extremes of the islands subtend an angle of 9 degrees; if, therefore, they be made, whilst passing on (or within a point or more of) the above bearings, to subtend an angle of 8° , a vessel will pass about a mile outside the bank; and if an angle of 10° , half a mile inside it. In calm weather the shoal, from its dark colour, is extremely difficult to see until close upon it; the above method as a safeguard will then be invaluable, and may be used with confidence. A sharp lookout should always be kept, as the shoal may only be detected by a slight ripple. At night it is recommended to close the Brothers and pass them at 1 to 2 miles.

BROUWERS REEFS are two dangerous coral shoals, separated about half a mile from each other, with a dry patch of sand and coral upon each. They are together a mile in extent, and a quarter of a mile in breadth, with depths of $4\frac{3}{4}$ to 15 fathoms in the swatch between them. Hard ground stretches out from their North and South ends; at a short distance to the eastward and westward the bottom is soft, and the depths $1\frac{1}{2}$ mile eastward are generally $14\frac{1}{2}$ and 15 fathoms, regular soundings.

The *Serpent* anchored near the N.E. part of these reefs. No astronomical observations were obtained, but the position of the North reef, by careful magnetic bearings, was made to be in lat. $5^{\circ} 4\frac{3}{4}' S.$, long. $106^{\circ} 15' E.$, the North Brother bearing S. $60^{\circ} W.$, distant 10 miles, and the North Watcher S. $58^{\circ} E.$, 15 miles. This is rather nearer the Brothers than the commonly received position.

A vessel passing eastward of the Brouwers and Lynn Reefs should keep nearer to the North Watcher than to the Two Brothers. The high mountain seen to the southward is Mount Karang, South of Anjer, and in lat. $6^{\circ} 15' S.$, but from the above reef and islands the round hill over St. Nicholas Point is more often visible, and is a good landmark. The latter is named Mount Agoeng on some charts, but is called by the Dutch Gedeh, and its height is 2,100 ft.

Clifton Shoal.—The ship *Clifton*, of Bristol, is reported to have grounded, in November, 1850, on a shoal with $2\frac{1}{4}$ fathoms on it, lying N. $\frac{1}{2} W.$, $10\frac{1}{2}$ miles from the Brothers. It is now marked on the Dutch charts with 18 ft. and 24 to 27 ft. to seaward, about 9 miles to the eastward of Cape Scopong or Supong, in lat. $4^{\circ} 56' S.$, long. $106^{\circ} 3' E.$

Comara, a shoal danger of doubtful existence, with 7 fathoms close-to, placed on the Dutch Government charts about 9 leagues to the N.W. of the North Watcher, and 7 leagues from the coast of Sumatra, in lat. $4^{\circ} 49' 30'' S.$, long. $106^{\circ} 14' 30'' E.$

Ocean Mail, marked on the Dutch Government charts with 18 ft. and 7 and 8 fathoms all round, is situated 11 leagues to the eastward of the Toelang River, in lat. $4^{\circ} 18' S.$, long. $106^{\circ} 26' E.$

A patch of hard ground, about 2 miles in extent, having but $4\frac{1}{2}$ fathoms least water over it, appears on the chart in lat. $4^{\circ} 11' S.$, long. $106^{\circ} 8' E.$ The soundings around it are irregular, 6 to 11 fathoms on the East side, and 6 to 9 on the West.

Arend Bank, in lat. $3^{\circ} 45' S.$, long. $106^{\circ} 16' E.$, is 2 miles in length, and the same in breadth, consisting of fine gray sand and broken shells. It has $4\frac{1}{2}$ to 6 fathoms water over it, and is surrounded by a depth of 6 fathoms, which rapidly increases, over a soft bottom.

Boreas Bank lies E. by N. $11\frac{1}{2}$ miles distant from the Arend Bank, in lat. $3^{\circ} 44' S.$, long. $106^{\circ} 27\frac{1}{2}' E.$ It is also composed of a fine gray sand, and the least water upon it is 5 fathoms. Around it the depth increases rapidly to 10 and 13 fathoms, except on the N.W. side, where the soundings are regular for some time with 5 and 6 fathoms. Between the Arend and Boreas Banks there are irregular depths of 8 to 14 fathoms.

City of Carlisle Patch.—A ship of this name, in 1861, reported a patch of 16 ft. to exist in lat. $3^{\circ} 46' S.$, long. $106^{\circ} 20' E.$, or S.W. by W. $\frac{1}{2}$ W., $3\frac{1}{2}$ miles from the Boreas Bank. Its North end is now marked on the charts in lat. $3^{\circ} 27' S.$, long. $106^{\circ} 24\frac{1}{2}' E.$, whence the bank extends $2\frac{1}{2}$ miles to the S.E., with 5 and $4\frac{1}{2}$ fathoms.

CAUTION.—Vessels in this neighbourhood unexpectedly shoaling their water at night ought to be very careful, for many that considered themselves to be upon these banks were in fact upon those off the coast of Sumatra, near Tree Island, and consequently in great danger. These two banks consist of fine gray sand, while those near Tree Island are of coarse sand with gravel.

The depths in that part of the sea which lies between the North Watcher, Two Brothers, and Lucipara, are, except the banks of Comara, Ocean Mail, Arend and Boreas, tolerably regular from 10 to 16 fathoms; but nearer to Sumatra, about 22 or 24 miles from the coast, they become irregular, changing often, and suddenly, from 10 to 5 and 6 fathoms. Towards Lucipara, in the usual track towards Banka Strait, the water shoals gradually to 6 and $4\frac{1}{2}$ fathoms.

BANKA STRAIT.

GENERAL DESCRIPTION.—The Strait of Banka separates the islands of Banka and Sumatra, and trends with many bendings to the north-westward.

In the ensuing account of it we have followed entirely that given in the *China Sea Pilot*, as the features of this important passage have been carefully and recently surveyed by our officers.

The coast of Sumatra is very low, densely covered with wood, and offers no other variation than a few points, or rather roundings, which are only clearly distinct at short distances, and are easily mistaken for the so-called false points, which are observed immediately after rounding the real points. The shore being inundated at high flood, the distance from it is generally over estimated.

The Island of Banka is covered with hills and mountains, varying from 930 to 2,320 ft. in height; and it is remarkable that, notwithstanding their comparatively small height, their summits are generally covered with clouds, which accounts for the erroneous heights given to these hills by various authors, who have estimated them at upwards of 9,000 ft.

On the Banka Coast are prominent points, sandy beaches, and in some places deep bights, as on the Sumatra side; as a rule, wherever sand occurs casuarina trees will be found; the other trees are principally pine, teak, and aspen. Near the western point of Banka stands the capital of the colony (or residency) of that name, called Mintok, and its roadstead is much visited by the coasters that supply the Chinese miners with rice.

The whole coast of Sumatra is bordered by a mud flat, which is narrower off the points, but in some of the bights from 2 to 4 miles wide. Towards the Banka side the bottom becomes gradually harder, and even rocky. Besides the few small islets and rocks in this strait, there are the group of Nangka Islands, where vessels sometimes proceed to procure fresh water and wood. Many rivers discharge themselves into the strait, of which the principal are the Soensang and the Assing, both navigable to a great distance for vessels of heavy burden.

The entrance to Banka Strait is encumbered with numerous long and narrow banks of sand, having various depths of water over them, and deep channels between. Only two of these channels, however, are available for the ordinary purposes of navigation, as it is not possible to give any directions which would enable vessels to use the others with safety; but in the event of a vessel from accident or other cause finding herself amongst the banks, she would be enabled, by careful attention to the Admiralty Chart, to extricate herself without much difficulty.*

Until the survey of this strait by Mr. W. Stanton, assisted by Mr. J. W. Reed, Masters R.N., in H.M.S. *Saracen*, during the years 1859 and 1860,

* CAUTION—*Buoys and Beacons*.—The Captain of the French transport *La Correze* reports, in 1873, several of the beacons and buoys in Banka Strait as out of position, while others have disappeared. Captain F. G. Petersen, also, in a letter to the "Nautical Magazine" of February, 1875, says—"In the Admiralty charts are mentioned a lot of beacons and buoys, which can never be seen in reality. I saw only one buoy in the whole strait on the Fredrik Hendriks Rock. In the same charts are many conspicuous trees mentioned, which are all or most of them gone. On the points of Sumatra should be some beacons and fishing stakes, but anything of them was not to be seen.

very little was known of the banks at its entrance. The Dutch had published a chart compiled from the observations of the officers of the Dutch men-of-war employed at various times on the station, which furnished a pretty correct outline of the coasts on both sides the strait, and showed the positions of the prominent dangers in the fairway, but the soundings on it were very imperfect, and the space eastward of Lucipara, occupied by the numerous long narrow sandbanks above referred to, was almost a blank.

The ordinary route of vessels up to the time of the *Saracen's* survey, was through the Lucipara Channel, between the Island of Lucipara and the Coast of Sumatra; but the advantages which a navigable channel along the coast of Banka Island would offer to vessels passing through Banka Strait had been long felt by seamen, and Melvill Van Carnbee, in the *Java Guide*, remarks upon this want as follows:—

“The passage between Lucipara and Banka would have great advantages in entering or leaving the Strait of Banka, were it not encumbered so much with shoals and banks, the positions of which are not known correctly, and which render this passage unsafe, at least for large vessels, although Commodore Watson took the *Revenge* by night to the eastward of Lucipara, into the Strait of Banka, and had not less than $5\frac{1}{2}$ fathoms water. For vessels of light burden and beating up against the western monsoon, this eastern channel into the strait is very desirable, as it is almost impossible to make any progress against the strong and continual currents in the Lucipara passage.”

During the *Saracen's* survey, an excellent passage, now named Stanton Channel, nearly 5 miles wide in its narrowest part, and with depths varying from 7 to 20 fathoms, was found between Lucipara and Banka. Mr. Stanton gives the following reasons for preferring this channel to the old one between Lucipara and Sumatra.

“The Stanton Channel will be found to possess many advantages over that of Lucipara, for it is a mile wider, the approaches to it are marked by well-defined hills on Banka Island, and a vessel of the largest draught may pass through it at any time of tide; whereas vessels frequently get on shore in using the latter channel, for the coast of Sumatra, consisting of low muddy mangrove shores about 50 or 60 ft. in height, is unmarked by a single conspicuous object to assist the seaman to clear the mud flat bordering its entire length, and which a few miles southward of Lucipara Point extends 11 miles from the land. The island of Lucipara also is small, about half a mile in length, and no marks can be given to avoid the rocks extending a considerable distance to the southward and eastward of it.

“The water also in the Stanton Channel being much deeper than in the Lucipara, causes the banks, which are mostly of sand, to be easily recognized by the light colour of the water on them. The tide also ebbs and flows more regularly in this channel, and sets directly through it, which enables

vessels even in calms to drop through ; whereas in light winds and calms they are often set over amongst the dangerous banks whilst rounding First Point in endeavouring to get through the Lucipara Channel.

“ The wind in the N.W. monsoon blows off the Banka coast, and throughout the year land breezes generally occur during the night. A strong land wind from the N.E. has been experienced in the Stanton Channel during the S.E. monsoon, when the wind was blowing directly through the Lucipara from the S.W.

“ There is also but little variation in the depth of water between the Sumatra coast and the Lucipara shoals ; and it is stated that during the months of January, February, and March, when the N.W. monsoon is at its full strength, the southern current continues from 14 to 18 hours successively, with a velocity of 2 to $2\frac{1}{2}$ knots, which would make it almost impossible for an indifferent sailer to make any progress against it. It is also said that during the latter part of the S.E. monsoon, it frequently blows hard from the S.W., accompanied with much rain ; this would considerably retard vessels going to the southward through the Lucipara Channel, and offer a fair wind to those proceeding through the Stanton Channel.

TIDES and CURRENTS.—The tides in Banka Strait are strong, but irregular, and are greatly influenced by the monsoons. The flood-tide, entering the strait from the southward out of the sea of Java, meets another flood, about the Nangka Islands, coming from the northward out of the China Sea. The direction of the streams is entirely influenced by the windings of the strait, forming, at their meeting, whirls and eddies in the bights of the land.

In the Lucipara Channel and the southern parts of the strait, sometimes there are two, but generally only one ebb and flood in the 24 hours, the former running to the southward and the latter running to the northward. During the months of January, February, and March, at the greatest strength of the N.W. monsoon, the southern current continues often from 14 to 18 hours successively, with a velocity of from 2 to $3\frac{1}{2}$ knots ; the flood-tide is then very trifling, and sometimes not at all perceptible. On the contrary, during the S.E. monsoon, the stream of flood runs sometimes 14 to 18 hours with great velocity into the strait, and the ebb runs out during the other 10 or 8 hours with but little strength.

In the northern parts of the strait during the N.W. monsoon the southern current or flood remains longer and is stronger than the ebb, and the reverse during the eastern monsoon. The velocity of the tide is sometimes 2 or $2\frac{1}{2}$ knots, and the range from 7 to 12 ft., and sometimes more ; and in the mouth of the rivers the water during the western monsoon, from the heavy rains which prevail at that period, is much higher than during the eastern monsoon.

Between the monsoons flood and ebb succeed each other generally every

12 hours, and the one or the other is then stronger, according to the wind being northward or southward. The rise of an ordinary tide is 5 to 7 ft., and a spring tide 9 to 10 ft., and sometimes 12 ft.; but the average rise seems to be much greater during the eastern monsoon than during the western one.

Mr. Stanton observes, that on the Sumatra shore, when the monsoon is blowing strong, a constant surface current will be found setting to leeward, and extending nearly mid-channel, except between Fourth and Batakarang Points, where it is influenced by the numerous branches of the Palembang River.

On the coast of Banka, owing to the formation of the land, more regular tides will be found; therefore, ships in working should only keep on the Sumatra side between Batakarang and Fourth Points, and when Tanjong Tadah bears N.E. $\frac{3}{4}$ N., work along the Banka coast, as by so doing, and leaving either extremity of the strait at low water, they may carry a fair tide all the way through, and generally have the advantage of a land wind at night.

Throughout the strait, a difference of 12 hours in the tides was observed in the opposite monsoon. It is high water, full and change, in the S.E. monsoon about 8^h 30^m p.m., but in the N.W. monsoon high water takes place at nearly the same time in the morning.

Eddies in the Bights.—When beating through the middle of the strait during the strength of the monsoons, continuous and contrary currents are certain, and the skilful seaman will therefore find great advantage in availing himself of the eddies, as well as of the more regular changes of tide, by standing into the bights and bays in those parts of the strait where he can safely approach the land.

Inshore Tides.—In the Toboe Ali Channel, also in the bay North of the Nangka Islands, and in the passage between Brom-Brom Reef and Banka, we meet, even in the western monsoon, a pretty regular succession in the roadstead tides. It has been often observed, when passing the road of Mintok, that the vessels were lying with their heads in a contrary direction to those at anchor upon the bank outside. In that road the flood comes from the westward, and the ebb from the eastward; but near the mouth of the Assing River the contrary occurs; the flood there runs West, and the ebb East. In the bays between Eerste and Tweede Points, and again between Derde and Vierde Points, there are probably eddies of which vessels of light burden may make use, and heavier vessels may no doubt, in many places, run close enough to the shore to keep out of the influence of the currents.

Freshes.—Between Bata-karang and Fourth Points the ordinary current in Banka Strait, after heavy rains, is considerably accelerated and diverted in the direction of Kalian Point, until it nearly reaches mid-channel, by

the freshes from the many rivers in this vicinity. Vessels sometimes take advantage of this to complete water, as it is frequently quite fresh on the surface.

During the westerly monsoon, which is the rainy season, these freshes set out of the rivers on the Sumatra coast with great force, and they require to be carefully guarded against in the night. Upon one occasion, when H.M.S. *Saracen* was at anchor near Lalarie Point, her decked pinnace, moored at the boom, was fairly pressed under the water and swamped by the force of the current.

LUCIPARA ISLAND, half a mile long, W.N.W. and E.S.E., and a quarter of a mile broad, lies at the southern entrance of Banka Strait, 9 miles East of Lucipara Point, in lat. $3^{\circ} 13'$ S., long. $106^{\circ} 13'$ E., and is visible in clear weather at 14 or 15 miles. It is surrounded by a reef, which from its S.E. end extends rather more than $1\frac{1}{2}$ mile; and around this reef is a bank, with $2\frac{1}{2}$ and 3 fathoms over it, extending about $1\frac{1}{4}$ mile to the north-westward from the island, and 2 miles to the south-eastward of it.

Formerly, the trees on the S.E. end of the island rose to a sort of peak 164 feet high, but all the trees on this peak have been cut down (1875).

Rocky Patches.—Lucipara should not be approached on its S.E. side nearer than $3\frac{1}{2}$ miles, for a rocky patch with $2\frac{1}{2}$ fathoms water over it lies S.E. by E. $\frac{1}{2}$ E., distant nearly $2\frac{1}{2}$ miles from the island; and a mile to the westward of this patch is another of $2\frac{3}{4}$ fathoms.

LUCIPARA POINT, which forms the south-western limit of Banka Strait, is in lat. $3^{\circ} 13\frac{1}{2}'$ S., long. $106^{\circ} 3'$ E. It is covered with trees, the tops of the highest being 89 ft. above the level of the sea.

The **COAST** between Lucipara and First Points is formed of mangrove jungle, and was found in the survey of 1859 to extend considerably more eastward than shown in the Dutch chart. This extension has evidently taken place since their survey in 1818, and it may be attributed to the sediment from the numerous small rivers in that vicinity affording more soil for the growth of the prolific mangrove. The contour of the dry mud was obtained and sounded close-to at the springs, and it will be a guide to show any further extension.

Green Point, so called from the trees on it being of a lighter and brighter green than elsewhere, bears N. $\frac{1}{2}$ W., distant 9 miles from Lucipara Point, the coast between forming a bight about $1\frac{1}{4}$ mile deep. Between these points is a ridge of high trees standing about $1\frac{1}{2}$ mile back from the coast line, with a conspicuous tree, 153 ft. high, near their centre.

EERSTE, or First Point, bears N. $\frac{3}{4}$ W., distant $4\frac{1}{4}$ miles from Green

Point, the coast between forming a bight. The trees on it are of equal height, 60 ft., and present a level appearance.

Mud Bank.—From the southward the coast line approaches Lucipara Point in a north-easterly direction; but the 3-fathoms line, which may be considered the edge of the mud-bank which fronts the whole coast of Sumatra, from a distance of 10 or 12 miles southward of the point, approaches it nearly straight in a N. by W. direction, and passing Lucipara Point about 2 miles off, follows, with a slight curve in towards the coast, the same general direction until abreast of Green Point, from which it extends a little over a mile; it then takes a direction a little more westerly until abreast of the South part of First Point, from which it is distant three-quarters of a mile. In rounding First Point, the bank approaches nearer to it, and on its N.E. side projects only about a quarter of a mile from the shore.

From 10 or 11 miles to the southward of Lucipara Point, to within 2 miles of Green Point, the soundings decrease regularly towards the bank; but just to the southward of, and fronting Green Point, the water shoals suddenly from 6 to 3 fathoms; and, therefore, this part of the flat should never be approached into less water than 7 fathoms. Near First Point the bank is also steep-to, especially on the N.E. side, and should not be approached under 12 or 10 fathoms, those depths extending to the distance of 1 to $1\frac{1}{2}$ mile off the point.

The **COAST** from First Point takes a N.W. by W. $\frac{3}{4}$ W. direction for $6\frac{3}{4}$ miles to False First Point, having a small bight or indentation between, at about two-thirds of that distance from First Point. From False First Point it falls back S.W. by W., about 3 miles, and then forming a deep bay, gradually curves round to a slight point (False Tweede Point of the Dutch), from whence it runs pretty straight about N. $\frac{1}{2}$ W. for 7 miles to Tweede or Second Point.

VALSCHE EERST, or False First Point.—The trees upon this point are more elevated than those on First Point, being 105 ft. high. Lalarie Point, on the Banka side, bears from it N. $\frac{1}{3}$ W. nearly $7\frac{1}{2}$ miles, and Second Point N.W. $\frac{3}{4}$ N. $18\frac{1}{2}$ miles.

The mud-bank projects two-thirds of a mile from False First Point, and more than 3 miles from the shore in the depth of the bay between that point and Second Point. The bank is very steep close-to, and should not be approached under a depth of 12 fathoms near the points, nor under 10 fathoms in the bight between them.

TWEEDE, or Second Point, the trees on which are 81 ft. high, bears from First Point N.W. $\frac{1}{4}$ N. $21\frac{1}{2}$ miles, and from Lalarie Point N.W. $\frac{3}{4}$ W. 13 miles. From this point the coast falls back, and curves round until within 5 miles of Third Point, forming a bay about 5 miles deep; it then runs nearly straight to Third Point.

The mud-bank extends about two-thirds of a mile from Second Point, and being very steep-to should not be neared under a depth of 12 fathoms. Between Second and Third Points it runs very nearly straight from point to point, filling up the bay. The soundings here do not, as a general rule, shoal so suddenly as they have been described to do between the other points, but at 2 or 3 miles South of Third Point the bank curves out considerably, and is dangerous to strangers, particularly when coming from the northward, as they are likely to infer that the bank falls back in the direction of the land. The depths, too, here again begin to shoal suddenly, adding to the danger, so that it is necessary to exercise caution and give a good berth to this part of the bank.

A *Spit* or *Horn* extends $1\frac{1}{2}$ mile from the above mud flat, and then in a south-easterly direction for 2 miles, with depths from $2\frac{1}{2}$ to 3 fathoms, mud, on it, and from 4 to 5 fathoms between it and the flat; from its northern extreme Second Point bears S.S.E. 8 miles, and Parmassang Peak E. by S. $12\frac{1}{2}$ miles; therefore in passing this spit, Second Point should not be brought eastward of S. by E. $\frac{3}{4}$ E. until Parmassang Peak bears E.S.E.

Doubtful Patch.—There is said to be as little as 4 fathoms over muddy bottom, with Little Nangka Island bearing North, and the middle of Parmassang Hill East.

DERDE, or Third Point, bearing N.N.W. $\frac{3}{4}$ W. $20\frac{1}{2}$ miles from Second Point, is 78 ft. high, and has on its North side a *square beacon*, with a *white* top and ball. From this point the coast runs back about W.S.W. for 2 miles to the entrance of a small river, named Songi Kisoegean, which, from native information, is said to connect with a branch of the Palembang River; from thence it curves round in a West and W.N.W. direction for 4 or 5 miles, and then assumes a tolerably straight outline until within 3 or 4 miles of Fourth Point, which it approaches in a N.W. by W. $\frac{1}{2}$ W. direction.

The mud-bank does not extend more than half a mile off Third Point, but is very steep-to, and should not be approached under three-quarters of a mile, or in less than 15 to 18 fathoms water. Between Third and Fourth Points the bank runs pretty nearly straight, the edge of it being distant from 1 to $1\frac{1}{2}$ mile from the shore, except in front of the bight just to the westward of Third Point, where it is 2 miles distant from the shore.

The soundings between Third and Fourth Points are irregular, but vessels may, with careful attention to the lead, stand towards the mud-bank into 7 or 6 fathoms, until nearly abreast of Fourth Point, where the bank gets steeper, having 10 fathoms close-to, and only 8 fathoms a little further off.

Four-and-Three-quarters Fathoms Bank.—A mud-bank, about 2 miles in length, and three-quarters of a mile in breadth, and having $4\frac{3}{4}$ fathoms water over it, lies between Third and Fourth Points, about two-thirds of the distance from the former, and nearly 3 miles from the shore; between this bank

and the edge of the mud flat extending from the shore, is a channel about three-quarters of a mile broad, with 7 to 9 fathoms water in it.

VIERDE, or Fourth Point, bears from Third Point W. $\frac{1}{2}$ N. distant $23\frac{1}{4}$ miles. The trees upon it are 112 ft. high; and a *square beacon*, with *white* top and ball, stands, or used to stand, at the edge of the mangrove.

The coast from Fourth Point stretches westward for 22 or 23 miles, and in this space the different branches of the Palembang River fall into the strait.

Banks off Fourth Point.—A bank of sand and shells, having $4\frac{3}{4}$ to 6 fathoms water over it, lies 4 miles off Fourth Point. It is 3 miles long W.N.W. and E.S.E., about $1\frac{1}{4}$ mile broad, and from its western extreme the beacon on Fourth Point bears S. by W. $\frac{1}{4}$ W. 3 miles; and from its eastern extreme the beacon bears S.W. by W. $\frac{1}{2}$ W. 4 miles. Between it and the mud-bank extending from the shore are from 7 to 9 fathoms.

Another patch, about a mile in extent, and having 6 fathoms water over it, lies nearly 2 miles north-eastward of the last-mentioned bank, with the beacon on Fourth Point bearing S.W. $\frac{1}{4}$ S. $6\frac{1}{4}$ miles, and the dry rocks on the Brom-Brom Reef N.E. by N. 3 miles.

Between these banks the depths are from 8 to 14 fathoms.

The *Mud Bank* from *Fourth Point* takes a W.N.W. direction for 18 miles, where it trends away near South, forming one side of the entrance to the Soengsang River; a spit projecting from the land forms the other side of the entrance to that river, as also the S.E. side of the entrance to the River Assing.

Caution.—This bank, for 6 miles westward of Fourth Point, is composed of hard sand, covered with a thin stratum of soft mud, and is exceedingly dangerous, being steep-to, and many ships, including H.M.Ss. *Himalaya* and *Assistance*, have grounded upon it. The lead cannot at all be relied upon for giving warning in time to avoid it, for 11 fathoms may be had, and the ship be aground the next instant. The safest plan is not to pass the beacon on Fourth Point within 3 miles, and having passed it not to bring it to the eastward of S.E. $\frac{1}{2}$ S. until Monopin Hill bears North.

From 10 to 12 fathoms will be obtained very close to this steep bank, outside of which is a long strip of 8 and 9 fathoms; outside of this strip are 10 to 13 fathoms, so that it is not at all possible for a vessel to discover her position by the lead only. The soundings, however, become more regular off the mouths of the Palembang Rivers, and towards and abreast Batakarang Point the lead will in those localities, if properly attended to, enable a vessel to proceed with ease and safety, as the soundings decrease regularly towards the shore.

Great care, however, is requisite in navigating this part of the strait during the rainy season, for large drifts are then brought down these rivers by the freshes, which set strong over to the West end of Banka; and as the

flood runs strong into them on the springs, a vessel may be driven too near either shore, both sides of which are fronted by dangers.

SUMATRA RIVERS.—To the westward of Fourth Point are the entrances of the Rivers Saleh and Oepan, then the Soensang, and lastly the Assing; the last two are navigable for vessels of light draught as far as Palembang.

SOENGSANG or PALEMBANG RIVER.—Mr. Stanton has furnished the following account of this river and town:—Since the survey of the N.W. part of Banka Strait in 1860, a deeper and more direct entrance to the main channel of this river has been formed, carrying 9 ft. at low, or 22 ft. at high water springs.

This new entrance is marked with beacon poles, similar to those in the old passage, but as, on account of the many floating trees and strong freshes, they will probably not remain long in their position, a vessel of large draught may safely enter at high water by bringing the trees forming the West point of the river entrance S. by W. $\frac{3}{4}$ W., and running for them on that bearing until Pulo Payong (Umbrella Island) bears South; then steer for the island, but take care in approaching it to keep close to the eastern bank of the river, to avoid the spit extending 2 miles off its North end. If a pilot is required, one may be obtained at Kampong Soengsang, the small village on the left bank, but there is no channel available for ships on the West side of Payong.

This branch of the Soengsang at its entrance is upwards of a mile wide, but within, the navigable channel is contracted in some places to the width of a cable's length by the different islands and banks, until close up to the town of Palembang, when the river widens to three-quarters of a mile with 5 and 6 fathoms close to the shore.

Vessels can navigate the whole length of the river up to the town by keeping close to the right bank; but those of large draught are recommended, when passing Pulo Singris and the bank off Kampong Maya, to keep near the opposite shore. Both sides of the river are wooded, and on nearly all the isolated banks there are small trees, and on others fishing slakes, consequently there will not be much difficulty in avoiding them.

PALEMBANG, one of the largest Malay towns in the Archipelago, and the largest in Sumatra, derives its name from the many bridges across the numerous creeks that intersect it. A Dutch resident and other officials reside here, and to support their authority there is a military force, consisting of one European and two native companies. The total number of Europeans in the town is 109, and by the last census the native population consisted of 45,000 Malays, 4,000 Chinese, and 1,000 Arabs. The climate in the vicinity is considered so salubrious that convalescent soldiers are sent here from Banka.

Near the extreme end of the town, commanding the mouth of the Ogan River, is a substantially built fort. It is a square enclosure of masonry,

with walls 8 ft. thick, about 50 ft. high, loop-holed, and at each angle a circular bastion mounting eight guns in casemate embrasures. The fort could easily accommodate 1,500 men, and is surrounded outside with strong wooden palisades, a thick bamboo hedge, and a ditch 20 ft. broad. The fort is in lat. $2^{\circ} 59\frac{1}{2}'$ S. There are several smaller forts some distance up the river.

Covered prahus (called bedahs) daily arrive from the interior, laden with large supplies of cotton for exportation. This useful article grows quite wild some distance up the river, in some places close to the stream, and covering many miles of land. The greater portion of it is sent to Batavia. The total quantity exported this season is estimated at 1,735,500 lbs.

All the necessaries of life are here found in abundance. The country abounds in large game, deer, wild pigs, &c. The river swarms with fish. Beef, fruit, vegetables, &c., are cheap and plentiful. Foreign vessels are not permitted to trade, and Dutch European vessels are not allowed to enter the river unless under special circumstances. The export trade, consisting principally of pepper, rattans, cotton, honey, dye-woods, and gutta-percha, is confined to thirteen European built ships, and numerous country craft, all owned by wealthy natives.

From November to March rains prevail, and the wind varies from N.W. to N.E. At this period vessels belonging to Palembang either remain in port or trade to other places, as it is almost impossible for sailing vessels at this period to make any progress up the river against the freshes. During a stay of five days off the town in January, the influence of the flood was not once felt. The ebb slackened during the day, but at night it often ran 5 knots. After much rain the freshes out of the river are felt in Mintok Bay.

ASSING or SALT RIVER offers the best passage to Palembang, being at all times navigable for vessels of the heaviest burden, but the shallow at its entrance often causes a delay of several days. At its mouth, which was surveyed in the beginning of 1846, Monopin Hill bears N.E. by E., and Assing Point N.W. by N. At the entrance, in mid-channel, there are 8 to 10 fathoms; and close to the poles at the back on the eastern side of the channel from 4 to 5 fathoms. Higher up this river the Pontain and Jarang Channels are just as good as that through the Soensang.

Directions.—To enter the Assing, bring Monopin N.E. by E., and Teloo Point N.W. by N., then steer in a S.W. direction, according to the state of the tide, for the ebb runs strongly over the very shallow outer bank towards Soensang, and the flood towards the inner banks.

Having reached as far as Api Point, take the mid-channel, between the beacon-poles, towards Bayan Point, and then, though still following the middle of the river, keep rather towards the Laga Point side, round which the Pontian Channel is entered. With a flood tide keep on the eastern

shore, as the stream runs with force past that channel; taking care, at the same time, to avoid the shoals which surround the point. In this river we have only to mind the points, as from most of them project small mud banks.

Pontian and other Affluents.—The junction of the rivers Pontian, Kietjar, Gassing, and Sebalick, which last unites the Pontian to the Jarang, causes a part of the ebb to run from the first two rivers through the Sebalick, and compels vessels having come so far with the flood to anchor, and to wait for the ebb. The Pontian is generally deepest on its western side, except near its mouth, where the greatest depth is in the middle; but again towards the western side, higher up, and in front of the shoal off the point, between the Kietjar and the Sebalick. When near its junction with the Sleino and Jarang Rivers, keep close to the eastern shore, in 6 to 8 fathoms, to avoid the reef which projects from the point between the Sebalick and Jarang. When there is no wind, it is necessary to anchor and wait for the flood coming up by the Sleino, in order to proceed up the Jarang, and it will be found that a great part of the flood goes into the Tambangadin River, while that going up the Jarang is very trifling. Having reached the Jarang Ketjil, anchor again till high water, to wait for the ebb from this river, which will soon take the vessel into the Soengsang.

JARANG BANK.—The bank off the Jarang is very shallow, but on the North side there is a narrow passage with 5 or 6 fathoms. Vessels of less draught than 15 ft. can also find a passage on the South side.

The **ASSING**, *always navigable.*—The difficulties in going up the Assing, caused by the narrowness of the rivers Pontian, Sebalick, and Jarang, and the necessity of stopping so often to wait for the tide, are amply compensated by the advantage that vessels of even the greatest burthen suffer no delay at its mouth.

Freshes.—Vessels navigating these rivers, especially during the western monsoon, should be aware that the heavy rains in the interior cause such strong freshes to run out of the river as to reach towards the opposite shore, and that in the spring, especially during the eastern monsoon, very powerful floods pour into the rivers. High up the rivers are seen rippings like breakers, caused by these tides and freshes, which frequently bring down large detached masses of grass and brushwood like floating islands.

BATAKARANG POINT, the N.W. boundary of Banka Strait, is in lat. $2^{\circ} 1' S.$, long. $104^{\circ} 50' E.$, and bears N.W. $\frac{3}{4}$ W. 32 miles from Fourth Point. It may be known by a group of trees, 130 ft. high, which gives it a bluff and jagged appearance.

Valsche or False Point is more sloping and flat, and lies 9 miles to the south-eastward of Batakarang Point; and there is another point about 3 miles in the same direction from Batakarang Point.

The mud-bank projects $4\frac{1}{2}$ miles off Batakarang Point, and 2 miles off

False Point. It then trends away to the south-westward, bounding the entrance of the Assing River on its N.W. side, to Tanjong Kampie, from which it projects not quite a mile.

The soundings off Batakarang Point are regular, and the point may be passed in from 6 to $4\frac{1}{2}$ fathoms water.

COAST OF BANKA.—This coast, which separates the straits of Banka and Gaspar, is treated of here, as being intimately connected with the former, for Mr. Stanton observes, that at the entrance of Banka Strait, in the S.E. monsoon, the ebb tide during the night at springs will be found setting to the south-eastward; consequently many vessels, although steering a course for the strait, get set between Pulo Dapur and Baginda Point.

The **SOUTH COAST**, between Baginda Point and the Dapur Islands, in extent about 14 miles E. $\frac{3}{4}$ N. and W. $\frac{3}{4}$ S., is generally low, and covered with trees; it presents, however, some points sloping down from hills of moderate elevation. It should not be approached under 3 miles, for it is fronted with a mud-bank, extending in places nearly 2 miles from the shore, upon which are many rocks above, and many others below water.

TANJONG BAGINDA, the south-eastern extreme of Banka, is in lat. $3^{\circ} 4' 40''$ S., long. $106^{\circ} 44'$ E. It slopes gradually in a south-easterly direction from a hill 387 ft. high, which rises a mile inside the point. Two miles inside the point, in a N.W. by W. $\frac{1}{2}$ W. direction, is another hill, named Baginda Peak, 521 ft. high.

Tanjong Dua (*Doeya*) bears W. by S. $\frac{3}{4}$ S. $2\frac{1}{2}$ miles from Baginda Point, from which it is separated by a bay about half a mile deep. N.N.W. $1\frac{1}{2}$ mile from the point is a hill, 432 ft. high, from which the land slopes down to the coast.

Rocks, some of which are above water, extend to the southward of this point and for more than a mile along the coast to the westward, to the distance of half a mile. A sand-bank, with rocky patches, commences about $1\frac{1}{2}$ mile S.S.E. $\frac{1}{2}$ E. from it, and extends to the westward until it meets the mud-bank which fronts the coast as far as Tanjong Tanah Roboe.

Tanjong Kejang is 231 ft. high, and bears West-southerly $2\frac{3}{4}$ miles from Tanjong Dua, from which it is separated by a sandy bay about two-thirds of a mile deep.

Karang Layar is a rocky reef above water, lying on the outer edge of the bank above mentioned, and S.W. by W. distant $1\frac{3}{4}$ mile from the East extreme of Tanjong Kejang. Inside these rocks to the north-westward is another bed of rocks, some of which are above water.

Tanjong Bantil, 240 ft. high, bears W. by N. $2\frac{3}{4}$ miles from the nearest part of Tanjong Kejang. The bay between these points seems to be full of rocks; and large and small rocks above water, with others awash, extend to the southward of the point, nearly to the edge of the mud-bank, which projects nearly a mile off shore.

Tanjong Tanah Roboe is $3\frac{1}{2}$ miles W. by S. $\frac{1}{2}$ S. from Tanjong Bantil, and off it, as at Tanjong Bantil, a number of rocks, some above and others below water, project nearly a mile to the southward to the edge of the bank; the bank curves round this point, and terminates just to the westward of it.

Dapur Point.—The coast from Tanjong Tanah Roboe runs West about a mile, and then, curving to the north-westward into a small bay about half a mile deep, runs about S.W. by W. with a rugged outline to Dapur Point, under Toboe Ali Lama Peak, which forms the south-western extreme of Banka. Adjoining Dapur Point is an islet or rock 40 ft. high, with smaller rocks above water on both sides of it.

Dapur Islands * are two islets lying a little more than a mile S. by E. from Dapur Point, and forming a good landmark when approaching from the southward. They form the south-eastern limit of the entrance to Banka Strait by the Stanton Channel, are nearly round, and about a cable's length in diameter, and connected at low water by rocks. The southern one is 120 feet high, resembles a shoe in appearance, and is fronted by a coral sandy beach. Some rocks above water lie about a cable's length to the southward, and a rock under water about 2 cables to the south-eastward of the islet.

There is a narrow channel, half a mile wide, with depths of $5\frac{1}{2}$ fathoms, between the Dapur Islands and Dapur Point; from thence to Nangka Point there are several white rocks lying inside the mud flat close to the shore.

Sand Ridges off the South end of Banka.—H.M.S. *Saracen*, when searching for the coral reef reported by the Netherlands barque *Banka* † (many prominent points offering good objects for fixing her position), was enabled to extend the soundings 20 miles off the land. The soundings were found to be very irregular, long sand ridges, with deep water over a muddy bottom between. None of these banks have less than 5 fathoms on them, with the exception of one lying S.E. $1\frac{1}{2}$ mile from Pulo Dapur, where there are several patches of $3\frac{1}{2}$ fathoms over a sandy ground. At 7 miles E. by S. of these patches, and separated by deeper water, is a bank of $4\frac{1}{2}$ fathoms, coral and sand, extending in an easterly direction for 3 miles; it appears to be a continuation of the Dapur Bank, and from its shoalest part Tanjong Baginda bears N.E. by N. 6 miles.

Overfalls.—At full and change great overfalls were repeatedly noticed, caused by the meeting of the ebb stream from Banka and Gaspar Straits over an uneven bottom.

* Dapur means cooking place. Prahus, in passing, generally land on these islands to catch turtle, as it is the only place in Banka Strait where they are seen.

† This coral reef, about 3 miles in circumference, and probably only 6 ft. water on it, was reported as lying 15 miles from the South end of Banka Island. Its position was given as lat. $3^{\circ} 21' S.$, long. $106^{\circ} 41' E.$, and the land in sight (probably Mount St. Paul, 930 ft. high) bore N.N.W.

TOBOE ALI LAMA is a hill about $1\frac{1}{4}$ mile N.N.E. of Dapur Point. Its peak is of pyramidal form, and rises to an elevation of 512 ft.

NANGKA POINT is 2 miles N.W. from Dapur Point, and the coast between is fronted by rocks extending about half a mile from it. The edge of the bank is nearly a mile from Nangka Point, and has 5 fathoms water close to, so that it must be approached carefully. The point may easily be distinguished by a round hillock over it 264 ft. high, and also the land receding forming Toboe (Tobu) Ali Bay, the shore of which is low, and fringed at high water with sandy beaches inside the mud flat, which here extends 2 miles off the land.

TOBOE ALI POINT, bearing N.W. by N., distant $5\frac{1}{2}$ miles from Nangka Point, has several white rocks near it, and has or had a conspicuous tree on its summit, elevated 213 ft., and visible 14 miles off.

Toboe Ali Fort, with its red-roofed barracks, stands half a mile S.E. of Toboe Ali Point, upon a low mound 40 ft. in height, at the left point of entrance of a small river, on the banks of which is the village of Sabang, situated close to the fort, and containing (in 1860) a mixed population of 600 Malays and Chinese. At low water the river dries to a distance of 3 cables' lengths from its mouth. A Dutch Administrator and a Captain with a small military force garrison the fort.

The anchorage off Toboe Ali Fort is in 4 fathoms, mud, with Toboe (Tobu) Ali Lama Peak S.E. by E. $\frac{1}{2}$ E., and Gadong Peak in line with Toboe Ali Fort N.E. $\frac{1}{2}$ N. Smaller vessels may approach on this bearing nearer the shore, as the soundings decrease regularly. In southerly and south-westerly winds there is a heavy swell here, which makes landing difficult.

No supplies of any description can be procured but water and wood; the former may be obtained at the above river, or at a small stream half a mile to the eastward of it, from half flood to half ebb.

Mount St. Paul, 5 miles E.N.E. from Toboe Ali Point, rises with a gradual acclivity on its south-eastern shoulder to a peak 990 ft. in height, with two others adjoining of nearly the same elevation, the western peak terminating rather abruptly to a lower spur in the direction of Gadong Hill. When to the westward of Puni Island, owing to a projecting spur from the middle peak, the eastern peak of St. Paul is hidden, and the western one then appears the highest, and forms, with the N.W. brow, a saddle hill.

Gadong Hill is a pyramidal peaked hill 593 ft. high, W. by N. distant nearly $2\frac{1}{2}$ miles from Mount St. Paul.

Owing to the land contiguous to these hills and to Toboe Ali Lama being low, they appear as islands at a distance over 15 miles.

Gossong Point bears N.W. by W. 4 miles from Toboe Ali Point, the land between forming a deep bay, with low mangrove trees. From Gossong to Laboh Point the land is more elevated, with numerous rocks close to the

shore. *Puni Island*, lying midway between Gossong and Laboh Points is a small islet, 47 ft. in height, and conspicuous from its white granite rocks. "The small Puni Island and Gossong Point, seen in one, is a good mark for being clear of the banks. Seen from a northerly bearing, this point looks like an island."—(F. G. Petersen, 1875.)

Laboh Point bears N.W. $\frac{3}{4}$ W., distant 12 miles from Nangka Point. There is a hill, 250 ft. high, about a mile to the eastward of it, and another, about the same height, and the same distance, to the northward. This point from the south-eastward presents rather a shelving appearance, with large white rocks extending from it.

Dahun Point is $7\frac{1}{4}$ miles N.W. by W. $\frac{1}{4}$ W. from Laboh Point, and the shore between is low and covered with mangroves; a range of hillocks runs parallel to the coast.

The land at Dahun Point attains a greater elevation, and is faced with sandy beaches and rocky points. At $4\frac{1}{2}$ miles N.N.E. $\frac{1}{4}$ E. from the point is a round woody hill, 315 ft. in height. Close to the coast, 2 miles N. by W. $\frac{1}{2}$ W. from Laboh Point, is a remarkable square tree, 167 ft. high, which is very conspicuous, there being no others of the same elevation near it. In clear weather it may be seen 12 miles off, closely resembling a ship under sail.

Pulo Dahun, 30 ft. in height, is one of a cluster of rocks lying off Dahun Point, nearly all of which are covered at high water. It is or was remarkable by having a solitary tree on it. *Panjang Hill* (or Long Hill) rises close to the coast between Dahun and Banka Points. It had one conspicuous tree on it in 1875. When seen from the south-eastward it shows as a wedge, with its greatest elevation, 316 ft., on the eastern end. A stream of *fresh water* runs close to the North side of this hill.

Banka Point and Hill.—Banka Point is $12\frac{1}{2}$ miles N.W. by W. $\frac{3}{4}$ W. from Laboh Point, and the land to the westward of it recedes into a bay. The point is about the same elevation as Pulo Besar, but at $1\frac{1}{2}$ mile to the northward it rises to *Banka Hill*. From the north-westward it shows with a flat top, having three clumps of trees on its summit, the whole height being 256 feet. *Pulo Besar* is nearly connected with Banka Point by rocks. It is but 3 cables in extent, and 63 ft. high, but shows up well when bearing between S.E. and East.

The Coast, from the foot of Banka Hill, takes a W.N.W. direction for about 4 miles, when it turns more to the northward to the entrance of a small river; from thence it curves round, forming a small bay to Pudi Point, when it runs pretty straight for 5 miles in a W. by N. direction, to Lalarie Point. *Mamelon Hummock* is a small round hill 265 ft. high, standing by itself 3 miles inland, in a N. by E. direction from Pudi Point. Two miles and a half E. by N. of the Mamelon is another small hill; $2\frac{1}{4}$ miles N. by E.

of which is a double-peaked hill, 396 ft. high; about $1\frac{1}{4}$ mile east-northerly of this last, is a hill 471 ft. high.

Lalarie, or *Langkong Point*, 75 ft. high, is very conspicuous. It had a clump of trees on its extremity; those around it (in 1862) have been cut down, and their trunks whitewashed. It is the turning point into the main part of the strait for vessels that have passed through the Stanton Channel. "Round Lalarie Point should be 'whitewashed stumps,' but are not. The point itself is very sharp and good for bearing. From N.E. the point looks at first as if it were an island; from the South the point is very sharp. Clump of trees mentioned in the chart I could not distinguish."—(F. G. Petersen, 1875.)

A mud bank fronts the whole coast just described between Dapur and Lalarie Points. The 3-fathom line may be considered to mark its edge, which in most places shoals very quickly inside that line. The chart will best show its features. It should not be approached under 10 fathoms.

Casuarina Point, so called from a number of casuarina trees on it, is nearly midway between Lalarie and Brani Points; seen from the northward it appears as an island. The coast between is low, with sandy beaches at high water mark.

Brani, or *Bold Point*, 11 miles N. by W. $\frac{3}{4}$ W. from Lalarie Point, is a termination of a spur from the Parmassang range, with a conical peak, 516 feet high, over it, showing very prominently both from the northward and southward.

Timbaga Rocks (or *Copper Rocks*), so called from their reddish colour, are three small rocks, lying East and West of each other, about a cable's length in extent. The highest and westernmost rock is 4 ft. above high water, and from it Second Point bears W. $\frac{1}{4}$ N. $5\frac{3}{4}$ miles, and Brani Point N. by E. 3 miles. With a setting sun their reddish colour, from the contrast to the green verdure of the land, makes them readily identified, but to render them more conspicuous at high water, and in the forenoon when they are not so clearly seen, a white conical *beacon*, surmounted with a ball, was erected on the highest rock, and the whole height being 24 ft. will make it visible in clear weather at 6 or 7 miles. Shoal water, about half a mile in breadth, extends nearly half a mile to the northward of the group, and $2\frac{1}{2}$ miles to the southward, and forms, with the shore and bank of Banka, a channel three-quarters of a mile wide.

Several shoal patches of coral and sand have been found nearly $1\frac{1}{2}$ mile W.N.W. from these rocks, but they are all inside the 10-fathom line, the depth vessels are cautioned not to go within when passing them. These patches are about a cable's length apart, having 2 fathoms least water on them, and 8 fathoms close to. In approaching them the soundings shoal suddenly from 20 to 10 fathoms. As a guide to lead ships clear, a temporary

black buoy has been placed in 4 fathoms on the outer patch, about 2 cables' lengths westward of the shoalest water.*

From the middle patch of 2 fathoms the Timbaga Rocks appear nearly in line with a sharp peak (130 feet high) South of *Bukit Limmaun*, bearing E.S.E.; and the apex of a distant long hill (657 ft. high) is just open West of a white rock off Tanjong Bedaauw, N. by E. $\frac{3}{4}$ E. These patches and the Timbaga Rocks will be avoided by not bringing Lalarie Point South of S.E. $\frac{1}{2}$ S., until Brani Peak bears E. by N. $\frac{3}{4}$ N.

A rocky bank, about a mile in extent East and West, and half a mile North and South, having 7 to 9 fathoms water over it, and 14 to 20 fathoms close-to all around, lies W.N.W. of the shoal patches just mentioned. From its outer edge the largest of the Timbaga Rocks bears E. by S. $\frac{1}{2}$ S., distant 3 miles, and Brani Peak E.N.E. 5 miles. Lalarie Point, bearing S.E. $\frac{1}{2}$ S., which leads clear of the Timbaga Rocks and the above-mentioned patches, also leads just outside the edge of this bank.

Water may be procured at a stream about half a mile to the northward of the Timbaga Rocks, from half flood to half ebb, after which the mud prevents a boat approaching near the shore.

Parmassang Range is a chain of hills running from Brani Point in a N.E. by N. direction for nearly 4 miles, to the highest peak, which rises to an elevation of 1,608 ft.; the range then turns more to the eastward, for a distance of about 3 miles, where it disappears.

Tanjong Bedaauw is a bold headland, N. $\frac{1}{4}$ E. $3\frac{1}{2}$ miles from Brani Point, the coast between forming a bay half a mile deep. A conspicuous white rock 45 ft. high, lies immediately off the point. *Pulo Pemein*, a good sharp mark to be seen 7 miles off, is a small round island, 50 ft. high, lying N.W. by N. 2 miles from Bedaauw Point. *Tanjong Karrah*, 171 ft. high, bears N.N.E. $\frac{1}{2}$ E., nearly 3 miles from Tanjong Bedaauw. Many rocks, some above and others below water, extend more than half a mile off this point.

SLAN BAY.—The coast from Tanjong Bedaauw falls back to the eastward, and between Tanjong Karrah and a point about 9 miles to the eastward of the Nangka Islands is a deep shallow bight, named Slan Bay, into which the Rivers Kotta and Slan disembogue. From the latter point the coast runs, with a slight bend in towards a small river, about N.W. $\frac{3}{4}$ N., $3\frac{1}{2}$ miles to Tanjong Tedong. On the coast line, in the depth of Slan Bay, is a conspicuous tree, 196 ft. high.

Slan is the chief town of a pangkal, or district, and is municipally governed by the administrator of the tin mines. Here, as at all other chief towns of districts, a small number of Dutch troops are stationed.

* Captain Petersen reports that both the beacon and the buoy could not be seen by him in 1875, while passing.

The edge of the Shore Mud Bank is nearly a mile outside Lalarie Point, and from thence its direction is nearly straight, about North by West for $18\frac{1}{2}$ miles, or for $2\frac{1}{2}$ miles beyond Pulo Pemein, passing Casuarina and Brani Points a little less than half a mile. It then assumes somewhat the form of Slan Bay, which it fronts, and surrounding the Great Nangka Island, projects a couple of spits or horns towards the bank extending northward from the middle Nangka. From thence the edge falls back in a north-easterly direction towards Tanjong Tedong, from which it extends little more than a mile.

About two-thirds of a mile south-westward of Tanjong Bedaauw, a narrow inlet, having $3\frac{1}{2}$ to 5 fathoms depths of water, runs into the bank in a north-westerly direction, and turns to the northward nearly as far as Pulo Pemein.

Northward of the Timbaga Rocks the bank may be approached to 8 or 7 fathoms, as far as a mile or two to the northward of Pulo Pemein, when vessels may stand into 7 or 6 fathoms, until near the Nangka Islands, which should not be approached on the West side nearer than 12 fathoms.

The **NANGKA ISLANDS**, three in number, lie about the middle part of the strait, from $1\frac{1}{2}$ to 4 miles distant from the shore of Banka Island, and 8 or 9 miles eastward of Third Point, on the Sumatra coast. *Great Nangka*, 285 ft. high, is $1\frac{3}{4}$ mile long North and South, and $1\frac{1}{4}$ mile broad; *Middle* and *West Nangka* are each about half a mile long, the former being 125 ft., and the latter 205 ft. high.

Great Nangka is nearly half a mile within the edge of the mud-bank which extends from the Banka shore. From the Middle Nangka a bank of 2 to 3 fathoms extends S.S.E. $1\frac{1}{4}$ mile; from West Nangka a similar bank projects to the southward for nearly a mile, and S.S.E. distant three-quarters of a mile from its tail is a $3\frac{1}{2}$ -fathoms patch.

A small flat rock, 6 ft. above water, named *West Reef*, lies about $1\frac{1}{2}$ cable off the West end of West Nangka; and another, 32 ft. high, named *Tree Rock*, lies nearly one-third of a mile south-eastward of Middle Nangka, between it and Great Nangka.

A reef, named *North Reef*, with rocks above and below water, lies a quarter of a mile off the North end of Middle Nangka, the mud-bank extending off in the same direction about a quarter of a mile further.

Between the banks which surround the islands are intricate channels, from 2 to 4 cables broad, having from 4 to 7 fathoms water in them.

Water.—There is a stream of water on the West side of Great Nangka, and another and smaller stream on the N.E. side; but both streams are frequently dry in the S.E. monsoon, and are difficult of approach for ships' boats. H.M.S. *Belleisle* was watering at Great Nangka night and day, and only filled 30 tons in 36 hours. The natives are not to be trusted, but on the contrary much caution is necessary while watering.

In the N.W. monsoon it is high water, full and change, at the Nangka Islands, at 7 a.m., and the rise is about $9\frac{3}{4}$ ft. Many eddies and small races will be met with in the vicinity of these islands. They are caused by the tidal flood wave from the China Sea meeting the flood from the southward.

TANJONG TEDONG, bearing N.E. by E. $\frac{1}{2}$ E., $3\frac{1}{2}$ mile from the West Nangka, is a conspicuous point, 234 ft. high, inside the Nangka Islands, to which it is connected by the mud bank. A large cluster of rocks, some above and others below water, lie about a mile north-westward of the point, only a short distance from the edge of the mud-bank.

The Coast from Tanjong Tedong falls back to the N.E. into the bay, at the bottom of which is the small *River Semboelan*; from thence it curves to the N.W. to *Tanjong Penegan*, from which it again falls back about a mile to the entrance of a small river of that name. The coast line from this river rounds the foot of the higher land sloping down from Mundo Peak, and then forming a small bay, trends N.N.W. to a point bearing E. by S. 2 miles from the largest of the Meddang Islands, when it again bends to the N.E. for $1\frac{1}{2}$ mile to the entrance of the Mundo River.

Mundo Bay.—From the Mundo River the coast trends to the N.W. about 8 miles to Tanjong Jurung-patt, forming the shore of Mundo Bay, with a point about the centre of it projecting nearly a mile. The shore of this bay is low, and covered with trees, which, at the entrance of the Kotta Waringin River, are 121 ft. high. *Tanjong Jurung-patt*, 240 ft. high, is the western limit of Mundo Bay. The land here begins to be more elevated, and continues to be so as far as the entrance of the Jiring River.

The coast from Tanjong Jurung-patt takes a westerly direction for nearly 3 miles to *Tanjong Raya*, where it falls back northerly about a mile to the *Tempelang River*; from thence it takes again a westerly direction for nearly 4 miles to Tanjong Ressam, the eastern extreme of Jiring Bay. This latter point is prominent, and faces the S.W.; it lies N.W. by W. 12 miles from the Meddang Islands.

Jiring Bay is the deep bight between Tanjong Ressam and Tanjong Tadah, the coast trending away from the former point in a N.N.W. direction to the entrance of the River Jiring, and from thence curving round about W.S.W. and S.W. to Tanjong Tadah, which bears from Tanjong Ressam W. $\frac{1}{2}$ S., distant $8\frac{3}{4}$ miles. The shore of the bay is low, with three conspicuous trees 152 ft. high in its N.W. part. *Tanjong Tadah*, 203 ft. high, is readily recognized, the land on both sides being lower, and curving into two bays, giving it a very prominent appearance.

Between Tanjong Tadah and Tanjong Puni, which lie nearly East and West of each other, about 8 miles apart, there are two bays, each about three-quarters of a mile deep, with a point having a hummock or mound, 256 ft. high, upon it midway between.

Tanjong Sukal, 2 miles East by North from **Tanjong Puni**, has a hill 209 feet high upon it, and a small river on its West side. *Tanjong Puni* is low, and the coast line rounds away very gradually on either side of it. From thence to a point $7\frac{1}{2}$ miles to the N.W. by W. $\frac{1}{2}$ W., the coast falls back and forms a bay about a mile deep. From the latter point to **Kalian Point** the bearing is W. $\frac{3}{4}$ S., and the distance nearly 4 miles, the coast between forming **Mintok Bay**.

There are several hills from 100 to 600 ft. high on the part of the coast just described between **Tanjong Tedong** and the **Mundo River**. *Mundo Peak* 512 ft. high, and bearing E. by S. $\frac{1}{4}$ S. 4 miles from the **Meddang Islands**, is the most convenient for fixing the vessel's position.

About three-quarters of a mile to the eastward of the **Tempelang River** is a small hill 263 ft. high; and N.E. 3 miles from its entrance is *Bukit Tempelang*, a hill 412 ft. high; W. by N. $\frac{3}{4}$ N. from **Bukit Tempelang** is *Bukit Pandin*, 585 ft. high, which will be found very useful when in this part of the strait. *Solitary Sharp Peak*, 661 ft. high, is the summit of a sharp cone hill standing by itself, N. $\frac{1}{2}$ E., distant $10\frac{1}{2}$ miles from **Tanjong Tadah**; this is also very useful when brought in line with nearer objects, for giving a correct line of direction.

Four or 5 miles inland from the coast between **Puni Point** and **Mintok** are some hills, one of which, *Bukit Beloe*, 773 ft. high, serves as a mark to clear the **Brom-Brom Reef** and **Amelia Bank**; a little to the westward is another hill 427 ft. high.

About 2 miles north-eastward of **Bukit Beloe** is *Bukit Panjang*, or long hill, 661 ft. high; and nearly 3 miles north-westward of **Beloe** is a hill 454 feet high.

Meddang Islands are three islets lying about 3 miles off the entrance of the **Mundo River**, and forming the south-western extreme of **Mundo Bay**, being joined to the main land by the mud flat. The largest islet is 147 ft. high, and bears North 9 miles from the **West Nangka**. A small island, named **Pulo Antu**, lies about $1\frac{1}{2}$ mile north-eastward of the **Meddang Islands**.

Pulo Sambayang is an islet 175 ft. high, lying about E. $\frac{1}{2}$ S. nearly 3 miles from **Tanjong Ressim**, and $1\frac{1}{4}$ mile W.S.W. of the entrance to the **Tempelang River**.

Karang Sarabu are a cluster of rocks, some above and others below water, extending in a S. by E. $\frac{1}{2}$ E. direction nearly 2 miles from the point with a hummock on it between **Tanjong Tadah** and **Tanjong Sukal**.

MONOPIN HILL, or *Gunong Manombing*, in lat. $2^{\circ} 1\frac{3}{4}'$ S., long. $105^{\circ} 12'$ E., rises near the West end of **Banka**, and its summit being 1,456 ft. high, may be seen at a considerable distance, and serves as a guide in approaching to or departing from the North end of **Banka Strait**. It frequently happens at

the North entrance of the strait, that this hill is the only visible object, especially when a vessel is near Sumatra in 5 or 6 fathoms water.

The edge of the bank, after passing a cable's length outside the rocks off Tanjong Tedong, takes a N.N.W. direction, till abreast of the Meddang Islands, outside of which it extends nearly a mile. From thence it curves round Mundo Bay, projecting 4 miles to the southward of Tanjong Jurungpatt; it then runs to the westward, passing Tanjong Ressam at $4\frac{1}{2}$ miles, and Tanjong Tadah at nearly 3 miles.

Mundo Peak, well open to the southward of the Meddang Islands, leads clear of the edge of this bank between those islands and Tanjong Tadah.

From Tanjong Tadah the bank still follows a westerly direction till South of Tanjong Puni, when it trends away sharply to the north-westward, following the curve of the coast line at an average distance of about $1\frac{1}{4}$ mile, until abreast the East point of Mintok Bay, from which it is distant only half a mile.

Between Tanjong Tedong and Tanjong Tadah, the soundings decrease regularly towards the bank, which may there be approached to 5 or even 4 fathoms, except near the Meddang Islands, where a vessel should not shoal under 9 fathoms. At Tanjong Tadah the bank begins to get steeper to, and abreast of the Karang Sarabu Rocks, there are 9 and 10 fathoms pretty close to its edge.

Caution.—The bank South of Puni Point is very shallow and steep-to, having from 11 to 16 fathoms, almost close to its edge. Tanjong Tadah, bearing E. by N. $\frac{3}{4}$ N., jutt clears this dangerous spit to the eastward, and Monopin Hill N.W. by N., just clears it to the westward.

KARANG BROM-BROM is an extensive shoal of rocks and sand, dry in some places at low water, lying $4\frac{1}{2}$ miles South from the shore between Tanjong Puni and Sukal. It is a little more than 2 miles long in a W. $\frac{1}{2}$ N. and opposite direction, and nearly half a mile wide at its western end, where the rocks are, and from which Monopin Hill bears N.W. $\frac{1}{2}$ N.; the eastern end tapers away to a sandy point. This danger was marked by a temporary beacon, which is said to have disappeared (1875).

A *red buoy* was placed off the southern side of Karang Brom-Brom, in 1875, in 5 fathoms water, with the middle of Monopin Hill bearing N. 40° W., and the East point of Cape Tadah, N. 50° E.

The highest part of the hummock on the point behind the Karang Sarabu Rocks bearing N. $\frac{1}{4}$ E, or the highest part of Tanjong Tadah bearing N.E. $\frac{3}{4}$ N., clears the eastern end more than half a mile; and Bukit Beloe, bearing N. $\frac{3}{4}$ W., clears the western end nearly a mile.

A channel, 2 miles wide, having 7 to 15 fathoms water in it, lies between the Brom-Brom and the shore bank. Notwithstanding that the channel between the Brom-Brom Reef and Banka is only 2 miles wide, a vessel may easily work through it by day, during the western monsoon, because she can

take advantage of the tides; but on the coast of Sumatra a strong easterly current runs with little interruption; she must, however, be very careful in crossing over to the coast of Banka, as the bank is very steep, and she might suddenly fall from 7 to 3 fathoms before there would be time for a second cast of the lead.

Amelia Bank is a small patch of hard ground, with $2\frac{3}{4}$ fathoms water over it, at the S.E. extreme of the Mintok Bank, to the shoal patches of which it is connected by a ridge of 4 and 5 fathoms water. From it the western extreme of the Brom-Brom bears East $4\frac{1}{2}$ miles, and Monopin Hill N. by W. $\frac{3}{4}$ W. 12 miles.

Bukit Beloe bearing N. $\frac{1}{2}$ E. leads a mile to the eastward of the Amelia Bank; and the same hill N. by E. $\frac{1}{2}$ E. leads the same distance to the westward.

Mintok Bank extends from the Amelia Bank in a direction nearly parallel to the shore, for a distance of 10 or 11 miles, to within about the third of a mile of the Karang Hadji Reef, off Kalian Point. It is composed of hard sand, and has several patches with only $2\frac{1}{2}$ and 3 fathoms water over them, and 4 or 5 fathoms between. A 2-fathoms patch lies N.W. by N. $2\frac{1}{3}$ miles from the Amelia Bank. Bukit Beloe, bearing N. by E. $\frac{1}{2}$ E., which clears the Amelia Bank to the westward, also clears the patch to the eastward.

From this last-mentioned patch, other patches of $2\frac{1}{2}$ and 3 fathoms extend N.W. by W. for 5 miles, this part of the bank being about $1\frac{1}{2}$ mile wide. For $2\frac{2}{3}$ miles further in the same direction the bank has from $4\frac{1}{2}$ to 7 fathoms water over it, the deepest water appearing to be with Mintok Fort flagstaff in line with the pier-head, bearing about N. by E. $\frac{1}{3}$ E.

Another 3-fathoms patch lies with the lighthouse on Kalian Point bearing N. $\frac{1}{2}$ E. $1\frac{1}{3}$ mile, from which 5 fathoms may be carried towards the Karang Hadji Reef until very close to it, when the water will suddenly deepen to 11, 17, or 20 fathoms. Monopin Hill, in line with the lighthouse on Kalian Point, N.E. $\frac{1}{2}$ N., leads westward of the 3-fathoms patch, between it and the Karang Hadji Reef.

A ship working through the strait, to keep clear of Mintok Bank, should take care not to bring the lighthouse on Kalian Point to the westward of N.W. by N.

KARANG HADJI is a dangerous reef of rocks and sand lying close to the N.W. end of the Mintok Bank; the rocks on it are all covered at high water, but many of them are visible at half tide. The beacon marked on the chart was not visible in 1875. The reef is $1\frac{1}{2}$ mile long N.W. by W. and S.E. by E., and half a mile broad, and from its western and outer extreme Kalian lighthouse bears E. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles, and Tanjong Oelar and Tanjong Bersiap are in line; its eastern extreme bears S.W. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ mile

from Kalian Point. Close to it on the North, West, and South sides, the depths are irregular from 16 to 21 fathoms.

A *rock*, with 12 ft. over it at low water, lies about 2 cables northward of the Hadjie Reef, with Tanjong Bersiap, the western point of Banca Island, bearing N. $\frac{3}{4}$ E., and Kalian Point lighthouse E. $\frac{1}{4}$ N.

Tanjong Oelar kept well open of Tanjong Bersiap clears the West end of this reef; the highest part of Monopin Hill in line with the lighthouse clears its eastern extreme; and Tanjong Puni bearing E. $\frac{3}{4}$ S. clears it to the southward.

A *red buoy* was placed off the N.W. side of Karang Hadjie, in 1875, in $4\frac{1}{2}$ fathoms water; from it Tanjong Kalean bears N. 87° E., and Bersiap Hill N. 26° E.

Inner or Binnen Bank, of hard sand, with $2\frac{1}{2}$ fathoms water on it, and 7 or 8 fathoms close-to, extends East $1\frac{3}{4}$ mile from Kalian Point, when it turns to the N.W. for about half a mile, thus forming a spit projecting to the eastward; from thence it curves away and is lost in the sand-bank which extends half a mile from the shore of Mintok.

Two-thirds of a mile E. by S. from this spit is a 3-fathoms patch, from which Mintok pier-head bears N.N.W. $\frac{3}{4}$ W., distant two-thirds of a mile, and Kalian Point lighthouse West, northerly.

KALIAN Point and Light.—Kalian Point, low and sandy, with some trees behind it, is the south-western extreme of the West end of Banka. The lighthouse upon it, in lat. $2^{\circ} 4' 37''$ S., long. $105^{\circ} 9'$ E., is a white stone tower with a red lantern, which shows, at an elevation of 170 ft., a *fixed* white light, visible in clear weather at 20 miles.

About three-quarters of a mile N.W. from the lighthouse is *Tanjong Batubrani*, the trees immediately behind which are 127 ft. high. *Kalian Ledge* is a small reef, with only 6 to 9 ft. water over it, lying a little more than a mile to the N.W. of Kalian Point; from it the lighthouse bears S.E. by E., Bersiap Point N. $\frac{1}{4}$ W., and Monopin Hill N.E. $\frac{1}{4}$ E.

Kalian Pass, formed by Kalian Point and Ledge on one side, and the Karang Hadji Reef on the other, is three-quarters of a mile wide, with soundings in it of 25 to 32 fathoms. This channel is generally used by vessels coming from the northward and proceeding to Mintok Bay, and with a fair wind is preferable to the passage outside the Karang Hadji; but the great depth, bad anchorage, and strong currents, render it unadvisable to attempt to beat through.

In using this channel, the sandy point upon which the lighthouse stands may be passed pretty close to; and the lighthouse on the bearing of E. by S. leads through between the Kalian Ledge and the Karang Hadji Reef.

MINTOK.—Two miles E.N.E. from Kalian Point, on the banks of a small

river, is the town of Mintok, the capital of the island,* having a fort upon a hill, and some stone houses close to the shore, the red roofs of which are visible at a considerable distance. The resident and other Dutch officers have houses on the hill near the fort, most of the native houses being lower down nearer the sea. The mail steamers, which run twice a month between Batavia and Singapore, always call here.

A pier nearly half a mile long, and running out to the edge of the bank, has been built, and is of great advantage to the trade of the place; on the extremity of the pier a small *fixed* white light is shown all night.

The best anchorage for large ships is in 10 to 6 fathoms, about $1\frac{3}{4}$ mile from the shore, with Monopin Hill bearing about N. $\frac{3}{4}$ E., and Kalian Point about W.N.W. or W. by N. The ordinary anchorage of the Dutch man-of-war stationed in Banka Strait, and of the merchant vessels trading to Mintok, which are usually of a small class, is in $4\frac{1}{2}$ or 5 fathoms inside the 3-fathoms patch lying off the spit which extends from the Binnen Bank, at any convenient distance and direction from the pier-head.

The usual route to Mintok Road is across the Mintok Bank, between the Karang Hadji Reef and the Amelia Bank. A vessel coming from the northward, and bound for the road, may proceed either through the Kalian Pass, or she may pass outside the Karang Hadji Reef, and then follow the usual track across the Mintok Bank. A good mark for crossing the bank is Monopin Hill in line with the flagstaff on the fort bearing N. by E. $\frac{1}{2}$ E., which will lead over it in 5 or 6 fathoms water; another good mark is Monopin Hill in line with the lighthouse N.E. $\frac{1}{2}$ N. No ship can cross the bank in safety with Monopin Hill bearing to the westward of North; with the hill bearing North, a ship crossing the bank would have 3 fathoms at low water spring tides, the bottom hard sand, coral, and shells. When over the bank, the water will deepen to 18 or 20 fathoms, soft muddy bottom, and shoal again quickly towards the inner bank and the shore.

With a working wind, keep Monopin Hill N. $\frac{1}{2}$ E. and N.N.E.

To enter Mintok Road from the eastward, a vessel must work between the shore and the Mintok Bank, being careful not to bring Tanjong Tadah to the eastward of E. by N. $\frac{3}{4}$ N., until Monopin Hill bears N.W. by N.

A hard sandy bottom and shoal water will show when near the edge of the

* Banka, like the adjacent countries, is now under the dominion of the Dutch, and has been so without dispute since 1821, when it was finally conquered from the treacherous Sultan of Palembang in Sumatra. As is well known, the chief commercial product is tin: a government monopoly, chiefly worked by Chinese, who form more than a moiety of the total population of Banka, estimated at 35,000. The island is comparatively sterile, and the natives rude and treacherous. There are numerous other colonies of Malays and Javanese, in addition to the Chinese immigrants. The chief geological feature is the range of volcanic and granitic hills which runs through the island, parallel to and of similar character to those on the Malay peninsula.

Mintok Bank; while, to avoid the shallow along the coast, Monopin Hill must not be brought more to the westward than N.W. by N., and taking care not to shoal to less than 5 fathoms.

At Kalian Point it is high water, full and change, in the N.W. monsoon, at 8^h 17^m a.m., and in the S.E. monsoon at 8 p.m.; the springs rise 12½ ft.

Tanjong Bersiap, 168 ft. high, bears from Tanjong Batu-brani, the north-western extreme of Kalian Point, N. by W. ¼ W., distant 3½ miles. The coast between curves slightly inland, and is fronted by a bank extending nearly a mile from it, pretty close to which are 7 and 10 fathoms. Inside the edge of this bank, and lying some distance off Bersiap Point, is a cluster of rocks, some of which are above and others below water. *Bersiap Hill*, 336 ft. high, is small, and stands by itself, about 1½ mile N.E. of the point. About 2 miles N.E. of the hill, the extreme of a range running from Monopin to the N.W. forms a conspicuous peak 709 ft. high.

Tanjong Oelar, 156 ft. high, is about 4 miles N. by E. from Tanjong Bersiap; nearly midway between is a remarkable yellow cliff. About three-quarters of a mile northward of the yellow cliff, and just to the South of a point with a rock off it, is a stream of *water*. *Oelar Reefs* is the name given to the rocky and uneven ground, with reefs and rocks above water in places, extending off shore between Bersiap and Oelar Points. From a mile off Bersiap Point, it runs in a N. by W. direction for nearly 3 miles, when it trends away to the north-eastward, passing about three-quarters of a mile outside Oelar Point, immediately off which are several rocks above water.

Transit Rock, on which H.M.S. *Transit* was wrecked, 10th July, 1857, lies at the western extremity of this rocky, uneven ground, at 2¼ miles off shore, and W. ¼ N. 8 cables' lengths from a reef which generally shows, except at high tides, with 6 and 10 fathoms between them. The least depth on the rock at low water springs is 12 ft., and from this spot Oelar Point bears N.E. by E.; the highest point of Monopin Range E. by S. ¾ S.; and Kalian Point is 1¼° open of Bersiap Point S.S.E. southerly, distant from the latter point 2¾ miles. There are 20 fathoms water at a cable's length to the westward of the 12-foot line; the depth around varying from 14 to 12, 7, and 5 fathoms over very uneven bottom.

A rock awash, at low water springs, lies E. ½ N. 2 cables' lengths from the Transit Rock; and there are 4½ fathoms (perhaps less) rocky bottom, at half a mile to the northward of the Transit, with 20 fathoms close-to; the locality of the latter is indicated by strong ripples.

Tanjong Batu-brani well open of Tanjong Bersiap, bearing S.S.E. ¼ E., clears the Transit Rock to the westward; and Tanjong Biat, well open of Tanjong Oelar, bearing E.N.E., clears it to the northward.

TANJONG BIAT bears N.E. ¾ E., distant 3 miles from Tanjong Oelar, and, like that point and Tanjong Bersiap, has rocks above and below water,

extending some distance off it. The line of danger which extends about three-quarters of a mile off Tanjong Oelar, follows the curve of the coast line at about the same distance towards Biat Point, where it projects rather farther off. In the bay between Oelar and Biat Points is a small stream of *water*, with a village close to it.

Rocky Patches, with 20 fathoms close to them, lie off Tanjong Biat, having a narrow channel with 10 and 11 fathoms water in it between them and the rocky ground extending from the coast. From the outer patch of 3 fathoms, Tanjong Oelar bears S. $\frac{1}{2}$ W. 3 miles, and Tanjong Biat S.E. by E., a little over 2 miles.

Tanjong Oelar bearing South leads nearly half a mile westward of these dangers; and *Bukit Batu*, a hill 708 ft. high, about 12 miles eastward of Tanjong Biat, bearing E. by S., leads northward of them.

Caution.—The West coast of Banka, between Tanjong Kalian and Tanjong Biat, is very dangerous to approach, owing to the rocky patches just described and the deep water close to them; ships should, therefore, exercise great caution when in this vicinity, observing that Tanjong Bersiap, if not brought to the westward of South, will clear all the dangers between Tanjongs Oelar and Biat; and they should be careful to regard the marks given to clear the Transit Rock.

FREDERICK HENDRICK ROCKS lie at the northern entrance of Banka Strait, nearly midway between Batakarang Point on the Sumatra coast and Tanjong Oelar on the Banka coast. They consist of two rocky patches, lying North and South of each other, having only 9 ft. on the northern patch, and 3 ft. on the southern. The two patches occupy a space about a mile long, North and South, and half a mile broad.

From the 3-foot patch Monopin Hill bears nearly E. by S. 14 miles; and the lighthouse on Kalian Point S.E. by E. $\frac{1}{4}$ E. $12\frac{3}{4}$ miles.

Monopin Hill E. $\frac{3}{4}$ S. leads about half a mile southward of the 3-ft. patch; and Monopin Hill in line with the remarkable yellow cliff between Bersiap and Oelar Points, E. by S. $\frac{3}{4}$ S., leads 2 miles northward of the northern patch.

Close around the shoal are 16 to 20 fathoms water.

A *red buoy* is moored on the South point of Frederick Hendrick Reef, in 5 fathoms, with Kalean light bearing S.E. by E. $\frac{1}{3}$ E., Bersiap Hill E. by S., and Mount Parrée N E. by E. It is visible about 3 miles off; but as the buoy from the strong tides frequently shifts its position, vessels are cautioned not to place too much dependence on it.

Channels.—The channel westward of the Frederick Hendrick Rocks is the one most generally used, the depths in it being moderate, decreasing regularly towards the bank extending from the Sumatra coast; whereas in the channel eastward of the shoal the water is much deeper, and the depths irregular.

Between the shoal and the 3-fathoms line at the edge of the mud-bank extending from Batakarang Point, the channel is $4\frac{1}{2}$ miles wide, having 16 and 17 fathoms close outside the 10-fathoms line towards the rocks; the depths under 10 fathoms decreasing regularly towards the bank.

The channel between the shoal and the Transit Rock and reefs off the West coast of Banka is 8 miles wide, having 16 to 20 fathoms at 3 or 4 miles eastward of the shoal, and 19 to 25 miles nearer Banka, which depths increase to 24 and 30 fathoms close to the dangers extending from that coast.

Directions for West Channel.—To avoid the Frederick Hendrick Rocks, vessels taking the channel between them and Sumatra should keep in $4\frac{1}{2}$ to 7 fathoms water on the edge of the bank off Batakarang Point, and not keep more to the eastward than in 9 or 10 fathoms, while Monopin Hill bears between East and E.S.E.

In working through this channel a vessel should not deepen to more than 9 fathoms towards the Hendrick Rocks, but the bank off Batakarang Point may be neared to 5 or $4\frac{1}{2}$ fathoms. When Monopin Hill bears E.S.E., the vessel will be northward of the rocks.

In the East Channel, Mounts Punyabung, Parée, and Jerankat, on the N.W. part of Banka, will appear like islands. To pass eastward of the Frederick Hendrick, keep Mount Punyabung N.E., until Monopin Hill bears E. $\frac{1}{2}$ S., when Punyabung must not be more eastward than N.E.; and when Monopin is E. by S. $\frac{1}{2}$ S., Punyabung must not be more North than N.E. $\frac{1}{4}$ N., so as to avoid in the first case the Hendrick Rocks, and in the second the Transit Rock. When Monopin bears southward of S.E., Mount Punyabung must not be brought to the northward of N.E.

Soundings in Banka Strait.—In Banka Strait, between Lalarie and Second Points, the depths are from 17 to 25 fathoms, shoaling suddenly from those depths to 10 fathoms on the Banka side of the strait, but decreasing regularly towards the 10-fathoms line on the Sumatra side.

The various banks and coral patches which exist in the strait, having more than 5 or 6 fathoms on them, will be best understood by reference to the chart. The dangerous banks have been described. Indeed, throughout the strait, the soundings cannot alone be relied upon to conduct a vessel safely through; but when associated with careful bearings and frequent references to the chart, a stranger need not run the least risk, or experience any difficulty in passing through the strait for the first time.

STANTON AND LUCIPARA CHANNELS.

The **STANTON CHANNEL**, which was surveyed, or rather discovered, by Mr. W. Stanton, R.N., in command of H.M.S. *Saracen*, in 1859-60, is a most important addition to our knowledge of these entrances to the China Sea. This is the more so, inasmuch as the Lucipara Channel to the westward of it is said to be filling up in consequence of the extension of the low Sumatran coast. His directions which follow will be found precise and sufficient. He also makes the following general remarks: It has hitherto been the custom for all ships to work along the Sumatra coast, where they have not only a strong wind, but a constant current to contend with; consequently sailing vessels have been delayed *two and three weeks*, and instances have been known of vessels being a month making the passage through Banka Strait.

The *Saracen* frequently worked well to windward under fore and aft sails, when the clipper ships could not make any progress, and were compelled to anchor on the Sumatra side. From my past experience, I feel confident that a smart sailing vessel, by taking advantage of the tides and currents, and following the directions hereafter given, may make the passage even in the full strength of the monsoon in *three or four days*.

The *Stanton Channel*, lying along the south-western coast of Banka, is 19 miles long, and nearly 3 miles wide at its narrowest part, with depths, mid-channel, increasing gradually from 7 fathoms at its south-eastern entrance to 20 fathoms near the other extreme. The approaches to it from the southward are marked by the well-defined mountain of St. Paul, and the conical hills of Gadong and Toboe Ali Lama (page 201), and in fine clear weather by the more distant range of Padang, 2,217 ft. high; these cannot fail to point out the entrance, and the water being deep within half a mile of the Dapur Islands (page 200), will give strangers confidence in steering for the land. Prominent points and hills will also be seen along the Banka coast, bearings of which will enable a vessel at any time to ascertain her position.

The channel is bounded by narrow banks extending in a N.W. by W. and S.E. by E. direction, and all partaking of the same formation (sand) in their shoalest parts, with a mixture of mud and sand between. The two marking the western boundary of the channel are named *Smits* and *Melville Banks*, and off the latter a lightvessel would be most useful.

Smits Bank consists of four smaller banks, nearly connected, and forming one long narrow ridge 15 miles in length, with its shoalest part of 3 ft., lying 6 miles, and the next shoalest of 9 ft., 3 miles from the north-western end; two other patches of 3 fathoms and $2\frac{3}{4}$ fathoms lie on the S.E. part of the bank.

Panjang Hill, bearing N.E., leads to the north-eastward of this bank, between it and the Nemesis Bank, in 6 fathoms at low water. Gadong Peak

in line with Toboe Ali Point N.E. $\frac{1}{4}$ E., or Lucipara S.W., clears the south-eastern end in 4 fathoms; and Lalarie Point N.W. by W. $\frac{1}{4}$ W., or not approaching the bank to a less depth than 10 fathoms, clears the north-eastern side.

Melvill Bank, 5 miles long, and nearly half a mile broad, lies a quarter of a mile to the eastward of the south-eastern part of Smits Bank, with a depth of 7 and 8 fathoms between. The shoalest part of this bank is near its north-western extremity, and is about 2 miles in length, with from 2 to 3 fathoms on it. At the North end, in 5 fathoms, Laboh Point bears N.E. by E.; and the bank is cleared to the south-eastward in 7 fathoms by the latter point bearing N. by E. $\frac{1}{2}$ E.; and to the eastward in 8 fathoms, by bringing Parmassang Peak to touch the West side of Banka Hill N.W. $\frac{1}{2}$ N.

Between the above banks and Lucipara, there are many others all trending in the same direction, with narrow deep-water channels between; but as these channels are exceedingly narrow, and no marks can be given to clear the banks, they are not available for vessels.

Eastern Bank.—The bank bounding the eastern side of Stanton Channel is 13 miles long and nearly a mile wide, at 3 miles S.W. by S. of Laboh Point, which is the broadest and shoalest part. It is formed by three smaller banks nearly joined together, with from 2 to 3 fathoms on the north-western and south-eastern ones, and only $4\frac{1}{2}$ ft. on the middle of the centre bank. The north-western extremity is separated from a projecting horn, extending from the shore mud flat at 2 miles S.S.W. of Pulo Dahun, by a narrow channel of 6 fathoms.

Gadong Peak, in line with Toboe Ali Fort, bearing N.E. $\frac{1}{2}$ N., leads to the southward of the south-eastern part of the bank in $4\frac{1}{2}$ fathoms; Dapur Island S.E. by E. $\frac{3}{4}$ E. leads to the westward; and the Mamelon or Hummock, kept open to the westward of Pulo Besar, N.W., clears the West side of the north-western extremity of the above banks.

A small bank of sand lies 1 mile to the westward of the south-eastern extreme of the eastern bank, but as not less than $4\frac{1}{2}$ fathoms were found on it at low water, it is not dangerous to ships passing through.

Inner Channel.—To the eastward of the eastern bank along the coast of Banka, there is an inner channel nearly a mile wide, with 4 to 6 fathoms water in it, but as it is encumbered with shoals it is only navigable for small vessels. Dapur Island, bearing S.E. by E., leads nearly in mid-channel.

There are also two outlets into the main channel over the western bank, in 5 and 4 fathoms; the former with Pulo Dahun bearing N.N.E.; the latter and southern outlet, when Pulo Puni and Gossong Point are in line, E. $\frac{1}{2}$ N.

Nemesis Bank, lying nearly mid-channel between Pudi Point and False First Point, is a long ridge of sand extending 9 miles in a N.W. by W. and

S.E. by E. direction, with irregular soundings of from 3 to 10 fathoms on it. The shoalest part consists of two patches of 3 fathoms, each about 2 cables' lengths in extent, upon one of which the French frigate *Nemesis* grounded in 1857. They lie E.S.E. and W.N.W. from each other, distant half a mile, and from the western patch Lalarie Point bears N.N.W. $\frac{3}{4}$ W. $4\frac{3}{4}$ miles, and False First Point S.S.W. $\frac{3}{4}$ W. $4\frac{1}{4}$ miles.

Casuarina Point kept open of Lalarie Point, bearing N. by W. $\frac{3}{4}$ W., leads to the westward of these shoal patches, in 14 fathoms water; the Mamelon or Hummock, N. by E. $\frac{1}{4}$ E., or False First Point S.W. $\frac{1}{2}$ S., leads to the eastward; and Lalarie Point bearing N.W. $\frac{1}{2}$ N., clears them to the northward. There is another patch of 5 fathoms lying 2 miles from the south-eastern extreme of the bank, with False First Point W. $\frac{1}{4}$ S., and First Point S. by W. $\frac{1}{4}$ W., distant $3\frac{1}{4}$ miles.

Anchorage may be found anywhere in the Stanton Channel, but ships bringing up with their kedge or stream anchor must always be prepared to let go the bower anchor, as there will be experienced, particularly during the change of the monsoons, very dangerous squalls, with heavy rain, thunder, and lightning, which generally last for about an hour.

TIDES.—In the S.E. monsoon it is high water, full and change, at Toboe Ali Point, on the Banka shore, at 8^h 30^m p.m., and at 10 a.m. in N.W. monsoon. The ordinary rise at springs is $10\frac{3}{4}$ ft., but it sometimes reaches 12 ft. The highest tide generally occurs two days after full and change. The rate at springs is $2\frac{1}{2}$ knots. The flood stream sets to the N.W. and runs for about 12 hours, and the ebb the same period in the opposite direction, but they are both sometimes influenced by the strength of the monsoon. When it is blowing strong from the S.E., the flood stream often runs for 14 hours.

A vessel may carry a *fair tide all the way through* by starting from either extremity of the strait at low water, as the tidal waves from the China and Java Seas meet near the Nangka Islands.

At Laboh Point it is high water, full and change, at 11 p.m. in the S.E. monsoon, and the rise at ordinary springs is 10 ft.

After rounding Lalarie Point in the S.E. monsoon the flood sets N.N.W., and the ebb to the S.S.E., along the Banka shore.

The time of high water at Laboh Point being $2\frac{1}{2}$ hours later than at Toboe Ali Point, in the southern part of Stanton Channel, for a few days after full and change the tides will be found (as there is generally 12 hours' flow and ebb) to run in one direction all night, and the opposite direction during the day, with a velocity of from $2\frac{1}{2}$ to 3 knots. The current also setting directly mid-channel, the flood N.W. by W., and the ebb S.E. by E., vessels may take advantage of it in light airs to drop through.

Directions for Stanton Channel from the Southward.—Vessels from the south-

ward, intending to proceed into Banka Strait by the Stanton Channel, cannot fail, in approaching the coast of Banka, to recognise the mountain of St. Paul (page 201) by its flattish top having several nipples of nearly the same elevation, and Gadong and Toboe Ali Lama Peaks by their conical appearance. Should the weather be clear, the distant high range of Pedang will be visible. The highest peak of this range is quoin-shaped, attaining from its western shoulder an elevation of 2,217 ft., with several lower hills of a rounder and more conical appearance adjoining, the two westernmost being about 1,200 and 1,400 ft. high.

After recognizing Mount St. Paul and Toboe Ali Lama Peak, approach the latter on a North bearing, and when about 3 miles to the southward of the Dapur Islands, steer N.W. by W., which will lead nearly mid-channel to abreast Banka Point; recollecting the marks given at p. 216, for clearing the Melvill and Eastern Bank.

When off Laboh Point, the high range of Parmassang will be visible, rising from a gradual slope on its western shoulder to a flat-top peak, with two lower ones adjoining. The three hills, Banka, Panjang, and Woody, will also be seen; the two former may be known by their wedge shape, and the latter by its isolated position.

From abreast Banka Point a course may be shaped along the Banka shore, passing Lalarie Point at a distance not within $1\frac{1}{2}$ mile, and from thence to Second Point. When Pulo Dahun bears North, great care must be taken to avoid the spit which extends in a south-easterly direction from the shore mud flat, between the above island and Banka Point. The Mamelon or Hummock, N.W., well open to the westward of Pulo Besar, clears this spit (page 216); from thence to the Timbaga Rocks the bank may be avoided by not shoaling towards it under a depth of 10 fathoms.

Working through this channel from the eastward, vessels may stand towards the South extreme of the Dapur Islands to a distance of half a mile, as these islands have deep water at 4 cables' lengths from them. Between this and Toboe Ali the shore mud flat may be approached until Pulo Dapur bears S.E. by E. $\frac{1}{2}$ E., and Lucipara may be neared to a distance of 5 miles; but when Gadong Peak bears N.E. $\frac{1}{2}$ N., or comes in line with Toboe Ali Fort, Pulo Dapur must not be brought to the southward of S.E. by E. $\frac{3}{4}$ E. to clear the north-eastern part of the Eastern bank.

Parmassang Peak touching the West side of Banka Hill N.W. $\frac{1}{2}$ N., will clear the Melvill Bank, and when Laboh Point bears N.E. $\frac{1}{2}$ N., by not shoaling under 10 fathoms, all the banks on both sides will be cleared. Lalarie Point N.W. by W. $\frac{1}{4}$ W. will also clear the north-eastern part of Smits Bank.

The shoal patches on the Nemesis Bank should not be approached under a depth of 10 fathoms until Casuarina Point comes open of Lalarie Point, and in rounding the latter point take care not to come into a less depth than 10

fathoms, as the bank is here steep-to. The Timbaga Rocks may also be avoided by following the same precaution, and from thence it is recommended to work up from Second Point along the Sumatra coast.

From the Westward.—Proceeding through Stanton Channel from the westward, when abreast and $1\frac{1}{2}$ mile distant from Lalarie Point, an E.S.E. course will lead nearly mid-channel between the Nemesis Bank and the bank extending from the Banka shore, but when Panjang Hill bears N.E. a more southerly course must be shaped to pass in mid-channel. When Dahun Point bears North, the Mamelon or Hummock open of Pulo Besar N.W. (the clearing mark for the spit off Pulo Dahun, page 216), also leads directly through the channel.

Working through from the westward in the S.E. monsoon, the same precaution must be taken as already mentioned to avoid the shoalest part of the Nemesis Bank, which will be passed when the Mamelon bears N. by E. $\frac{1}{4}$ E.; and should a strong flood tide be then running, it would be advisable to anchor in 8 or 9 fathoms, sand, on the Nemesis Bank, as the water on both sides of it is deep, and wait for a change of tide, or the chance of the land breeze, which blows generally either during the night or early in the morning from the Banka shore. When Panjang Hill bears N.E., Lalarie Point must not be brought to the northward of N.W. by W. $\frac{1}{4}$ W. to avoid Smits bank, and the same directions as already given in not approaching the banks under 10 fathoms until Laboh Point bears N.E. $\frac{1}{2}$ N., will be quite sufficient to enable any vessel to work through.

LUCIPARA CHANNEL.—The South entrance to this channel is between Lucipara Island and Lucipara Point, nearly West, 9 miles distant from it. The western side of the channel (p. 193) is bounded by the mud flat which projects from the coast of Sumatra for 2 miles and more, and its eastern side by various hard and dangerous sandbanks, which narrow the breadth of the passage to $1\frac{1}{2}$ and 2 miles.

Mr. Stanton is of opinion that this channel will, within a few years, become unnavigable for vessels of large draught, owing to the rapid extension of the mud flat projecting from the Sumatra coast on the western side, and to the extension, also of the sandbanks on the eastern side.

Round Shoal.—The southern sandbank in this channel is nearly 2 miles long W N.W. and E.S.E., and about a mile broad, the least water, $1\frac{1}{2}$ fathoms, being near the middle of it. From its southern edge, in 3 fathoms, the summit of Lucipara Island bears S.E. $\frac{1}{3}$ E. $7\frac{1}{4}$ miles, and from the western edge S.E. $\frac{1}{2}$ E. 9 miles. The narrowest part of the Lucipara Channel is between the lightvessel off the western extreme of this bank and the mud flat extending from the Sumatra coast.

LIGHTVESSEL.—In 1870 the Lucipara Channel Lightvessel, showing a *fixed bright light*, elevated 28 ft., and visible 10 miles off, was placed in the position formerly occupied by a buoy, in the narrowest part of the channel,

off the N.W. side of Round Shoal. She is painted yellow, and carries one mast with a black ball on the top. From the lightvessel, Green Point bears N.W. $\frac{2}{3}$ N. $4\frac{1}{2}$ miles nearly, Lucipara Point S. by W. $\frac{1}{2}$ W., and Lucipara Island summit, S.E. $\frac{2}{3}$ E. 9 miles.

Hindustan Bank extends from close to the eastern edge of the Round Shoal N.N.W. $\frac{1}{2}$ W. about $3\frac{1}{2}$ miles. The depths on the southern and middle parts of it are 1 to 3 fathoms, but about three-quarters of a mile from its northern extreme is a patch of hard sand, with only 3 feet water over it.

Merapie Shoal, the most northern of the banks on the eastern side of the Lucipara Channel, is composed, like the others, of hard sand, and is three-quarters of a mile in extent North and South, and more than half a mile broad. The least water on it is $2\frac{1}{4}$ fathoms. From the middle of the shoal, False First Point is in line with First Point.

In the Lucipara Channel the bottom is generally hard sand on the banks towards the eastern side, and soft mud on the western or Sumatra side; yet close to the north-western edge of the Middle sand-bank the bottom is also soft, with $5\frac{1}{2}$ and 6 fathoms. It is, therefore, advisable not to keep in too hard or in too soft bottom, but in the middle of the channel.

Directions for Lucipara Channel from the Southward.—When bound towards Banka Strait from the southward, the Island of Lucipara is generally made between the bearings of N. by E. and N.W., and in $5\frac{1}{2}$ to 8 or 9 fathoms. With westerly winds it is advisable to keep on the western side of the channel in $4\frac{3}{4}$ to $5\frac{1}{2}$ fathoms.

In clear weather, when the Parmassang Range is visible, the highest peak on the western extreme of the range in line with First Point, N. by W. $\frac{1}{2}$ W. will lead up to abreast the lightvessel. This mark should be left when Lucipara Island bears about E.S.E., or S.E. by E.; then, by keeping the Mamelon Hummock (page 202) on a N. $\frac{3}{4}$ W. bearing, it will lead through between the bank off First Point and the Merapie Shoal, until Lalarie Point is seen well open of First Point, when a vessel may begin to edge away to the westward to round First Point, taking care not to approach it nearer than a mile, as the bank projecting from the point is steep-to, especially on its N.E. side. After rounding First Point at not less than that distance, a N.W. $\frac{1}{2}$ W. course will lead midway between False First Point and the Nemesis Bank.

From the Northward.—Entering Lucipara Channel from the northward, First Point must be rounded with great caution, on account of its being steep-to, especially on its north-eastern side, and it must not be approached nearer than a mile; at the same time, if the tide is running to the south-eastward, it will be necessary to use proper care that, in giving a safe berth to First Point, the vessel is not set too near the Merapie Shoal, which the tide will be likely to do unless guarded against. When Mamelon Hummock

bears N. $\frac{3}{4}$ W., keep it so, until Lucipara is S.E. by E., or E.S.E., when Parmassang Peak may be brought in line with First Point, N. by W. $\frac{1}{2}$ W., which will lead clear of the Sumatra Bank; or a S.E. by E. course may be steered, which will lead midway between Lucipara and the main.

Working through this channel, a vessel may stand toward the Sumatra Bank safely by attending carefully to the lead, remembering not to go into less than $6\frac{1}{2}$ fathoms when near the elbow projecting just to the southward of Green Point. Lucipara must not be approached nearer than 2 miles, when bearing to the northward of N.E. by E.; between the bearings of N.E. by E. and E. by S. it may be approached to a mile.

Careful attention to the lead and a good look-out will also give sufficient warning when standing towards the banks on the eastern side.

Caution.—Many vessels passing through the Lucipara Channel have grounded on the mud flat extending from the coast of Sumatra, especially a short distance to the southward of Green Point, where the flat extends farther out, and all have been obliged, before they could get off, either to transship or to throw a part of the cargo overboard, as the anchors which were laid out on the soft muddy bottom to heave them off came home. This part of the flat shoals suddenly from 6 to 3 fathoms, and therefore should never be approached to a less depth than $6\frac{1}{2}$ fathoms.

It will also be necessary to use great caution when working through this channel from the southward, and standing to the eastward, to avoid being set on the banks by the tides, which sweep over them with great strength. In working through this channel from the northward, similar caution is required. With light winds it is very difficult to get into the northern entrance, the tides sweeping vessels away to the south-eastward amongst the banks.

Directions from Lalarie Point through Banka Strait.—Having passed through either Stanton or Lucipara Channels, and brought Lalarie Point to bear about East, distant 3 miles, a N.N.W. $\frac{3}{4}$ W. course for about 10 miles will lead midway between the rocky bank of 7 or 8 fathoms water, lying north-westward of the Timbaga Rocks, and the mud-bank projecting from Second Point. Continuing the same course for 6 or 7 miles further, the vessel will be $1\frac{1}{2}$ to $1\frac{3}{4}$ mile outside the horn or spit projecting from the Sumatra Flat (page 194). Still continuing the same course for another 14 or 15 miles, Third Point will bear S.W., distant about 2 miles.

If a vessel following this track, after having passed Second Point, should shoal the soundings under 6 fathoms, she will be getting too near the Sumatra Flat, and should haul out more to the eastward; remembering that Second Point must not be brought eastward of S. by E. $\frac{3}{4}$ E. until Parmassang Peak bears E.S.E., to clear the spit or horn projecting from the bank.

From the above position off Third Point, a W. by N. $\frac{1}{4}$ N. course may be

steered for about 28 or 29 miles, which, if the vessel be not affected by tides or currents, will place her in a position from which Fourth Point will bear about S.E. $\frac{3}{4}$ S. distant 7 miles, and Monopin Hill N. $\frac{1}{4}$ E. to N. $\frac{1}{2}$ E.

From thence steer about N.W. by W. for Batakarang Point—paying particular attention to the tides, which frequently set strong into or out of the Palembang Rivers (pp. 191-2)—and the vessel will soon pass over a narrow bank of sand, having 7 fathoms on it, and again deepen the water to 13 and 16 fathoms. Having run 15 or 16 miles, the soundings will again decrease under 10 fathoms, and she will be on the edge of the bank extending from Batakarang Point, and may proceed along the edge of it in from 8 to 6 fathoms; the directions given at page 214 must then be followed to pass westward of the Frederick Hendrick Rocks, which channel is recommended as being the best and safest, especially at night.

Through Banka Strait from the Northward.—A vessel having passed the Toedjoe, or Seven Islands, and steering to the southward for the entrance of Banka Strait, will find no difficulty in clear weather in fixing her position which can be readily done by cross bearings of Mount Punyabung or Saddle Hill, and Monopin Hill; under such circumstances the strait can be entered on either side of the Frederick Hendrick Rocks by attending to the directions given at page 214. But in thick weather it often happens that no land can be seen until the vessel has arrived very near to the entrance of the strait, and at such times it is important to get hold of the bank extending from the Sumatra coast, and then proceed along its edge in 8 to 6 fathoms, carefully attending to the lead. Sometimes Monopin will be seen, but no other land, in such case it will be prudent to proceed as before, keeping along the edge of the bank.

Working through Banka Strait.—Directions have been given in pages 217-18 and 220, for working into the strait from the southward, and in page 214 for working into it from the northward by the channels on either side of the Frederick Hendrick Rocks; it may, however, be as well to remark again here that the passage westward of the Frederick Hendrick Shoal is much to be preferred at night, or when the land is obscured and reliable bearings cannot be obtained.

The bank fronting the Sumatra coast may be conveniently approached when well between the points, by common attention to the lead; but off the points and for a few miles on either side of them great attention must be paid to the soundings. The most dangerous part of the bank is from Fourth Point for about 6 miles to the westward of it, which must be approached with the utmost caution.

Mr. Stanton strongly recommends vessels working in either direction through the strait, or proceeding through with a fair wind and contrary tide, to avoid the Sumatra coast and keep on the Banka shore, between Lalarie

Point and Tanjong Tadah. He observes that hitherto it has been the custom for all ships to work along the Sumatra coast, where they have not only a strong wind but a constant current to contend with, consequently, sailing vessels have been delayed two or three weeks, and instances are known of vessels being a month making the passage through Banka Strait, whereas a smart sailing vessel, by keeping on the Banka side, taking advantage of the tides, and following the directions given below, may make the passage even in the full strength of the monsoon in three or four days.

The advantages gained by keeping on the Banka coast are as follows:—

A vessel may carry a fair tide all the way through by starting from either extremity at low water, as the tidal waves from the China and Java Seas meet near the Nangka Islands; prominent hills and points, with a gradual decrease in the soundings, give confidence to mariners when steering for the land; a strong land wind will be generally experienced during the night, when the regular monsoon is blowing in the middle of the strait and near the Sumatra coast; and in the strength of the monsoon regular tides will be met with on the Banka shore, while strong currents will invariably be found setting to leeward along the Sumatra shore.

From the Southward—In working between Lalarie Point and the Nangka Islands, the lead is a good guide, as the soundings decrease regularly, except near Lalarie Point and the Timbaga Rocks, where they decrease rather suddenly from a depth of 10 fathoms; if, however, Lalarie Point is not brought South of S.E. $\frac{1}{2}$ S. until Brani Peak bears E. by N. $\frac{3}{4}$ N., a vessel will keep clear of all danger near the Timbaga Rocks. Having arrived within 3 miles of the Great Nangka, the spit extending from the South end of that island should not be approached under a depth of 7 fathoms; and to avoid the rocky ledges extending from Middle and West Nangka, West Reef (6 ft. above water, page 205), should not be brought to the westward of North after the peak of Great Nangka bears N.E., until the vessel is to the northward of the Nangka Group,

From the Nangka Islands to Tanjong Tadah the shore may be safely approached by the lead, as the soundings are shoal with a gradual decrease. When Tanjong Tadah bears N.E. $\frac{3}{4}$ N. (which clears the eastern side of the Brom-Brom Reef), vessels should cross over towards Fourth Point on the Sumatra coast.

From the Northward.—Coming from the northward, it is merely necessary to reverse the order of the above directions. Vessels should keep towards the Sumatra coast until past Fourth Point, which they should not approach nearer than 3 miles. When Tanjong Tadah bears N.E. $\frac{3}{4}$ N., they may cross over to the Banka side, taking care not to bring that point to the eastward of the above bearing. From Tanjong Tadah to the Nangka Islands they may stand in-shore guided by the lead; but having arrived abreast of the latter, take care not to bring West Reef to the westward of North, until the peak of

Great Nangka Island bears N.E., and not approach the spit off the South end of the island under 7 fathoms. From $2\frac{1}{2}$ miles South of the Nangka Islands the shore may be approached by the lead to any convenient depth of water, but when Brani Peak bears E. by N. $\frac{1}{2}$ N. the vessel will be nearing the Timbaga Rocks, and must not then come under 10 fathoms. Lalarie Point bearing S.E. $\frac{1}{2}$ S. clears all the dangers near the Timbaga Rocks, and the point should not be brought to the southward of that bearing until Casuarina Point bears East. From thence to Lalarie Point the shore may be again approached by the lead; but when nearing the point the soundings decrease more suddenly, and a vessel should not go into a less depth than 10 fathoms, and should round the point at the distance of about $1\frac{1}{2}$ mile. From thence she can proceed to the southward through either the Stanton or Lucipara Channels, according to the directions at pages 217—219 and 222.

NORTHERN COASTS OF BANKA.

BULO, or Jibuse Bay.—The N.W. coast of Banka is 43 miles in extent, from Tanjong Oelar to Tanjong Malalu, the bay of Bulo or Jibuse occupying more than half of that space. From Tanjong Biat (p. 212), the south-western point of the bay, to Tanjong Ginting, its north-western point, the direction is about N.E. $\frac{3}{4}$ N., and the distance $17\frac{1}{2}$ miles; the depth of the bay is 7 miles.

The whole of this bay is shallow to a distance of 3 miles from the shore, except to the southward of Ginting Point, where the shoals do not appear to extend farther than a quarter of a mile. The rivers Bulo and Jibuse disembogue in its N.E. part. The bay is much visited by coasters, and occasionally by larger vessels, for the purpose of loading tin.

The anchorage is in 5 or 6 fathoms, on soft muddy bottom, with Ginting Point N. by E. $\frac{1}{2}$ E., Songi Bulo E. $\frac{1}{2}$ S., and the watering place N.E. by E. $\frac{1}{2}$ E.; or in 5 fathoms off the Bulo River, with the village N.E. $\frac{1}{2}$ E., and Ginting Point N. by W. $\frac{3}{4}$ W., 3 miles from the shore.

Water.—Fresh water can be obtained in a small bay about $1\frac{1}{2}$ mile to the eastward of Tanjong Ginting.—Commander J. W. King, R.N., says it is brackish.

TANJONG GINTING, the N.W. point of Bulo Bay, is a long, low point, having a reef projecting 2 miles from it, close to which are 8 fathoms water. The position of the point may be easily recognized by the three hills, *Paree*, *Punyabung*, and *Jerankat*, which at a great distance appear like islands. The first, 858 ft. high, is the most southern one of the three, and rises 4 miles East of the point; Punyabung, a remarkable saddle-shaped hill, 794 feet high, very conspicuous from seaward, rises close to the coast, about 3 miles

south-eastward of Ginting Point; Jerankat, 657 ft. high, is about 4 miles E.N.E. from Punyabung.

The Coast between Ginting Point and Punyabung Hill forms a small bay, which appears to be nearly filled with rocks. It then trends E.N.E. about 18 miles to Tanjong Melalu. The whole coast between Punyabung Hill and Tanjong Melalu is fronted by a reef which projects 1 or 2 miles from the shore.

Malan Hyu, Malan Doyang, and Malan Guntur, are three rocks lying off the coast between Tanjong Dugong and Tanjong Melalu. Malan Hyu is about the size of a boat, and covered with white guano. It lies about 3 miles North from Tanjong Dugong. Malan Doyang is not much above water, and only the size of Malan Hyu. It lies about 3 miles off shore, with Punyabung Hill S.W. $\frac{1}{4}$ S. Malan Guntur is nearly midway between Malan Doyang and Tanjong Melalu, and about a mile off shore. It is larger than the other two rocks, and lies within the limit of the shoal water projecting from the coast. All these rocks appear to be surrounded to a short distance by sunken rocks; and a sunken rock lies southward of Malan Doyang, midway between it and the shore.

KLABAT BAY.—*Tanjong Melalu*, in lat. $1^{\circ} 31\frac{1}{2}'$ S., long. $105^{\circ} 38\frac{1}{4}'$ E., is the western point of entrance of Klabat Bay, and upon it is a pretty high hill, known as *Mount Melalu*. Here the N.W. coast of Banka terminates, as the coast line on the other side of entrance of Klabat Bay trends to the eastward, and forms the North shore of the island.

Klabat Bay runs up into Banka Island about 27 miles in a S.E. direction, but being encumbered with many rocks and shoals, there is only a narrow passage left, of 4 or 5 fathoms water, by which vessels of heavy burden proceed as far as the mouth of the Lyang River. Over the inner end of the bay hangs the highest of the Banka Mountains, called *Gunong Marass*, or *Maradi*. This beautiful mountain is easily recognized by its three peaks, the summits of which may often be seen when passing through Banka Strait, presenting somewhat the appearance of a crown. The highest of the peaks, 2,320 ft. high, is in lat. $1^{\circ} 51'$ S., and long. $105^{\circ} 53'$ E.

Tanjong Penyusu, the eastern point of Klabat Bay, is a long, low projection, with an islet and some rocks extending nearly 2 miles from it.

Karang Trasseh Laout is a reef with only 2 or 3 fathoms water over it, and 10 and 11 fathoms around it, lying about 3 miles N.W. $\frac{1}{2}$ N. from Tanjong Penyusu. From the reef the West point of Penyusu Islet is in line with the hill near Monkubur Point, bearing S.S.E., Moncudu Islet East, and Mount Melalu S.W. by W. $\frac{1}{4}$ W.

Vessels coming to Klabat Bay for cargoes of tin, usually anchor outside the entrance, between its eastern point and the Trassie Reef, in $9\frac{1}{2}$ or 10 fathoms, soft muddy bottom, having Penyusu Islet in line with Mount

Marass S.S.E. $\frac{1}{2}$ E., Klabat Hill S.S.W. $\frac{1}{2}$ W., Melalu Point W. by S. $\frac{1}{4}$ S., and Moncudu Island E. $\frac{3}{4}$ N.

The Coast from Tanjong Punyusu takes, with a slight curve inland, a direction about E. by N. for 10 miles, to a point abreast of a small islet named *Pulo Moncudu*; and from thence East for $2\frac{1}{2}$ miles to Tanjong Crassok, the northernmost point of Banka, in lat. $1^{\circ} 29'$ S., long. $105^{\circ} 56\frac{1}{2}'$ E. Many rocks lie close to this part of the coast, and shoal water extends nearly a mile from it. From Tanjong Crassok the coast trends to the south-eastward, forming the N.E. coast of Banka.

A reef, having 2 fathoms water over it, lies about 2 miles off shore, with Moncudu Islet bearing East, and Gunong Chundong S.E. $\frac{1}{2}$ S. Rocks are also marked on the chart, one at 3 miles E.S.E. from Tanjong Crassok, and another at $2\frac{1}{2}$ miles farther to the south-eastward, and $1\frac{1}{2}$ mile off shore.

CHAPTER VI.

G A S P A R S T R A I T.

THE channels between Banka and Lepar on the West and Billiton to eastward are collectively known as the Strait of Gaspar. Captain Huddart says that the first ship which passed through was the *Macclesfield* galley, Capt. Hurle, in March, 1702. This is the westernmost channel. The name *Gaspar* is that of the Spanish commander from Manila, who passed through it in 1724. Besides the first-named channel westward of Pulo Leat, there is a second, called the *Middle Pass*, on the eastern side of that island. The third is the *Clements Channel*, named after the Commodore of the homeward bound English East India Fleet, in 1781, which passed through between the islets south-eastward of Pulo Leat; and the fourth, the *Stolze Channel*, to the eastward of these islets, is named after the Dutch officer who first surveyed it. Of these the first and fourth are most used, as will be explained presently.

Banka or Gaspar Strait?—From the earliest times of our China commerce Gaspar Strait has been preferred to Banka Strait, by ships coming from China. But it is of much more dangerous approach, both from North and South, and the new and excellent Stanton Channel in the latter may lead to a preference being given to it. Upon this subject the following is given in the *China Sea Pilot*.

Banka Strait possesses unquestionable advantages over those of Gaspar and Carimata, and is without doubt the best and safest route *into* the China Sea. Although of much greater length, and not so direct for vessels bound to China as Gaspar Strait, yet it is manifestly superior to that strait; for it is easy and safe of approach. It affords convenient anchorage in every part, which enables vessels to avail themselves of favourable winds and tides; and it leads into a part of the China Sea free from danger. Gaspar Strait, on the contrary, is difficult and dangerous of approach, rocks and shoals extending for 35 miles to the southward. The depths of water are too great to afford convenient anchorage; and it conducts into a part of the China Sea

very imperfectly explored, and abounding with hidden dangers, amongst which vessels are liable to be set by uncertain currents. No serious accident has occurred within the last few years to vessels passing through Banka Strait; whereas many fine ships, with valuable cargoes, have been lost in or near Gaspar Strait.

For vessels proceeding to Singapore there can be no doubt that Banka Strait is in all respects to be preferred, and it has in fact become the recognized highway of the trade passing between Sunda Strait or Batavia, and Singapore. But for ships to China, Gaspar Strait being shorter and more direct, is still preferred, and will no doubt continue to be by many navigators, especially those who are anxious to make quick passages, even at the expense of incurring additional risk. It is certain that a vessel arriving off the entrance of Banka or Gaspar Strait in the morning, and favoured with a commanding breeze, would gain some advantage in point of time by passing through the latter; but in calms and light airs, or against the N.E. monsoon, there is good reason to believe that vessels will make quick, and often quicker passages, by proceeding through Banka Strait, and they will always be assured of much greater safety. In thick or bad weather, it is possible to proceed through Banka Strait without risk; but Gaspar Strait can never be approached at such times without incurring considerable danger.

The fast clipper ships, which every season contend for the honour of landing the first of the year's teas in England, usually proceed through Gaspar Strait, as do most homeward-bound ships, to whom saving of time is of the first importance, and there can be no doubt but they will continue to do so in preference to the more circuitous, although much safer, route of Banka Strait. Until, however, the correct positions of the shoals and dangers known to exist to the northward of Gaspar Strait are determined, and this space properly explored, vessels must keep a vigilant lookout when approaching the strait from the northward, and be prepared for the possibility of meeting with some danger not marked on the charts. Nor must they relax their vigilance when getting near to Pulo Leat, and when passing through the strait. No opportunity should be lost of determining the ship's exact position; and the greatest attention should be paid to ascertaining the set of the current, and to guard against its effects. Many fine ships have been lost in Gaspar Strait—not a few on the Alceste Reef, from wrongly estimating their distance from the land; but in the majority of instances from causes which might have been guarded against by the exercise of due care and judgment.

Gaspar Strait was surveyed in 1854 by the officers of the United States Navy attached to an exploring expedition.

The territory on either side of the strait being in possession of the Dutch, the names in strict propriety should be in accordance with that orthography.

But as the strait is a common highway for the whole world, only those names which might be otherwise ambiguous will be thus denoted.

BILLITON ISLAND, or in Malay *Blitung*, is only one-half the size of Banka, but it resembles it in its geographical structure and in the production of tin, which is worked by a Dutch company. This is the south-easternmost extremity of the mining fields for this important metal, the northernmost being at Tavoy, on the Tenasserim coast, a range of 20 degrees of latitude.

The following description of and directions for the strait are taken from the *China Sea Pilot*.

DANGERS SOUTHWARD OF GASPAR STRAIT.

Dangerous shoals extend for about 35 miles to the southward of Gaspar Strait, rendering *great caution* necessary when approaching the strait from that direction.*

Sharpshooter Shoal.—The British merchant ship *Belted Will*, Captain Alexander Locke, in July, 1869, during her passage from Canton to London, slightly touched on a shoal patch lying S. $\frac{1}{4}$ E., 34 miles from entrance point in Gaspar Strait. The ship was going 9 knots at the time, but the state of the weather, occasioned by the monsoon blowing very strong, prevented an examination of the danger beyond two casts of 9 fathoms, which were obtained shortly after the shoal was passed. Observations obtained on the same day, as well as the reckoning carried from Entrance point, place this patch in lat. $3^{\circ} 35' 35''$ S., long. $106^{\circ} 56'$ E.

Near this position the Sharpshooter Shoal, of 12 ft. water, and lying 12 miles W. $\frac{3}{4}$ S. from the Hancock Shoal, was unsuccessfully searched for by Staff Commander Edward Wilds of H.M.S. *Swallow*, in 1866. It is probably the same danger, and the name has therefore been retained on the charts.

HANCOCK SHOAL, in lat. $3^{\circ} 34\frac{1}{4}'$ S., long. $107^{\circ} 4'$ E., is a small patch about a quarter of a mile in extent, but whether composed of sand or coral does not appear on the chart. It has only 1 fathom of water over it, and 6 to 7 fathoms around it.

HIPPOGRIFFE SHOAL was so named after an American ship lost on it. Mr. Wilds, R.N., in H.M.S. *Swallow*, searched for the Hippogriffe Shoal, and found it in lat. $3^{\circ} 23' 36''$ S., long. $106^{\circ} 54' 30''$ E. It is a dangerous

* **DOUBTFUL DANGERS**.—A doubtful rock was marked in former charts at $3\frac{3}{4}$ miles S.W. by W. $\frac{1}{4}$ W. of the Hancock Shoal; a small shoal of 6 feet water, named Mary Goddard, at $4\frac{1}{2}$ miles S.S.E. of the Hancock; but a careful search having been made for these dangers in May, 1866, by Mr. Wilds, Master commanding H.M. surveying-vessel *Swallow*, without the slightest indication of their existence, they have been expunged from the charts.

boulder rock, with only 3 ft. over it at low water, of circular shape, and about 150 ft. in diameter, having large branches of coral upon it. It was not seen until close to, and at the time it was examined there was not the slightest swell or ripple to indicate its position; the weather being fine and clear, and the wind light from the S.S.E. Regular soundings of 8 fathoms, sand and shell, were found around it, and the water in that depth was of a pale colour.

TURTLE SHOAL lies about 2 miles N.E. by E. from the Hancock Shoal, and is of about the same extent; it has but 3 ft. water over it, and 8 to 12 fathoms around it. There are tide ripples over this shoal.

LARABE SHOAL, in lat. $3^{\circ} 33'$ S., long. $107^{\circ} 10'$ E., and distant nearly 6 miles E. by N. $\frac{1}{4}$ N. from the Hancock Shoal, is about a third of a mile in extent, having $3\frac{1}{2}$ fathoms of water over it, and 5 to 8 fathoms around it.

SAND ISLAND is the name given to a small patch of sand, just awash at high water, with 8 to 14 fathoms water around it, lying about 4 miles northward of the Larabe Shoal, in lat. $3^{\circ} 29'$ S., long. $107^{\circ} 9'$ E. At a mile E.N.E. from Sand Island is a shoal patch about a third of a mile in extent, having $2\frac{1}{2}$ fathoms water over it, and 8 to 9 fathoms around it; the tide also ripples over this bank.

There is a danger, named *Padang Reef*, marked on the chart about $2\frac{1}{4}$ miles W. $\frac{1}{2}$ N. of Sand Island, but we have no information about it.

MIDDLE REEF, lying N.N.E. $\frac{3}{4}$ E. nearly $2\frac{1}{2}$ miles from Sand Island, appears to be a rock, just above water, on the North end of a small sand patch having 2 fathoms water over it, and 8 to 9 fathoms around it.

BRANDING SHOAL (*Breaking*, Dutch).—North-west, nearly $1\frac{3}{4}$ mile from Middle Reef, are two small patches occupying a space about two-thirds of a mile in extent, E.N.E. and W.S.W., and with 12 fathoms water between them. The western patch has $1\frac{1}{4}$ fathom water over it, the eastern one only 3 ft.; all around them are 7 or 8 fathoms.

FAIRLIE ROCK, in lat. $3^{\circ} 27\frac{1}{4}'$ S., long. $106^{\circ} 59'$ E., was discovered by the East India Company's ship of that name grounding upon it in 1813. It is of coral, about a cable's length in diameter, nearly awash at low water, and 6 or 7 fathoms close around it. The sea breaks over the rock, and all around are overfalls caused by the rocky and uneven character of the bottom. From it Entrance Point, the south-eastern extreme of Pulo Lepar, bears N. by W. $\frac{1}{2}$ W., distant $26\frac{1}{4}$ miles, and Shoal-water Island N.E. by E. 15 miles, and just in sight from the deck of a large ship; therefore, to avoid this rock, Shoal-water Island must, from the deck of a large ship, be sunk below the horizon by the time it bears N.E. by E., this island being the only land distinctly visible from the rock.

SHOAL-WATER ISLAND and **SHOALS** form a group amongst which it would not be prudent to venture. *Shoal-water* or *Embleton Island*, in lat. $3^{\circ} 19\frac{1}{2}'$ S., long. $107^{\circ} 11\frac{3}{4}'$ E., is a little more than half a mile in diameter,

and from it Middle Reef bears S. $\frac{3}{4}$ W., distant 8 miles. Hancock is a small islet, lying N.E. $\frac{1}{2}$ N., three-quarters of a mile from Shoal-water Island.

Dangerous reefs surround both these islands, among which are some deep but very narrow and intricate channels. From Shoal-water Island a reef extends from half to three-quarters of a mile, on its S.E., South, and S.W. sides; and about half a mile off its West side is a small detached reef, having 10 fathoms between it and the reef bordering that side of the island. Off its East side reefs extend nearly $1\frac{1}{2}$ mile. The reefs surrounding Hancock Island are separated from those around Shoal-water Island by a very narrow channel, with depths of 6 to 10 fathoms on it. On the N.E. side of Hancock the reef extends about a third of a mile, and on its N.W. side about three-quarters of a mile, with some rocks above water on its outer edge.

One-fathom Patch.—A patch having but 1 fathom water over it, and 7 to 9 fathoms around it, lies W. $\frac{1}{4}$ N. nearly 2 miles from Shoal-water Island.

Embleton Rock is just above water on the N.W. extreme of a bank of hard sand, which nearly dries, distant 2 miles N.N.W. $\frac{3}{4}$ W. from Shoal-water Island; there are 12 to 14 fathoms around it.

Bliss Shoal, lying N.E. by E. nearly a mile from Embleton Rock, and N. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles from Shoal-water Island, is about a third of a mile in extent, N.W. and S.E.; it has only a quarter of a fathom water over it, and 6 to 14 fathoms at a short distance from it.

There appear to be no dangers between the reefs contiguous to Shoal-water and Hancock Islands, or between One-fathom Patch, Embleton Rock, and Bliss Shoal, the soundings being from 6 to 14 fathoms; but vessels had better keep well outside, as there is nothing to be gained by venturing among those dangers.

BLAS MATEU ROCK is said to lie right in the fairway track of vessels proceeding through Gaspar Strait by the Macclesfield Channel. The American surveyors searched for it without success, but their chart does not exhibit many soundings in that vicinity, and it would be very unsafe to disregard its reputed existence in the face of the following circumstantial account:—The Blas Rock was first discovered on September 23, 1839, by the Spanish brig *San Joachim*, Captain Blas Mateu. Having anchored in 12 fathoms, coarse sand, he took the boat and found three rocks, each about 10 ft. in diameter. Upon the northern rock he had 9 ft., on the southern 12 ft., and on the western 17 ft. water, and between them passages of $4\frac{1}{2}$ fathoms. Shoal-water Island bore E. $\frac{1}{4}$ N., the opening between the two hills on Lepar Island N.N.W. $\frac{1}{2}$ W., and the latitude determined by the sun's meridian altitude $3^{\circ} 20' 38''$ S. The whole extent of the three rocks is about half a cable's length, and round them the depths were 12, 13, and 14 fathoms; but there was reason to believe that there were more rocks, because the chain parted while the anchor was being weighed.

Another Spanish captain, M Aldon, who examined these rocks afterwards, gives them a similar description, and states that the light colour of the water over them was distinctly visible at a considerable distance N.N.W. of them. He places them in $3^{\circ} 21' S.$, with Fairlie Rock S.S.E. $\frac{3}{4}$ E., Shoal-water Island East, and the hills of Lepar Island N.N.W.

To avoid this danger, Entrance Point must not be brought more to the westward than N. $\frac{1}{2}$ W., when Shoal-water Island bears between E. $\frac{1}{2}$ S. and E. $\frac{1}{2}$ N.

Sand Banks.—At 12 miles South of Entrance Point is a patch of 5 fathoms; and at $2\frac{1}{2}$ miles W. $\frac{1}{2}$ S. of this is another of the same depth; between them the depth is 7 fathoms. These spots appear to be on the eastern end of one of the long sand ridges which lie to the southward of Banka (page 200), probably an extension of the strip upon which is shown the following sounding of $4\frac{1}{2}$ fathoms.

A Bank, in $3^{\circ} 19' S.$, with $4\frac{1}{2}$ fathoms water, lies South from a remarkable hummock in Banka; and there are two other banks of 5 fathoms, from which a hummock upon the low long point of Baginda bears N.N.W. $\frac{1}{4}$ W. To avoid these banks, the low land which unites the hills of Banka must be kept from a vessel's deck below the horizon, till Entrance Point bears N. by W., when a vessel may steer towards the strait; taking care not to bring this point more to the northward than N. by W. or N. $\frac{1}{2}$ W.

VANSITTART SHOALS are a collection of rocky patches divided into groups, lying between the bearings of S.E. $\frac{1}{2}$ E. and E. $\frac{3}{4}$ S., distant about 12 miles from Entrance Point, and extending from lat. $3^{\circ} 10'$ to $3^{\circ} 4' S.$ At their southern part are two patches, lying E. $\frac{1}{2}$ S. and W. $\frac{1}{2}$ N. from each other, their inner edges being about $2\frac{1}{3}$ miles, and their outer edges nearly $3\frac{1}{2}$ miles apart. From the western patch of $1\frac{1}{2}$ fathom water, Entrance Point bears N.W. $\frac{1}{2}$ W. 12 miles, Shoal-water Island S.E. $\frac{1}{4}$ E. 14 miles, and Barn Island N.N.E. $\frac{1}{4}$ E. 12 miles; from the eastern patch of only 3 ft. water, Shoal-water Island bears S.E. $\frac{1}{2}$ S. $11\frac{1}{2}$ miles, and Barn Island N. by E. $\frac{1}{4}$ E. 11 miles.

Nearly the centre of the space occupied by these shoals are a group of patches extending N.E. and S.W. about a mile, some having but 1 fathom over them, and one patch, the north-eastern, dries at low water.

The patches at the northern end of the shoals lie close together, and extend in an E.N.E. and W.S.W. direction, about $2\frac{1}{2}$ miles. One or two of them are dry, and others have but 3 ft. water over them at low tides. From the S.W. patch, which dries, Barn Island bears N.N.E. $\frac{1}{2}$ E., distant $6\frac{1}{2}$ miles; the South extreme of Saddle Island is open of the South extreme of Low Island, N.E. by E. $\frac{1}{2}$ E.; and Pulo Jelaka bears N. by W. $\frac{2}{3}$ W. 13 miles. From the N.E. patch, of 2 fathoms water, Low Island is distant $2\frac{1}{2}$ miles, with its South extreme in line with the middle of Saddle Island, bear-

ing N.E. by E. ; and Sand Island is just open of the East extreme of Pulo Leat, bearing N. $\frac{1}{2}$ W.

The marks to clear the Vansittart Shoals are given hereafter.

GEORGE BANKS is the name given, on the American chart, to four or five patches, under a depth of 5 fathoms, lying southward and south-westward of the western Entrance Point. The southern extreme of one of these patches, which is about $1\frac{1}{2}$ mile long North and South, half a mile broad, and has 3 fathoms water on it, lies S.W. $\frac{1}{2}$ W. 4 miles from Entrance Point. About a mile S.W. of this patch is another, but smaller one, of $3\frac{1}{2}$ fathoms water ; and 5 miles S.W. by W. $\frac{1}{2}$ W. from this last patch, or S.W. $\frac{1}{4}$ W. 9 miles from Entrance Point, is a patch of $3\frac{1}{4}$ fathoms water, but this latter lies quite out of the ordinary track of vessels. All these patches lie within the edge of the 10-fathoms line, which, passing Entrance Point about $1\frac{1}{2}$ mile off, runs with an irregularly curved outline to the south-westward.

A bank, under a depth of 10 fathoms, 9 or 10 miles long, which assumes on the chart the form of a shoulder of mutton, N.E. and S.W., with its small end to the north-eastward, lies nearly 2 miles outside the 10-fathoms line extending from Pulo Lepar. Between it and the shore banks the depths are 13 to 17 fathoms.

Two-and-a-half Fathoms Bank.—About the middle of the above shoulder of mutton bank, and about a mile from its eastern or outer edge, is a patch of only $2\frac{1}{2}$ fathoms water. This was formerly known as the George Bank, because the ship *Royal George* had, in 1813, passed over its edge in $5\frac{1}{2}$ fathoms. It was afterwards explored by Capt. D. Ross. From it Entrance Point bears N. $\frac{1}{3}$ W., distant $6\frac{1}{2}$ miles ; and Baginda Peak, on Banka Island, W. by N. $\frac{2}{3}$ N., $12\frac{1}{2}$ miles. To avoid this bank, keep the high trees near Klippige Point, or Rocky Point Hill, open to the eastward of Entrance Point.

About 2 miles West of the $2\frac{1}{2}$ -fathoms bank is a small patch with 5 fathoms water over it.

Two-fathoms Patch.—It would appear from the following report of Capt. Keay, of the ship *Falcon*, March 13th, 1862, that a patch having but 2 fathoms water over it, lies about 3 miles to the southward of Round Island, off the South point of Pulo Lepar :—

Clear, light, northerly, and smooth sea ; steering towards Entrance Point, Gaspar Strait ; Round Island bearing N. $\frac{1}{2}$ W. by compass, ; apparently 3 miles distant, the *Falcon* drawing 18 ft., ran aground on a small sand patch, with 12 ft. least water over it, the diameter of the shallowest part being about 30 ft. The position of this was not properly ascertained by cross-bearings, but it seems as if it was not one of the previously known shoals off the entrance of the Lepar Strait.

MACCLESFIELD CHANNEL.

The approach to the Macclesfield Channel, the westernmost of those through Gaspar Strait from the southward, is bounded on the eastern side by the Hippogriffe Shoal, the position of the Doubtful dangers (page 229), the Fairlie Rock, and the Vansittart Shoals; and on the western side by the outermost of the George Banks. The Blas Mateu Rock, if it exists, lies right in the fairway.

The Sharpshooter, Hancock, and Turtle Shoals, may be said to form a point, from which the shoals already mentioned as bounding the eastern limit of approach to Macclesfield Channel diverge in one direction, whilst those forming the western limit of approach to Stolze and Clements Channel diverge in another; these last may also be said to form the eastern limits of the southern entrance to Macclesfield Channel, as vessels may stand to the eastward of the Fairlie Rock over towards them, if they should find it convenient to do so.

EAST COAST of BANKA.—From Tanjong Baginda (page 199), the south-western limit of Gaspar Strait, the coast of Banka turns sharp to the northward, and after running 4 miles in a northerly direction, forms a large bay, the northern limit of which is Brekat Point, which is also the north-western limit of Gaspar Strait. There are several rivers upon this part of the coast, the principal of which, the *Medang*, is sometimes visited by coasters, but little is known of it.

LEPAR STRAIT, between Banka and Pulo Lepar, is 6 or 7 miles wide at the entrance, but narrows to less than 2 miles some 4 or 5 miles within. The entrance appears from the chart to be barred, although there seems to be deep water inside. It is said to be so crowded with small islands and reefs, as to be available only for small coasters. The most southern of these islands, named *Sugar-loaf*, is very conspicuous, rising to a peak 650 ft. high.

PULO LEPAR is an irregularly shaped island, about 12 miles in diameter, lying close off the southern part of the East coast of Banka. On its southern part are several ranges of hills of moderate elevation, viz: *Six Peak Range*, 781 ft. high; *Maroon Hill*, 850 ft.; *Four Peak Range*, 750 ft.; and two hills not named on the chart, 650 ft. high; further to the westward is a hill, 700 feet high, named *False Sugar-loaf*.

Entrance Point, the south-eastern extreme of the island, is in lat. $3^{\circ} 1\frac{1}{2}'$ S., long. $106^{\circ} 53'$ E. The land over it is hilly, and the point is bordered by a reef, extending 1 or 2 cables' lengths from it. *Pergam* or *Round Island* is a small islet surrounded by reefs, lying W.S.W. $2\frac{2}{3}$ miles from Entrance Point, and about half a mile off the South coast of the island. *False Rocky Point* bears N. $\frac{2}{3}$ E., distant 4 miles from Entrance Point. Immediately to the northward of it is a small stream named Red River.

Rocky Point and Light.—*Tanjong Laboe, Klippige, or Rocky Point*, the N.E. extreme of Pulo Lepar, is distant $1\frac{1}{2}$ mile N. $\frac{1}{2}$ E. from False Rocky Point. Rocky Point Hill, 522 ft. high, stands $1\frac{3}{4}$ mile to the westward of the point. The light on Rocky Point was first shown in October, 1870. It is a *fixed bright light*, elevated 39 ft., and visible in every direction seaward 8 miles off.

At $1\frac{1}{4}$ mile N.W. $\frac{3}{4}$ W. from the lighthouse is Tree Point, from which the coast runs nearly straight to the north-westward for about 6 miles.

Shore Reef.—The whole coast from Entrance Point to Tree Point is fronted by a reef, which at about 2 miles northward of Entrance Point, just to the southward of the entrance of Fresh-water River, extends off to the distance of $1\frac{1}{2}$ mile; it then runs nearly straight to the northward, and rounding Rocky Point at a quarter of a mile, turns to the north-westward, and beyond Tree Point projects but a short distance from the shore.

Water.—To the northward of Entrance Point the coast forms a bay, in which are two small rivers. Vessels may anchor about a mile to the north-eastward of the point, abreast of which position is a sandy beach. Captain Ross watered here, and found the water a little tinged with a red colour, but it produced no pernicious effect upon the crew.

KLIPIGE SHOALS is the name given to three or four reefs, with rocks above water on them, and deep channels between them, lying off Rocky Point. The outer reef lies E. by N. $\frac{2}{3}$ N. 2 miles from the point; the southern reef, over which is a depth of 4 fathoms, lies E. $\frac{1}{3}$ N., 2 miles from False Rocky Point.

Close to these shoals are depths varying from 9 to 14 fathoms, and there appears to be a channel three-quarters of a mile wide, with 6 to 10 fathoms in it, between them and the shore, but it would be a very unwise proceeding for vessels to venture to use it.

Discovery Rocks appear on the American chart as two rocks lying N.N.E. $\frac{1}{2}$ E. $3\frac{3}{4}$ miles from Rocky Point, with a shoal bank extending nearly half a mile north-eastward of them. Close to the rocks and bank are 6 to 10 fathoms, with 13 to 15 fathoms at a short distance all around them.

Capt. D. Ross, in the *Discovery*, was the first to determine the exact position of these rocks, and he says they have only 2 ft. least water over them.

A rocky Patch, with only 3 ft. water over it, lies about $1\frac{1}{2}$ mile W. by S. from the Discovery Rocks. In the channel between the soundings are from 10 to 16 fathoms.

There is also a 4-fathom patch lying midway between Rocky Point and the rocky patch, and a $4\frac{1}{2}$ -fathom bank $3\frac{1}{2}$ miles N by W. from Rocky Point.

PULO LEAT, or *Middle Island*, which separates Macclesfield Channel from Clements Channel, is about $5\frac{3}{4}$ miles long, North and South, and $4\frac{3}{4}$ miles wide. Upon it are several hills, 400 to 600 ft. high, which appear at a distance like a group of islands.

LIGHT.—*Pulo Jelaka* is a small islet lying about a quarter of a mile north-westward of the West point of *Pulo Leat*, to which it is connected by a reef of rocks. Since the year 1870 a *fixed bright light* has been shown from *Pulo Jelaka* over the *Macclesfield Channel* to the westward from N.E. by N. round by North and West to S.S.E. It is elevated 39 ft., and visible 8 miles off. A *dangerous reef* surrounds both *Pulo Leat* and *Pulo Jelaka*, in addition to which are numerous outlying rocks, in many places extending far from the shore.

The South and S.W. coasts of *Pulo Leat* are fronted by a reef which projects from the shore in a convex form to seaward for the distance of a mile. Off the S.E. point of the island are outlying rocks and dangers extending in a S. by W. $\frac{1}{4}$ W. direction, to the distance of nearly $2\frac{1}{2}$ miles. A rock also lies about three-quarters of a mile South of *Jelaka*, just outside the edge of the reef extending from the shore, but there are no other outlying reefs on the S.W. coast of the island.

When three-quarters of a mile distant from *Jelaka*, outside the reef extending from the shore, is a 3-fathoms patch; and N.W. by W., more than a mile from that islet, is a rock near the water's edge, with 11 fathoms water between it and the shore reef. All along the N.W. shore of *Pulo Leat*, and at little less than 2 miles from it, are numerous outlying rocks and patches of reef, between which and the reef extending from the shore are some dry sand-banks.*

ALCESTE REEF.—The *Alceste* Rock, upon which H.M. ship of that name was wrecked in February, 1817, when returning from China with Lord Amherst and suite, is the outer patch of a coral reef which projects N.N.W. nearly 2 miles from the North point of *Pulo Leat*, and has but 2 fathoms water on its shallowest part. It is the same reef upon which, in 1816, the Portuguese ship *Amelia* was wrecked, the remains of both her and the *Alceste* being still visible, with only a few yards between them, at the time the reef was surveyed by Captain D. Ross. The wreck of the *Alceste* was lying $1\frac{1}{2}$ mile from the North point of *Leat*, with the West point of *Jelaka* in one with the southern sand-bank West of *Leat*; the northern sand-bank in one with a white rock which lies between *Jelaka* and the N.W. point of *Leat* and close to it; and a white rock near the N.W. point open to the eastward of a high tree on the centre of the eastern hill of *Leat*.

Many ships have since been lost on this reef, or on some of the coral patches contiguous to it, and they have generally furnished bearings which

* Captain Joass, of the British ship *Lammermuir*, reports that at 2^h 20^m a.m., December 31st, 1863, when proceeding through the *Macclesfield Channel*, his vessel struck on a rock, the position of which, from bearings taken, is lat. 2° 53' S., long. 107° E. H.M.S. *Rifteman* has since searched for this rock, but could find no danger in the vicinity of the position ascribed to it.

would show them to have been wrecked some distance from these dangers; but the wrecks of several of them have afterwards been found upon, or close to the Alceste Reef; and two such wrecks, the *Cornelius Haja** and the *Memnon*, have found a place on the American chart. There is good reason to believe that there is no danger in the fairway of the Macclesfield Channel in this vicinity.

A reef is placed by Dutch authorities 2 miles E. by N. from Alceste Reef, with only 6 ft. water. From a position three-quarters of a cable northward of the shoal, the northern point of Pulo Leat bears S.W., and the eastern point of Bulo Anak, or Selagin, S. by E. $\frac{1}{2}$ E.

The soundings round Alceste Reef do not by any means afford a certain guide, although to the north-eastward they appear to be a few fathoms shoaler than elsewhere. Close-to on the West side are 17 fathoms, and from 15 to 21 fathoms at the distance of 1 or 2 miles; close-to on the North side 12 fathoms, with 16 to 18 fathoms at 1 or 2 miles; and close-to on the N.E. side 16 fathoms, with 12 to 17 fathoms at 1 to 2 miles.†

KILAPAN and **SENIOR** are two hilly islands lying 2 or 3 miles North of Pulo Lepar. Kilapan is about $1\frac{1}{2}$ mile in extent East and West, and a mile wide, and bears from Rocky Point light, N.W. by N. $6\frac{1}{4}$ miles. Senior is not quite so large as Kilapan, from which it bears W. by N. 2 miles.

Wilson Bank, discovered by Captain Lestock Wilson, of the *Carnatic*, in February, 1787, has but 1 fathom water on its shoalest spot, although Capt. Wilson did not find less than 3 fathoms. From the 1-fathom spot the extreme of Brekat Point, the N.W. point of Macclesfield Strait, bears N.N.W. $\frac{1}{4}$ W. $6\frac{1}{2}$ miles; the hummock just inside the point, which is more conspicuous, bearing N.W. by N. The bank extends about a mile to the northward of the shoal patch, having $2\frac{3}{4}$ fathoms over that part of it; to the southward it extends about a quarter of a mile. Close-to on the East side are 13 or 14 fathoms, but to the N.N.E. 8 to 10 fathoms for about $1\frac{3}{4}$ mile, when the depths suddenly increase to 19 or 20 fathoms. The extreme of Brekat Point bearing

* This vessel was reported to have struck on a rock in lat. $2^{\circ} 44\frac{1}{2}'$ S., long. $107^{\circ} 1'$ E.—*Horsburgh*.

† The barque *Carl Ronneberg*, Captain C. L. Lied, is reported to have struck upon a rock about 6 miles to the northward of the Alceste Reef, in lat. $2^{\circ} 42'$ S., long. $107^{\circ} 5'$ E. It is said to be about a cable's length in circumference, having from 4 to 20 ft. water on it, and surrounded by depths of 19 fathoms. The American chart exhibits many soundings in the locality ascribed to this danger, which were obtained in searching for the rock on which the *Cornelius Haja* was reported to have been wrecked, said to lie W.S.W., distant 4 miles from the reported position of the Lied Rock. Mr. Richards, in H.M.S. *Saracen*, also searched for the *Cornelius Haja* Rock without discovering any danger in that locality: for these reasons the Lied Rock is not placed upon the Admiralty charts, and the wreck of the *Cornelius Haja* (as mentioned above) was subsequently found by the American surveyors upon the Alceste Reef.

N.W. by N., or the hill over it N.W., leads a mile outside Wilson Bank, as does also the eastern extreme of Kilapan Island, bearing S. by W. $\frac{1}{4}$ W. The same bearings also clear the elbow of Brekat Bank.

Brekat Bank.—A long, narrow strip of bank, which appears to have from 3 to 4 fathoms water over it, and deeper water inside of it, runs in a S. by W. direction for 3 or 4 miles to the southward of Wilson Bank, and, passing about $1\frac{1}{4}$ mile westward of that shoal, forms to the northward, about a mile farther on, an elbow projecting to seaward, with $1\frac{1}{4}$ fathom water on it, and a small patch which dries at low water; it then takes a N. by W. $\frac{1}{2}$ W. direction, until it joins the bank extending from Brekat Point, which bears from the elbow N.N.W., distant 4 miles.

The soundings in the channel between Brekat and Wilson Banks are $4\frac{1}{2}$ to 8 fathoms. Near the elbow they decrease suddenly from 10 fathoms; there are 9 or 10 fathoms at $2\frac{1}{2}$ miles eastward of the elbow, and 12 and 15 fathoms at a mile N.E. of it.

BREKAT POINT, in lat. $2^{\circ} 34' S.$, long. $106^{\circ} 50' E.$, has a rock off it 28 feet high, and forms the eastern extreme of Banka, and the north-western limit of Gaspar Strait. The land from the inner part of the projecting point falls away to the southward, and has a hill or hummock 620 ft. high upon it. Immediately off the point are some rocks, and shoal water extends nearly a mile from it to the eastward. The point should not be approached nearer than 2 miles, the soundings off it being deep and irregular, 14 to 21 fathoms.

AKBAR SHOAL.—The American ship *Akbar* struck, in 1843, upon a shoal having only 12 ft. water upon it, in lat. $2^{\circ} 39' S.$, long. $107^{\circ} 11' E.$ In the American chart the position of this shoal is marked doubtful, so that the American surveyors did not succeed in finding it.

The ship *Seawfell* reports that, on March 23rd, 1864, she passed close to the Akbar Shoal, which had apparently very little water on it, though no breakers, as the sea was quite smooth. It appeared to be a narrow ridge of coral, about 2 cables long, North and South, and not half a cable wide. Its position is given as $2^{\circ} 38' S.$, long. $107^{\circ} 13\frac{1}{2}' E.$

This places the shoal 3 miles N.E. by E. from the position ascribed to it by the *Akbar*; in either case it is much in the way of vessels proceeding through Clements or Stolze Channels, and until its exact position is determined, it will be necessary to keep clear of the localities in which it is reputed to lie.

TREE ISLAND (*Boompjes Eiland*), distant 10 miles N.E. $\frac{1}{4}$ E. from Brekat Point, and 7 miles S.W. by W. $\frac{1}{2}$ W. from Gaspar Island, is a barren rock, 40 ft. high, with two or three trees on the summit, giving it the appearance of a ship under sail, and making it visible 15 miles off. It is surrounded by a coral reef, and a rock about as high as a boat lies a third of a mile south-eastward of it. There is a cave upon this island where the Malays

come to collect birds' nests, which are probably found also on the other islands.

A detached coral reef lies more than half a mile N.E. of the island, and another about the same distance S.E. of it; between these reefs and the one surrounding the island are narrow channels, with deep water.

GASPAR ISLAND, or *Pulo Gelassa*, in lat. $2^{\circ} 24\frac{3}{4}'$ S., long. $107^{\circ} 3\frac{1}{2}'$ E., bears N. $\frac{1}{4}$ E. $24\frac{1}{4}$ miles from the North point of Pulo Leat, and N.E. $\frac{3}{4}$ E. nearly 17 miles from Brekat Point. Its centre rises to a peak 812 ft. high, which may be seen in clear weather at a distance of 30 miles, and is the principal mark for avoiding the shoals in sailing to or from the northern part of the strait. It is nearly surrounded by a reef, which projects from the South and East points of the island about a third of a mile. The West and North points are bold close-to. The soundings near the island are variable, 12 to 19 fathoms.

Fresh water is to be found upon this island, but the chart does not point out the particular spot where it may be obtained.

Glassa or Gelassa Rock, 24 ft. high, with some trees on it, and rocks contiguous to it, lies about a mile westward of Gaspar Island. It is surrounded by a reef extending about a third of a mile south-eastward and eastward from it, but not quite so far in other directions.

Gaspar Island, Glassa Rock, and Tree Island, form the northern limit of Gaspar Strait. The Canning Rock, Warren Hastings Reef, Belvidere Shoals, and other dangers, are described hereafter.

TIDES and CURRENTS.—It is high water, full and change, in the Macclesfield Channel, at $2^{\text{h}} 30^{\text{m}}$, and the ordinary rise is only 4 ft. The *Vansittart's* boat is reported to have found at Tree Island a perpendicular rise of 18 ft., between the hours of 8 a.m. and 5 p.m.; but there is probably some mistake in this, as 12 ft. is an extraordinary rise in Banka Strait, into which some very large rivers disembogue.

The currents greatly depend upon the strength of the monsoon. When the monsoon is strong, the current will generally be found setting in the same direction at the rate of 2 or 3 knots an hour, but affected somewhat by the tides. In light winds and calms the tides are seldom very regular.

Directions from the Southward.—Proceeding towards the Macclesfield Channel during the S.E. monsoon, having passed the Two Brothers (p. 185), steer N. by E. $\frac{1}{2}$ E., or N.N.E., keeping midway between the Clifton Shoal and the Brouwers Reefs. The depths in this track are pretty regular, 10 to 15 fathoms, soft bottom. In thick weather, or if uncertain of the vessel's position, the entrance of Gaspar Strait should be approached with great caution, keeping a good lookout for broken or shoal water.

Be also guarded when in the vicinity of the Blas Mateu Rock, for although the American surveyors could not find that danger, yet, for reasons given at p. 231, it would be unsafe to conclude that it does not exist. The Six-peak

range (the first clump of hills to the westward of Entrance Point) kept N. by W., will lead 3 miles westward of this rock, and when Baginda Peak bear N.W. $\frac{1}{2}$ N., and the water has deepened from 8 or 9 to 11 or 15 fathoms, steer to the north-eastward until the highest trees on Klippige or Rocky Point, or Rocky Point Hill, are well open of Entrance Point, which will lead clear of the $2\frac{1}{2}$ -fathom bank.

Being 3 or 4 miles to the northward of the Blas Mateu Rock, a N. $\frac{1}{2}$ E. course—guarding against currents—for 14 miles, will lead about 5 miles eastward of Entrance Point, and in this track the depths will be 13 to 18 fathoms; if the vessel gets too far to the eastward the water will deepen, and if to the westward, it will shoal to 12, 11, or 9 fathoms. From 5 miles eastward of Entrance Point, a North course for about 16 miles will lead nearly midway between the shoals West of Jelaka and the Discovery Rocks. In this track there will be from 14 to 25 fathoms till abreast of Klippige or Rocky Point, when there will be 23 or 24 fathoms, deepening to 30 or 33 fathoms between Pulo Jelaka and the Discovery Rocks, having passed which they will decrease to 25, 19, and 16 fathoms. The vessel will now have arrived in a position with Pulo Kilapan bearing S.W. by W., and the North point of Pulo Leat S.E. by E., and may steer N. by E. $\frac{1}{2}$ E. for Gaspar Island, in which track she will have 16 to 21 fathoms.

Since the survey of the sandbanks South of Banka by Mr. Stanton, it no longer appears dangerous to approach the coast to a less distance than 14 miles, and it might be convenient for a vessel to make Entrance Point on a N. by E. or N.N.E. bearing, and pass inside the $2\frac{1}{2}$ -fathom bank by keeping Klippige and Entrance Points in line.

To work through from the Southward.—During the northern monsoon it is very difficult, almost impossible, to work through Gaspar Strait, even in the latter part of the monsoon, about March, when vessels are obliged to anchor often on account of the faintness of the wind and the rapidity of the southerly current. In the southern monsoon vessels will often meet with light, variable winds, rendering it impossible for them to preserve a straight course.

Macclesfield Channel does not afford convenient objects as marks to keep vessels clear of danger, but the following have been taken from the American chart as being, so far as we are able to judge, the best that can be given for that purpose; as, however, some of the objects are at a considerable distance from the dangers, navigators are cautioned not to depend too implicitly upon having made out, or being able to make out, such distant objects, but rather to rely upon a more general exercise of judgment, paying attention to the soundings, frequently referring to the chart, &c. It is indispensable that the greatest vigilance be observed, and careful regard had to the set of the tides and currents, in order to work a vessel safely through this dangerous channel.

Standing to the eastward.—A vessel having passed eastward of the Fairlie Rock may stand on, keeping a good lookout, until she is about $2\frac{1}{2}$ miles from Sand Island, or 1 mile from Branding Breakers, and will have from 13 to 7 fathoms water. Sand Island is just awash at high water, and Shoal-water Island, bearing N.N.E. $\frac{1}{2}$ E., leads a mile to the westward of the Branding Breakers. Shoal-water Island should not be approached nearer than 3 miles, on account of the 1-fathom patch lying about 2 miles westward of it.

The Java Guide gives the following directions to clear the Vansittart Shoals:—

“To avoid the Vansittart Shoals with a contrary wind, do not bring Entrance Point more to the westward than N.W. $\frac{1}{2}$ N. before the peak of Saddle Island bears N.E. by E., or rather keep Leat Island a little to the eastward of North. When near the N.W. part of these shoals, the West end of Leat may be brought N. $\frac{1}{2}$ W., but not more westerly, until South Island is open to the northward of Low and Saddle Islands. The northern extremities of these two islands, and the southern part of South Island in one, E. by N. $\frac{3}{4}$ N., just clear the northern part of the shoals.”

It appears, however, by the American chart, that Entrance Point bearing N.W., and the peak of Saddle Island N.E. $\frac{1}{2}$ E., will keep a vessel nearly $1\frac{1}{2}$ mile clear of the S.W. prong of the shoals. Leat Island a little eastward of North, seems rather an indefinite mark, unless it be known how much of the island is visible; but, taking it to mean the highest point, viz., Putat Hill, 613 feet high, and which would appear from the southward nearly in the middle of the island, it should not be brought to the northward of N. $\frac{1}{2}$ E., until the peak of Saddle Island bears N.E. $\frac{1}{2}$ E., when it may be brought to bear North. The North extremes of Saddle and Low Islands in line, bearing N.E. by E. $\frac{3}{4}$ E., clears the northern end of the shoals nearly a mile.

Being to the northward of the Vansittart Shoals, Low Island must not be brought South of E. by S. $\frac{1}{2}$ S., or Sand Island West of North, to avoid the shoals between those islands; and to clear the patches lying southward of the S.E. point of Pulo Leat, keep Barn Island East of E.S.E., until Middle Point, or Putat Hill, bears N. by W. $\frac{1}{4}$ W., when Barn Island may be brought to S.E. by E. $\frac{1}{2}$ E., which will clear the reef extending from Middle Point. To clear the reefs South of Jelaka, the S.E. point of Leat should not be shut in by Middle Point, until Pulo Jelaka bears N.N.E.; and to avoid the reefs westward of that islet, keep Middle Point East of E.S.E., until Jelaka bears East. Jelaka bearing East also leads northward of the Discovery Rocks.

Having arrived 2 miles West of Jelaka, and to the northward of the Discovery Rocks, Entrance Point must not be brought West of S.S.W. $\frac{1}{4}$ W.,

nor Klippige Point West of S.W. $\frac{3}{4}$ S., until Pulo Kilapan bears W.S.W., which will lead outside the dangers extending from the N.W. coast of Leat, and $1\frac{1}{2}$ mile to the northward of the Alceste Reef. Rocky Point Hill in line with Tree Point, S.W. $\frac{1}{4}$ S., leads about a mile north-westward of the Alceste Reef.

Standing to the westward.—To avoid the $2\frac{1}{3}$ -fathom bank, keep the high trees on Klippige or Rocky Point, or Rocky Point Hill, well open of Entrance Point, bearing N. by W. $\frac{1}{4}$ W., or keep Entrance Point West of N. by W. $\frac{1}{2}$ W., until Baginda Peak bears W. by N., when a vessel may stand over until Entrance Point bears N. by E. $\frac{1}{2}$ E.

To clear the Klippige Shoals, do not bring Entrance Point South of S.W. $\frac{3}{4}$ S., until the right extreme of Pulo Kilapan bears N.W. by W., Klippige Point S.W. by W., or Pulo Jelaka N.E. by E., leads about half a mile northward of the Klippige Shoals.

When standing towards the Discovery Rocks, do not bring Entrance Point South of S.S.W., or Klippige Point South of S.W. $\frac{1}{2}$ S., until the right extreme of Kilapan bears W. by N. $\frac{1}{4}$ N., or Pulo Jelaka, East, when a vessel will be northward of the dangers, and may stand westwards towards the bank into 10, or even 8 or 7 fathoms, until she nears Wilson Bank.

The Saddles, two hills on the Banka coast, 912 ft. high, bearing W.N.W., or the Padang Hills W. by N. $\frac{1}{4}$ N., lead about $1\frac{1}{4}$ mile southward of the Wilson Bank; and the extreme of Brekat Point, N.W. by N., leads more than half a mile eastward of that danger, and will also keep a vessel clear of the elbow when standing inshore between Wilson Bank and Brekat Point.

Directions from the northward.—In the early part of the N.E. monsoon, northerly and north-westerly winds prevail about the entrance of Gaspar Strait, when strong south-easterly currents will generally be experienced between Gaspar Island and Pulo Leat. It appears certain that the frequent accidents happening to vessels in the vicinity of Alceste Reef arise principally from neglecting to guard against the effects of this current. A vessel, therefore, intending to proceed to the southward through Macclesfield Channel, and having passed a mile or two eastward of Gaspar Island, should steer to the south-westward until Gaspar Island bears N. by E. $\frac{1}{2}$ E., upon which bearing it should be kept until Pulo Kilapan is S.W. by W., and the North point of Pulo Leat S.E. by E., when she will be in the fairway of the channel, and may steer South, carefully guarding against the effects of tides or currents by frequent cross bearings of the North point of Leat, Pulo Jelaka, Rocky Point Hill, or Pulo Kilapan. If a South course be preserved, when Pulo Kilapan bears West, Middle Point, the S.W. point of Leat, will be the breadth of Jelaka open of that islet, and Rocky Point will bear S.W. by S., which latter bearing also leads *close* to the East side of the Discovery Rocks. If, when Pulo Kilapan bears West, Middle Point be not open of Jelaka, the vessel will be too far to the eastward; and if Middle

Point should be more than the breadth of Jelaka open of that islet, she will be too far to the westward.

If, in consequence of light or baffling winds, it be found impossible to keep Gaspar Island N. by E. $\frac{1}{2}$ E., but that as the vessel approaches Pulo Leat it is found to bear N. by E., or N. $\frac{3}{4}$ E., great caution must be observed in passing Alceste Reef, for Gaspar Island bearing N. $\frac{1}{2}$ E. is the line of direction of that danger, and to avoid it Pulo Kilapan must not be brought westward of W.S.W. until Pulo Jelaka bears South.

Being in the fairway, with Pulo Kilapan bearing West, and Middle Point the breadth of Jelaka open of that islet, Entrance Point will be just in sight bearing about S.S.W. A ship may continue the South course, but if there be any doubt of her position, it will be prudent to bring Entrance Point S.S.W. $\frac{1}{4}$ W., which will lead through nearly in mid-channel between the Discovery Rocks and the dangers off Jelaka, the narrowest and most difficult part of the channel. But great care must be taken to preserve that bearing, Entrance Point being at so great a distance, that any error in the bearing would be extremely likely to lead into danger. Entrance Point bearing S.S.W. $\frac{1}{2}$ W., leads about half a mile westward of the dangers off Jelaka, and the same point S.S.W. leads clear of the Discovery Rocks.

When the S.E. point of Leat is open of Middle Point, the ship will be southward of the Discovery Rocks, and if she has been steering for Entrance Point, the course must be immediately altered to the south-eastward, until Entrance Point bears S.W. $\frac{1}{2}$ S.—which leads eastward of the Klippige Shoals—when a South course may be again shaped until Entrance Point bears about W. $\frac{1}{2}$ S.; then steer S. $\frac{1}{2}$ W. for 13 or 14 miles, or until Entrance Point is about N. by W. $\frac{1}{4}$ W., and Baginda Peak N.W. $\frac{3}{4}$ W., when the vessel will be in about 10 fathoms on the outer edge of the bank extending northward of the Blas Mateu Rock, and to clear that rock must steer about S.W. until the Six-peak range of hills on Pulo Lepar bears N. by W., when a S. by W. $\frac{1}{2}$ W. or S.S.W. course may be shaped for the Two Brothers.

To work through from the northward, it will generally be advisable to get over to the westward towards the Banka shore as soon as possible, where a vessel will be more in the fairway of the channel, and will find more convenient depths of water for anchoring, if it should be necessary to bring up.

If, however, when to the southward of Gaspar Island, it should be found advantageous to stand well over to the eastward, it is not advisable that Gaspar should be brought more westward than N. by W., or N. by W. $\frac{1}{4}$ W., when nearing the doubtful position of the Akbar Shoal; and the greatest care should be observed in rounding Alceste Reef, not to bring Pulo Kilapan westward of W.S.W. until Pulo Jelaka bears South.

Standing to the westward.—Tree Island may be approached to about a mile, or until Gaspar Island bears N.E. $\frac{3}{4}$ E., which leads that distance clear of the dangers extending from it. Brekat Point bearing N.W. by N., will

lead about half a mile eastward of the Elbow and of Wilson Bank, and a vessel will be to the southward of those dangers when the Saddles on Banka bear W.N.W., or Padang Hills W. by N. $\frac{1}{4}$ N., and may then stand on to the bank into 8 or 7 fathoms, until the North extreme of Pulo Kilapan bears W. by N. $\frac{1}{4}$ N., which leads northward of the Discovery Rocks. Klippige or Rocky Point, S.W. $\frac{1}{2}$ S., leads eastward of the Discovery Rocks, and also clears the shoals extending from the N.W. coast of Pulo Leat.

Standing to the eastward towards Jelaka, take great care not to bring Entrance Point anything West of S.S.W. $\frac{1}{2}$ W. until Middle Point is E.S.E., which leads southward of the dangers off Jelaka. Jelaka must then be kept East of N.N.E., until the S.E. point of Leat is in line with Middle Point, when it may be brought to bear North. To avoid the rocks off the S.E. point of Leat, do not bring Putat Hill, or Middle Point, West of N. by W. $\frac{1}{4}$ W., until Barn Island bears E.S.E. The East extreme of Pulo Leat bearing North will keep a vessel clear of the dangers extending from Sand Island, and Sand Island, if not brought to the West of N. $\frac{1}{2}$ W., will clear the dangers to the southward of it and of Barn Island. Saddle Island in one with Low Island, bearing E.N.E., leads about three-quarters of a mile northward of the northern group of the Vansittart Shoals; Putat Hill bearing North, or N. $\frac{1}{4}$ W., leads westward of the middle group; the same hill N. $\frac{1}{2}$ E. leads westward, and Entrance Point N.W. to the southward of the S.W. group. Shoal-water Island should not be approached from the westward nearer than 4 or 3 miles; bearing N.N.E. $\frac{1}{2}$ E., it will lead a mile westward of the Branding Breakers.

The Padang, Turtle, and Hancock Shoals may be approached to a mile, if a good lookout is kept when in their vicinity.

Standing to the westward when southward of the Discovery Rocks, the right extreme of Kilapan bearing N.W. $\frac{3}{4}$ W., or Entrance Point S.S.W. $\frac{1}{2}$ W., clears the northern cluster of the Klippige Shoals; but when Rocky Point bears West, Entrance Point should not be brought South of S.W. $\frac{1}{2}$ S. After passing Entrance Point, keep the high trees on Rocky Point, or Rocky Point Hill, open of Entrance Point, or keep Entrance Point West of N. by W. $\frac{1}{2}$ W., until Baginda Peak bears W.N.W., to clear the $2\frac{1}{2}$ -fathom bank.

CLEMENTS CHANNEL.

This channel is much narrower and more encumbered with dangers than either the Macclesfield or Stolze Channels. It is separated from the former by the four small islands, which from their appearance are respectively named Low, Saddle, Sand, and Barn, and by Pulo Leat, which form its western limit. To the eastward, it is only separated from Stolze Channel by South, North, and Table Islands, three small islands lying close together, so

that the entrances to both channels, either from the southward or the northward are common. The entrance to Clements Channel from the southward is, however, understood to lie to the westward of the Doubtful Dangers (page 229), Sharpshooter Rock, Hippogriffe Shoal, Hancock and Turtle Shoals, Sand Island, Padang Reef, Branding Breakers, Shoalwater Island, and Embleton Rock; whilst the entrance of Stolze Channel is considered to be to the eastward of those dangers; and this order will be observed in the description of these channels.

LOW and **SADDLE** are two small islands, a little more than half a mile in diameter, lying in a S.E. by S. direction about $8\frac{3}{4}$ miles from the southeastern point of Pulo Leat. They bear E.N.E. and W.S.W., and are distant a mile from each other. Low Island, the westernmost, is 123 ft. high; Saddle Island has two hills upon it forming a saddle, the western hill being 210, and the eastern 266 ft. high. Both islands are connected and surrounded by reefs, extending nearly half a mile from them.

Three *dangerous patches*, extending a mile in a N.W. and opposite direction, lie between the bearings of E. $\frac{1}{2}$ N. and N.E. by N., distant $1\frac{1}{4}$ mile from the East point of Saddle Island. In the Java Guide a dry reef is said to lie $1\frac{1}{4}$ mile N.E. by E. from Saddle Island, but in the American survey 1 fathom water is shown on the S.E. and N.W. patches, and 2 fathoms on the middle patch. Between the reefs and the island is a narrow channel of 8 to 14 fathoms water; close-to, on the outside of the reefs, are 15 to 19 fathoms.

Sand Island, lying S. by E. $\frac{3}{4}$ E. 5 miles from the S.E. point of Pulo Leat, is very small and low, and surrounded by rocks to the distance of a third of a mile. About half a mile to the northward of it are 12 or 14 fathoms, and from 10 to 23 fathoms the same distance to the southward.

Barn Island, lying about $1\frac{1}{4}$ mile E. by N. $\frac{1}{2}$ N. from Sand Island, is small, about a third of a mile in diameter, 154 ft. high, and surrounded by a reef to the distance of about a third of a mile. Between Barn and Sand Islands are depths of 8 to 14 fathoms.

Dangerous reefs, dry at low water, extend nearly 2 miles between the bearings of S.S.E. $\frac{1}{4}$ E. and S.S.W. $\frac{1}{4}$ W. from Barn Island.

SOUTH ISLAND, one of the islands limiting Clements Channel to the eastward, lies S.E. by E. $\frac{1}{2}$ E. $10\frac{1}{4}$ miles from the S.E. point of Pulo Leat. It is the largest of the islands in this vicinity, being about a mile in diameter; the highest hill upon it is 200 ft. high. It is surrounded by a reef extending from it in most parts about a third of a mile, but off its South end dangers project three-quarters of a mile. Close to the reef are from 5 to 14 fathoms, and 18 and 24 fathoms a short distance to the westward.

Table Island, lying E. by S. $1\frac{3}{4}$ mile from South Island, more properly belongs to Stolze Channel. It is surrounded by reefs projecting nearly half a mile from it, and in the middle of the channel between it and South Island, is a $2\frac{1}{4}$ -fathoms patch.

North Island, lying $1\frac{1}{4}$ mile northward of South Island, is also surrounded by a reef, which extends from it about a third of a mile. At two-thirds of a mile E.N.E. from the East end of the island is a dry bank with 16 fathoms close-to, and 12 fathoms between it and the reef extending from the island. A mile S.E. from the same end of the island is a patch of 3 fathoms.

Sunk Rock is 16 yards only in diameter, with 9 ft. water on it, and 10 fathoms around it. From it Saddle Island bears S. by W. $\frac{1}{4}$ W., $4\frac{3}{4}$ miles, North Island E. by N. $2\frac{1}{4}$ miles, Barn Island W. by S. $3\frac{1}{4}$ miles, a reef near Saddle Island South, the centre of Table Island and the North point of South Island are in one, and Sandy Island is entirely hidden by Barn Island.

From its position as placed upon the American chart, the southern extreme of North Island bears East, distant $2\frac{1}{2}$ miles; the south-western extreme of South Island S.E. by E. southerly; and the northern point of Barn Island W. by S. southerly. A quarter of a mile S. $\frac{1}{4}$ E. from it is a patch of 5 fathoms, with 13 fathoms between it and the rock.

Middle Pass Shoals are three coral patches lying close together, and extending nearly a mile in a N.E. by N. and opposite direction. From their southern extreme Barn Island bears S. $\frac{2}{3}$ E. 3 miles; and the south-eastern point of Pulo Leat bears N.W. by W. $\frac{3}{4}$ W. $2\frac{3}{4}$ miles. Barn Island, bearing S. $\frac{2}{3}$ W., leads about two-thirds of a mile to the eastward of the shoals; the southern extreme of North Island S.E. by E., clears them about the same distance to the north-eastward, and bearing E. by S. $\frac{1}{4}$ S., clears them to the southward; the S.E. point of Pulo Leat bearing W. $\frac{1}{4}$ S., clears them to the northward.

Coral Bank is a small patch just awash, with 12 to 19 fathoms around it, lying $1\frac{3}{4}$ mile north-westward of the Middle Pass Shoals. From it the S.E. point of Pulo Leat bears S.W. by W. $\frac{1}{2}$ W., nearly $1\frac{1}{2}$ mile; and Pulo Anak N. by W. $\frac{2}{3}$ W. westerly, $2\frac{3}{4}$ miles. The S.E. point of Leat bearing W. by S. $\frac{1}{2}$ S., leads to the southward of the bank, but over a $2\frac{1}{2}$ -fathom bank which lies between Rocky Bank and the S.E. point of Pulo Leat. The eastern extreme of Pulo Anak, N.W. by N., leads to the north-eastward.

HEWITT SHOAL, upon which, in August, 1820, the ship *General Hewitt* struck, and remained fast for half an hour, lies 5 miles N. by W. $\frac{1}{4}$ W. from the western extreme of North Island. When aground the western extremes of South and North Islands were in one; the extremes of Leat Island bore from W.N.W. to W. by S. $\frac{1}{8}$ S.; Barn Island S.W. by S.; and the hill on Brekat Point was well open of Pulo Leat. It is about a ship's length in extent, and 16 to 20 yards in breadth. The coral rocks were visible under the vessel with only 14 (or 18) ft. water over them, and near the shoal 12 to 15 fathoms.

The high part of South Island open of the West extreme of North Island leads westward of Hewitt Rock; and the same object open of the East extreme of North Island leads to the eastward.

PULO LEAT.—The western coast of this island and Jelaka light are noticed on pp. 235-6. The eastern coast takes a northerly direction for $3\frac{1}{4}$ miles from its S.E. point, when it runs about N.W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles to the northern point. The whole of this coast is fronted by a coral reef, which commences about half a mile northward of the S.E. point; in front of the bay, about three-quarters of a mile northward of the S.E. point, the reef extends half a mile, but not quite so far from the eastern extreme of the island. Close to the northward of the eastern extreme, upon the dry reef extending from the shore of the island, is an islet called Pulo Anak, or Selagin.

According to the American chart, *fresh water* may be obtained in the small bay, about half a mile to the northward of the S.E. point of Leat, just where the dry reef begins to project from the shore.

Rocky Shoal, lying N.E. by E. $\frac{1}{2}$ E. $1\frac{3}{4}$ mile from the S.E. point of Leat, is before described on page 246.

Of the N.E. coast of Pulo Leat, besides the reef projecting from the shore, are numerous outlying coral patches, extending nearly 2 miles from it, and rendering this part of the coast exceedingly dangerous. The north-eastern of these dangers—which bound this part of Clements Channel to the westward—lies with the S.E. point of Leat in line with the eastern extreme of the island, distant nearly 2 miles from Pulo Anak; from whence the dangers take a S. $\frac{3}{4}$ W. direction until they join the reef which projects about half a mile East of Pulo Anak.

A vessel will pass eastward of these dangers by keeping the S.E. point of Leat West of S. by W. $\frac{3}{4}$ W.; and North Island bearing S.E. $\frac{3}{4}$ S. will lead to the north-eastward.

Akbar Shoal is noticed on page 238.

The **MIDDLE PASS**, which unites Macclesfield and Clements Channels, is bounded on the S.E. by Sand Island, Barn Island, Sunk Rock, and North Island; and on the N.W. by the dangers projecting from the southern end of Pulo Leat and the Middle Pass Shoals.

To proceed from the Macclesfield Channel through the Middle Pass from the south-westward, steer between Entrance Point and the Vansittart Shoals towards Sand Island, the channel between which and the shoals extending from the southern end of Leat, is clear, with depths of 14 to 20 fathoms; Entrance Point kept bearing W. by S. $\frac{3}{4}$ S., leads through in mid-channel.

In the event of meeting with baffling winds, so that the vessel cannot preserve a straight course, the following may prove useful:—The East extreme of Pulo Leat bearing North, clears the dangers extending from the West side of Sand Island; the North extreme of Barn Island bearing East, clears the dangers extending from the North side of Sand Island; Barn Island E.S.E., clears the shoals projecting from the southern end of Leat; Middle Point of Leat W.N.W., clears the Middle Pass shoals; and the North extreme of Barn Island S.W. by W. $\frac{3}{4}$ W. leads North of Sunk Rock.

The Channel between Low Island and Sand Island is narrowed to the breadth of $1\frac{1}{2}$ mile by the shoals extending to the southward of Barn Island. It is not easy to see what advantage is to be gained by using this channel.

The Channel between Vansittart Shoals and Low Island is 2 miles wide, and may be used by bringing Sand Island to bear N.N.W., which will lead through in mid-channel.

CLEMENTS CHANNEL from the Southward.—Proceeding through Clements Channel from the southward, having passed the Fairlie Rock, steer about N. by E. or N. by E. $\frac{1}{2}$ E., if the vessel has passed on the South side of the rock, or about N.E. by N. if she passed on the North side. When the summit of South Island is made out, bring it N.N.E., which will lead between the Embleton Rock and the Vansittart Shoals; take care, however, not to mistake South Island, remembering that Low and Saddle Islands will be seen to the westward of it. Low Island bearing N.N.E. leads over the south-eastern prong of the Vansittart Shoals.

Approaching South Island on a N.N.E. bearing, the soundings will be 9 to 13 fathoms until well up with Low Island, when they will deepen to 16 and 18 fathoms, and to 24 or 25 fathoms when abreast of Saddle Island. When Saddle Island bears West, steer N. by W., which will lead more than a mile clear of the reefs off the north-eastern end of Saddle Island, and midway between North Island and Sunk Rock, and in this track the soundings will be 22, 24, 17, 24, and 23 fathoms. When the North extreme of North Island bears East, steer N.W. by N. for 5 or 6 miles to pass between Middle Pass Shoals and Hewitt Shoal, in depths varying from 22 to 32 fathoms; when the S.E. point of Leat bears about W.S.W., a N. $\frac{3}{4}$ W. course may be shaped for Gaspar Island.

To pass westward of Sunk Rock, keep the summit of South Island N.N.E., until Saddle Island bears W. by S., when steer N.W. $\frac{1}{2}$ W., which will lead clear of the shoals north-eastward of Saddle Island, and between Barn Island and Sunk Rock, and between Middle Pass Shoals and Hewitt Shoal.

No vessel would from choice attempt to work through Clements Channel, as Macclesfield and Stolze Channels are much better adapted for that purpose; but it is possible that a vessel, embarrassed by light baffling winds, may find it convenient to proceed through some part of this channel.

From the Northward.—For the convenience of navigators, the directions for proceeding through this channel from the southward, with a fair wind, are here reversed; but for working through, it will not be necessary to give other directions than merely to observe the bearings of objects to avoid the various dangers, and which equally apply to vessels proceeding in either direction.

Having passed a mile or two eastward of Gaspar Island, steer to bring it N. by W., and kept on that bearing, steering S. by E., it will lead clear of

the dangers lying off the N.E. coast of Pulo Leat. When the North extreme of Pulo Leat bears West, its S.E. extreme should bear S.W. by S. Continue the S. by E. course until the S.E. extreme of Leat bears W.S.W., when Saddle Island should be seen just on the starboard bow with Barn Island and Low Island to the right of it; South Island should be about two points on the port bow, with North Island close to the left of it. The West extreme of South Island, S.E. by S., will lead between Sunk Rock and the dangers extending from North Island. When the North point of North Island bears East, steer S. by E. to pass between South Island and the shoals off the N.E. end of Saddle Island; and when the South extreme of Saddle Island bears West, bring the peak of South Island N.N.E., and keeping it on that bearing will lead between Embleton Rock and the Vansittart Shoals.

If intending to pass westward of Sunk Rock, preserve the S. by E. course until the S.E. extreme of Leat bears West, when Saddle should bear, or must be brought to bear, S. $\frac{1}{2}$ E., which leads between Sunk Rock and Barn Island. When North Island bears E. $\frac{1}{2}$ N., steer, S.E., taking care that the North end of Barn Island is not brought to the North of N.W. by W. $\frac{3}{4}$ W., to clear the dangers north-eastward of Saddle Island; when the peak of South Island bears N.N.E., steer S.S.W., and proceed as before.

STOLZE CHANNEL.

STOLZE CHANNEL is rather wider, less encumbered with dangers, and furnishes objects more convenient for guiding vessels safely through it, than the Macclesfield Channel. The southern entrance is 15 miles broad, bounded on the West by the Larabe Shoal, and the dangers described on pp. 229-30, and on the East by the Carnbee Rocks, Naga Reef, Aanvang Bank, Cooper, and Three-feet shoals. These latter shoals are very much against this channel in making it from the southward, for the Carnbee Rocks—the most southern of the dangers—are 20 miles distant from the land, so that in thick or hazy weather, when a ship might be uncertain of her exact position, she would not be able to make Billiton with nearly the same safety that she would be able to make Pulo Lepar or the South coast of Banka. These shoals would appear to form the only drawback to the adoption of this channel, and in fine weather even this would almost disappear, for the hills on Billiton are high, and may be seen at a distance of 30 or 35 miles; and when in the vicinity of these dangers, not only are the hills on Billiton clearly distinguishable, but Kennedy and Otan Islands are well in sight.*

* Stolze Channel is easy for a stranger; but the nature of the bottom, and the depth of water in it is against anchoring, in the event of calms or thick weather. North of Gaspar

Heroine Shoal.—The positions assigned to this shoal, in lat. $3^{\circ} 33\frac{1}{2}'$ S., long. $107^{\circ} 52'$ E., also in lat. $3^{\circ} 37'$ S., long. $107^{\circ} 46'$ E., were examined by H.M.S. *Nassau*, in 1876, when soundings of not less than 15 fathoms were obtained, with no indication of shoal water in the vicinity; the exact position is, however, doubtful, but it is still placed on the charts in lat. $3^{\circ} 37'$ S., long. $107^{\circ} 46'$ E.

Carnbee Rocks, in lat. $3^{\circ} 33' 15''$ S., long. $107^{\circ} 39' 40''$ E., are of coral formation, 400 yards long in a North and South direction, and 300 yards broad. These rocks are covered at high water, and are thus difficult to distinguish, when the water is smooth, from a distance of more than 1 cable; but a portion dries 5 ft. at low water; there are 12 to 15 fathoms 1 cable from them.

Naga Reef is placed on the chart in lat. $3^{\circ} 26\frac{1}{2}'$ S., long. $107^{\circ} 36'$ E., 7 miles N.N.W. from Carnbee Rocks, and S. by E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles from Aanvang Bank. A rock above water is marked on the Dutch chart at $3\frac{1}{2}$ miles S.S.E. of the Aanvang Bank.

AANVANG BANK (*Commencement Bank*), discovered in 1822 by Lieut. J. Stolze, is half a mile in length W. by N. $\frac{1}{2}$ N. and E. by S. $\frac{1}{2}$ S., and about a cable broad. It consists of large black rocks, some of which are visible at low water springs; close to them are 5 to 13 fathoms, and about $1\frac{1}{2}$ mile westward of them are 22 fathoms. From the western extreme of the bank, Gunong Bolo, on the South point of Pulo Selio, bears N.N.W. $\frac{3}{4}$ W. $10\frac{1}{2}$ miles, and Blantoe Hill N. by E. $\frac{1}{2}$ E.

Cooper Shoals, lying N.N.W. $\frac{1}{4}$ W. $2\frac{1}{2}$ miles from Aavang Bank, have only 2 ft. water over them, and 7 to 10 fathoms close-to. Gunong Bolo bears from them about N.W. by N., and Blantoe Hill N.N.E.

Three-foot Shoal is a patch having only 3 ft. water over it, and 10 to 13 fathoms around it, lying N.W. by W. $\frac{1}{4}$ W. $4\frac{3}{4}$ miles from Cooper Shoals, with Gunong Bolo bearing N. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles, and Blantoe Hill N.E. $\frac{1}{4}$ N. $13\frac{1}{2}$ miles.

Kennedy or Masar is a small island, lying 7 miles to the N.E. of the Aanvang Bank, in lat. $3^{\circ} 19'$ S., long. $107^{\circ} 40' 10''$ E. There is a small islet at $1\frac{1}{2}$ mile to the N.W. of it.

Otan Island is rather smaller than Kennedy Island, and lies about $1\frac{3}{4}$ mile E.S.E. from it. Other dangers and islands lie to the southward of Billiton,

Strait we always found a soft bottom, whereas in Stolze Channel, besides the inconvenient depth, it is of rock or coral. The strength of the current probably prevents the accumulation of mud. High or Hoog Island, off the N.W. coast of Mendanao, shows conspicuously, and is a good distinguishing mark; at night we found it an easy object to see."—Capt. the Hon. C. G. J. B. Elliot, H.M.S. *Sybilie*, 1855.

but they are to the eastward of the track of vessels bound through Gaspar Strait.

‡ The West Coast of Billiton, forming the eastern limit of Gaspar Strait, is fronted by numerous islands, separated by narrow and, for the most part, unnavigable passages. *Pulo Selio*, with the dangers westward of it; the group named the Six Islands; and Pulo Mendanao, the largest of the islands, form the eastern limit of Stolze Channel.

At the S.W. end of Billiton are the *Haycocks*, or Gunong Beginda, two remarkable hills, 496 ft. high, which, when coming from the southward, appear as islands. Five miles north-eastward of the Haycocks is *Blantoe Hill*, 1,166 ft. high; and to the eastward of Blantoe are *Luda*, *Pyramid*, and *South Peak*, all of which serve to determine a ship's position when approaching the strait from the southward.

Seven miles northward of Blantoe are *Kliang*, 1,198 ft., and *Nose* 1,090 ft. high. Ten or eleven miles N. by E. from Blantoe is *Agong*, 1,242 ft. high, and which appears to be the highest hill on the island. Seven miles northward of Agong, in lat. $2^{\circ} 53'$, is *Tadjem*, 1,096 ft. high. The whole of the hills just mentioned are visible from the southward and south-westward. Three miles S.S.E. $\frac{1}{2}$ E. from Tanjong Bienga, a high bluff forming the north-western extremity of Billiton, is *Gunong Tebalo*, the highest part of which, Round Mount, is 541 ft. high.

A little to the northward of Tamelang Point, on the S.W. side of Billiton, there is a small rivulet of *good water*, which may be easily approached by boats. *Fresh water* is also to be found in the northern part of the bay on the West side of Selio.

PULO SELIO is surrounded by a reef, and separated from the south-western point of Billiton by a narrow channel, in the middle of which is the small island of Seriboe; a mile south-eastward of Seriboe is a reef which partly dries. Close to the shore of Billiton are the small islands *Goenting* and *Proet*.

The South point of Selio is in lat. $3^{\circ} 14'$ S., long. $137^{\circ} 30'$ E., and the conspicuous hill, 242 ft. high, upon it, is named Gunong Bolo.

White Rock, 28 ft. above water, stands on the outer edge of a rocky patch, lying nearly 3 miles W. $\frac{1}{4}$ N. from the South point of Selio; a mile S.E. by E. from it are some rocks above water. There is no channel between White Rock and Selio, and shoal water extends nearly $1\frac{1}{2}$ mile southward of that island. A $4\frac{3}{4}$ -fathom patch lies 3 miles S.S.E. from White Rock.

A Shoal, about a third of a mile in extent, having but $1\frac{1}{2}$ ft. of water over it, and 10 to 16 fathoms close-to, lies N.W. nearly 2 miles from White Rock. Between this shoal and White Rock, and between both and the Koerier Bank, are channels of 5 to 8 fathoms water.

Koerier Bank, of sand, about a mile long, and a quarter of a mile broad,

dries at low water at 3 miles North of the White Rock, and 4 miles West of the North point of Pulo Selio.

The 3-fathoms edge of the bank surrounding Selio forms a sort of bay on the West side of that island, where a ship may anchor to fill up water. The entrance to it is between the $1\frac{1}{2}$ -feet shoal and the Koerier Bank; Gunong Bolo bearing S.E. by E. $\frac{1}{2}$ E. will lead into it, midway between those dangers.

Foul ground and shallow water extends to the westward from Billiton, nearly to a line drawn from White Rock to Ross Island, the most southern of the Six-island Group; within this line, $2\frac{1}{2}$ miles N. by W. $\frac{1}{2}$ W. from the Koerier Bank, is *Gull Rock*.

The large bay to the northward of Selio, and eastward of the Six Islands, is crowded with small islands and reefs.

The **SIX ISLANDS**, or *Pulo Lima*, are small, low, and surrounded by reefs, between which are narrow passages having depths of 10 to 20 fathoms water. The southernmost of these islands, named *Ross*, after Captain Ross, I.N., is 42 ft. high, and lies in lat. $3^{\circ} 5' S.$, long. $107^{\circ} 20' E.$ The others are named *Benolo*, 94 ft. high; *Kasengo*, 58 ft.; *Bago*, 146 ft.; *Betong*, 170 ft.; and *Binget*, 158 ft. high. They may be approached to the southward and westward as near as 1 mile; but dangerous patches extend from Ross Island in a S.E. direction for nearly 2 miles; and from Kasengo, the north-western island, reefs, some of which dry at low water, extend in a N.N.W. direction to the distance of $1\frac{1}{4}$ mile, and for three-quarters of a mile in a southerly direction. The western extreme of Mendanao bearing North a little easterly leads *close* to the reef extending N.N.W. from Kasengo, and bearing N. $\frac{1}{4}$ E. or N. $\frac{1}{2}$ E., clears all dangers near the Six Islands.

TABLE ISLAND, 116 ft. high, forms the western limit of the narrowest part of Stolze Channel, the reef extending N.N.W. from Kasengo, forming the eastern limit. The island is about a third of a mile long N.N.W. and S.S.E., and nearly a quarter of a mile broad. It lies nearly 2 miles E. by S. from South Island, and, from its isolated position, serves as an excellent mark to guide vessels in steering for the narrow part of Stolze Channel when approaching it either from the southward or from the northward. It is surrounded by a reef to the distance of nearly half a mile, and at two-thirds of a mile S.W. of it is an outlying patch of 3 fathoms.

SOUTH ISLAND is about four times as large as Table Island, and a hill on its northern part is 200 ft. high. It is bordered by a reef, and dangers extend three-quarters of a mile in a southerly direction from its South point. On its North side are some rocks not far from the shore, and a patch with only 3 ft. water over it lies half a mile N. by W. from its eastern point.

A Two-and-a-quarter Fathoms Patch lies nearly in mid-channel between Table Island and South Island, which makes that passage dangerous; elsewhere are soundings of 14 to 21 fathoms.

A 3-foot patch lies $2\frac{1}{2}$ miles W.S.W. from Table Island, and three-quarters of a mile off the South side of South Island.

NORTH ISLAND, 240 ft. high, is separated from South Island by a channel $1\frac{1}{2}$ mile wide, which, from the reefs projecting from both islands, is narrowed to three-quarters of a mile. The channel is clear, with soundings of 7 to 18 fathoms. The two islands are in one on a N. by W. and opposite bearing. Three-quarters of a mile E.N.E. from the N.E. point is a dry patch; there is also a patch of 3 fathoms lying S.E. $\frac{1}{4}$ E., distant a little more than half a mile from the same point.

PULO MENDANAO, or *Long Island*, lying $15\frac{1}{2}$ miles to the eastward of Pulo Leat, is much the largest of the numerous islands which front the West coast of Billiton. It is about 8 miles in extent North and South, and about the same distance East and West. The island is for the most part low, but has some hills 600 to 700 ft. high upon it.

Pulo Ayam is a very small islet, lying S.S.E. $2\frac{1}{2}$ miles from West Point. There is a rock on the outer edge of the reef extending from Mendanao from which the South point of the island bears E. $\frac{1}{2}$ S. $2\frac{3}{4}$ miles, and Pulo Ayam N.N.W. $\frac{3}{4}$ W. At three-quarters of a mile from the rock in the direction of Pulo Ayam is a dry patch.

Pulo Gala, or Low Island, lies off the S.E. coast of Mendanao, from which it is separated by the Nado Passage, about three-quarters of a mile broad.

The *Nado Passage*, between Mendanao and Gala Islands, is said to be entirely clear, and very deep, but this is doubtful.

A *buoy* is moored on the eastern side of the channel, about a mile wide, which separates the dangers extending from Pulo Gala from those extending westward from the islands which lie southward of Tanjong Roe, off the western side of Billiton Island. The buoy lies $2\frac{1}{2}$ miles south-eastward of the southern extreme of Pulo Gala.

Brown Reef.—The English barque *Victor*, when proceeding through Stolze Channel, struck on a rock with only 8 ft. water on it, and 14 fathoms close to, Pulo Betong (the easternmost of the Six Islands) bearing S.S.E., and Table Island W. $\frac{1}{2}$ S. These bearings would place this reef near the position of a danger named Brown Reef on the Dutch chart.

As there appear to be *other dangers* besides Brown Reef in this locality, a vessel will do well to pass westward of a line drawn between Kasengo Island and the West point of Mendanao.

Hoog Island (*High Island*), or *Pulo Kumbong*, is a small islet, 100 ft. high, and in the form of a sugar-loaf, lying nearly $1\frac{1}{2}$ mile to the northward of West Point; a reef surrounds it, which on the eastern and northern sides projects nearly half a mile.

PULO BATU DINDING lies off the North coast of Mendanao. On the western side of the island is a deep bay, but it is quite filled up with coral

shoals. Half a mile off the north-eastern end of the island is a small round islet.

Rotterdam Island, lying about $1\frac{1}{4}$ mile northward of the S.W. point of Batu Dinding, is small, and more than half a mile West of it is a very small islet, half a mile S.W. of which are some rocks. A bank of sand and rocks surround both island and islet, between which and the reef extending from Batu Dinding is a narrow channel with 6 to 9 fathoms water in it.

The whole coast between Mendanao Island and Tanjong Bienga, the N.W. point of Billiton, is fronted by dangers, and vessels should use extreme caution in approaching it; the outlying dangers only will be described.

Perlak Shoal, or *Kalang Serat*, is a rock nearly awash, with a 2-fathoms patch about a third of a mile north-eastward of it. A monster *buoy*, painted black, is placed in 7 fathoms water on the North side of the bank, and W.S.W. of Tanjong Pandang (Billiton). From it a remarkable tree on Pulo Kalmanbang bears N. $87^{\circ} 20' E.$; the N.E. point of Pulo Sibongkok (on Hoorn Island), S. $75^{\circ} E.$; and the South end of Pulo Kalmanbang on with the North point of Gunong Tadjem.

Pulo Kalmanbang is a small island lying E. $\frac{1}{2}$ N. $6\frac{3}{4}$ miles from the N.E. point of Batu Dinding. It is surrounded by an extensive reef, on the western extreme of which, $1\frac{1}{4}$ mile W.S.W. from the S.W. point of the island, a *buoy* is placed. About a mile North from Kalmanbang, and 2 miles N.N.E. from the last-named buoy, is another buoy, which lies off the middle of a narrow bank, named *Tokul* (Toekoel), which extends 2 miles in a N.E. and S.W. direction, and is separated from the reef lying off the North side of Kalmanbang by a narrow channel. A 5-fathom bank of small size lies 2 miles N.W. from the latter buoy. A shoal, named *Pinang*, lies off the South and S.E. sides of Kalmanbang, distant $1\frac{1}{2}$ mile from it.

Tieroetioep Bay and River.—This bay is to the northward of Kalmanbang Island and the Toekoel Shoal, between the latter and the Karang Panjang, or Bakka Shoal. The river falls into the eastern part of the bay, but reefs extend off its entrance to a distance of nearly 4 miles. The small island of Kalmoa, 150 ft. high, lies directly off the entrance, 3 miles within the reefs.

Pandan, the town on the North entrance point of the river, is joined with Blantoe, 22 miles to the southward, by a railway.

The outer edges of the reefs which lie on either side of the entrance of the river, form a sort of bight, within the horns of which a vessel may anchor in 6 or 7 fathoms. The best anchorage appears to be a little further out, with Kalmoa Island bearing about E.S.E., and Kalmanbang Island S. by W. $\frac{1}{2}$ W. But it is not a safe anchorage in the N.W. monsoon, and even during the N.E. monsoon there are heavy gales from the N.W.

Buoys.—There is a conical buoy lying on the North side of the entrance to the channel between the reefs, at 2 miles W.N.W. from Kalmoa Island. There is also a can buoy lying 1 mile further out, and marking the eastern

side of a rocky 5-fathom patch, which should be avoided by vessels anchoring. It is advisable to lay the kedge out to the northward, as vessels often foul their anchors, either by the currents or winds. To enter and anchor in this bay, having passed the West point of Mendanao at a distance of 2 miles, steer North or N. by E. till Rotterdam Island or the N.W. point of Dinding bears S.S.E., then steer N.E. by E., E.N.E., or E. by N., till Kalmoa Island bears S.E. by E.; steer then direct for that island till Kalmanbang bears S.S.W. $\frac{3}{4}$ W., and anchor in $7\frac{1}{2}$ fathoms, with the mouth of the river S.E. by E. $\frac{1}{2}$ E., 4 miles distant, and the nearest rocks S.E. $\frac{3}{4}$ E., 3 miles. By the American chart, Kalmoa bearing S.E. by E. leads just to the southward of the Bakka Shoal.

When near the N.W. point of Dinding, the wind sometimes flies round to the eastward; and if bound to this bay it is better to anchor and wait for the sea breeze from the southward or south-westward, as the current runs to the N.W. with an easterly wind.

The *water*, which is fetched from a little way up the river, is very good; it may be procured also on the right bank of the river, near the entrance, but it is not so good.

Karang Pandjang, or *Bakka Shoal*, bounding Tieroetioep Bay to the northward, is about three-quarters of a mile in extent, with $1\frac{1}{2}$ fathom water over it. Tanjong Koeboe (Kubu), or Billiton, bears from it E. by S. $\frac{1}{4}$ S.; Kalmoa Islet S.E. $\frac{1}{2}$ E.; and Kalmanbang S. by W.

Argo Shoal, about $1\frac{1}{2}$ mile in extent, with only a foot of water over the middle of it, lies N.N.E. $\frac{1}{2}$ E. $4\frac{1}{2}$ miles from the Karang Panjang, and from its outer edge Tanjong Bienga bears N.E. $\frac{3}{4}$ E. Several shoals are reported to lie westward of the Argo Shoal.

Numerous detached patches lie eastward of the line joining Argo Shoal and Karang Pandjang.

A small *shoal*, with two fathoms water over it, lies $1\frac{3}{4}$ mile N.E. $\frac{1}{4}$ N. from the Argo Shoal, with Tanjong Bienga bearing N.N.E., distant 2 miles; and N.W. Island N. $\frac{3}{4}$ E., $3\frac{1}{2}$ miles.

TANJONG BIENGA is a high bluff point, forming the north-western extreme of Billiton; from this point the coast trends away north-eastward.

Eleven Islands are a cluster of small islands lying off the north-western extreme of Billiton. The names of some of them are the *Sailor's Hat*, *Bamboe*, *Sampit*, and *Burong*; the latter is the largest of the group, and lies N.N.E. nearly 4 miles from Tanjong Bienga.

N. W. Island or *Langwas*, the outer and most north-western of the islands, lies just inside the edge of the coral reef which extends from the shore, and surrounds the entire group. Its North end is in lat. $2^{\circ} 31\frac{1}{2}'$ S., long. $107^{\circ} 38\frac{3}{4}'$ E.

Alwina Shoal.—The ship *Alwina* passed close to a rock lying N.N.W. $1\frac{1}{2}$ mile from the north-westernmost of the Eleven Islands. It appeared to be

a detached danger, with a depth of 6 to 9 feet on it, and deep water all around.

Directions for Stolze Channel.—No soundings appear on the charts for a distance of 7 or 8 miles southward and south-westward of the Carnbee Rocks (p. 250), nor yet close to those dangers, so that a vessel cannot be guided by the lead when approaching them. Between the Carnbee Rocks and the Aanvang Bank are 13 to 18 fathoms. The Aanvang Bank, Cooper Shoals, and Three-feet Shoal appear to lie just within the edge of the line of 10 fathoms, running from a position 4 or 5 miles south-eastward of the Aanvang Bank, outside the shoals just mentioned.

Towards the shoals on the western side of the entrance to the channel the depths are much less, and they decrease more regularly, the 10-fathom line extending some 5 or 6 miles to the eastward of them, so that they may be approached by proper attention to the lead.

The bottom, through the entire length of Stolze Channel, appears to be composed principally of sand and broken shells, with here and there broken coral. To the north-westward of Billiton the bottom is mostly soft, black mud, with sand and broken coral and shells in places.

From the Southward.—As soon as Blantoe, 1,166 ft. high (the highest hill on the South coast of Billiton), can be recognized, it should be brought to bear about N.N.E., and with it just in sight on that bearing, if the weather is clear, a vessel will be about 33 or 35 miles distant from it, in the fairway of the Stolze Channel, with the Carnbee Rocks about 15 miles to the north-eastward, and may shape a course North or N. $\frac{1}{2}$ W. As the vessel proceeds to the northward, Luda Hill will come in sight, and shortly afterwards Pyramid and South Peak, all of which will be seen to the right or eastward of Blantoe. Soon the Haycocks will be visible, at first a little to the left of Blantoe, and by the time they are in line with it, Gunong Bolo, on the South end of Selio, will be well in sight, bearing about N.N.E., and distant 14 and 15 miles. Shoal-water Island will also be in sight, not perhaps from the deck, but from the mast-head, or a little way up the rigging, bearing about N.W. by W., and distant 15 or 16 miles.

From this position a N. by W. $\frac{3}{4}$ W. course will lead up to Table Island. Passing 6 or 7 miles westward of White Rock, Saddle and South Islands will be seen on the port bow; soon Low Island will also rise in sight on the port bow, and the Six Islands on the starboard bow; and as they are approached—if the N. by W. $\frac{3}{4}$ W. course has been preserved—Table Island will be seen right ahead in mid-channel.

Table Island should be approached on a N. by W. $\frac{3}{4}$ W. bearing until the West point of Mendanao bears N. by E. or N. by E. $\frac{1}{4}$ E., which will lead between Table Island and the reefs extending N.N.W., from Kasenga. When the North point of North Island bears W.N.W., either steer N.N.W. for Gaspar Island, which will lead 3 miles eastward of the Hewitt Rock, and

2 miles westward of the western of the two positions ascribed to the Akbar Shoal; or bring North Island S. by W. $\frac{3}{4}$ W., and steer N. by E. $\frac{3}{4}$ E., or N.N.E., which will lead 4 or 5 miles westward of the dangers extending from Rotterdam Island, and into the China Sea eastward of the Akbar and Canning Shoals.

Working through from the Southward.—When standing to the eastward, to avoid the Carnbee Rocks, Blantoe Hill must not be brought North of N. by E.; and to clear the Aanvang Bank and Cooper Shoal, Gunong Bolo must not be brought West of N. by W. When Blantoe bears N.E. $\frac{3}{4}$ N., or the Haycocks N.N.E. $\frac{3}{4}$ E., Gunong Bolo must be kept East of N. by E., to avoid the Three-foot patch.

The dangers southward of Selio should not be approached under a depth of 10 fathoms, or White Rock brought to the West of N. by W. $\frac{1}{2}$ W.; and when Gunong Bolo bears N.E. by E. $\frac{1}{2}$ E. White Rock must be kept to the East of North, to avoid the edge of the bank which lies S.S.E. nearly a mile from it. White Rock should not be approached nearer than a mile, nor to a less depth than 14 or 13 fathoms; when northward of White Rock, it must not be brought anything South of E.S.E. until the North point of Pulo Selio bears E. by N. $\frac{1}{2}$ N., to clear the $1\frac{1}{2}$ ft. patch lying nearly 2 miles N.W. of it. The Koerier Bank should not be approached under a depth of 10 fathoms, or White Rock brought South of S.E. by S.

Gunong Bolo kept East of S.E. by E. will lead clear of the Koerier Bank, and to the S.W. of the foul ground between it and the Six Islands. Ross Island bearing N.N.W. $\frac{1}{4}$ W. leads westward of the foul ground, and also clear of the dangers lying S.E. of Ross Island. Kasenga bearing North clears the dangers extending from the West side of Ross Island; and the hill on the West point of Mendanao, if not brought to the North of N. $\frac{1}{2}$ E., will lead well clear of the rocks which extend more than a mile N.N.W. from Kasenga, and will also clear all danger contiguous to the Six Islands. When Table Island bears W. by N. a vessel will be northward of the dangers extending from Kasenga, and may stand eastward until the hill on the West point bears N. $\frac{1}{4}$ W.

As Pulo Ayam is neared, the hill on West point must not be brought to the West of North, and the islet must not be approached nearer than a mile.

To clear the dangers about Hoog Island, West point should not be brought to the South of S.S.E. until Rotterdam Island bears N.E., when Hoog Island, in line with West point bearing South, will lead clear of the dangers westward of Rotterdam Island. Rotterdam bearing S.W. leads clear of the shoal bank extending from the North point of Batoe Dinding.

The dangerous coast of Billiton northward of Mendanao should not be neared under 5 or 6 miles; the summit of the North range of hills on Mendanao S.S.W., or Taling, the highest hill on Mendanao, on the same bearing will lead well clear of all danger. N.W. Island and Boerong Island should

not be approached nearer than 2 miles, and caution must be observed to avoid the position of the Alwina Shoal (see p. 255).

When standing to the westward, Shoal-water Island, if not brought to the East of North, will clear all danger from the Larabe Shoal to the Middle Reef, and the lead will also give good warning when standing towards them, as they lie some 4 or 5 miles within the edge of the 10-fathom line. Shoal-water and Hancock Islands must be approached with caution, as the lead does not give much warning when nearing their ledges; they should on no account be approached under a depth of 10 fathoms, or within $2\frac{1}{2}$ miles. Hancock Island bearing South leads clear of the Bliss Shoal, between which and South Island a vessel may stand to the westward until the summit of South Island bears N.E. by N., which will lead clear of the Vansittart Shoals and the dangers about Saddle and Low Islands.

Saddle Island bearing W. $\frac{1}{2}$ S., leads southward of the dangers extending from South and Table Islands. When near Table Island, its South point should not be brought to the eastward of North, to avoid the 3-fathom patch lying three-quarters of a mile S.W. of it. The East side of Table Island may be approached to a mile; but the East side of North Island has dangers lying nearly a mile off it, and to clear them Table Island must not be brought eastward of S.S.E. The East extreme of South Island just open of the East extreme of North Island bearing S. by E., leads a mile eastward of Hewett Shoal.

Through Stolze Channel from the northward.—Having passed eastward of Gaspar Island, bring it to bear N.N.W., and keep it so, steering S.S.E., and it will lead into the fairway of Stolze Channel, midway between West point and the Hewett Shoal, and in this track the soundings will be 14, 16, 20, 22, 28, and 26 fathoms. When West point bears East, distant 4 or 5 miles, Table Island will be seen on the starboard bow, with North and South Islands to the right of it. Continuing the S.S.E. course, the Six Islands will soon be visible on the port bow, and, after passing Table Island at about 2 miles on the starboard beam, West point will soon bear N. by E. or N. by E. $\frac{1}{4}$ E.; when an opposite course may be steered to pass between Table Island and the dangers extending N.N.W. from Kasenga.

When Table Island bears N. by W. $\frac{3}{4}$ W., all danger will be cleared near the Six Islands, and if kept upon that bearing it will lead mid-channel between White Rock and Shoal-water Island, having passed which, the most convenient course may be shaped to the southward, giving a good berth to the shoals extending from Branding Breakers to the Larabe Shoal, on the western side of the channel, and to the Aanvang Bank and Carnbee Rocks on the eastern side.

Entering Stolze Channel to the eastward of the Akbar Shoal, between it and the N.W. coast of Billiton, steer to the S.W., giving the Billiton coast a berth of 4 or 5 miles; and as soon as North Island can be made out, bring

it S.S.W., and it will lead well to the westward of the dangers near Rotterdam Island. When Table Island bears a little East of South, a S.S.E. course may be steered until West point bears N. by E. or N. by E. $\frac{1}{2}$ E., which leads midway between Table Island and the reefs off Kasenga; when proceed as before.

Working through from the Northward.—When standing to the eastward, the N.W. coast of Billiton should not be approached nearer than 5 or 6 miles, or the summit of the North range of hills on Mendanao brought westward of S.S.W. (pp. 257-8). Rotterdam Island, bearing S.W., will lead clear of the reefs extending from the North side of Batoe Dinding, and the islet off the N.E. point of the latter island, bearing East, will clear the dangers northward of Rotterdam. West point bearing South will clear the rocks, &c., which lie westward of Rotterdam, and bearing S.S.E. will clear the reef surrounding Hoog Island.

West point and Pulo Ayam should not be approached much under a mile, as a reef extends about a third of a mile outside them. After passing Pulo Ayam, the hill near the extremity of West point, if not brought North of N. $\frac{1}{2}$ E., will keep a vessel outside the dangers between Mendanao and the Six Islands. Kasenga bearing North, leads westward of Ross Island; and Ross Island N.N.W. $\frac{1}{4}$ W., or Gunong Bolo, on Pulo Selio, bearing S.E. by E., leads clear of the dangerous elbow of foul ground to the westward of Gull Rock, and also clear of the Koerier Bank.

To avoid the $1\frac{1}{2}$ -foot patch at 2 miles N.W. from White Rock, do not bring White Rock South of E.S.E. after the North point of Selio bears E. by N. $\frac{1}{2}$ N. White Rock should be passed about a mile off, and afterwards not brought West of N. by W. $\frac{1}{2}$ W., to avoid the edge of the bank about a mile S.S.E. from it. Gunong Bolo N. by E., leads westward of the Three-foot Shoal; and the Haycocks N. by E. $\frac{1}{2}$ E., or Blantoe Hill N.N.E. $\frac{1}{4}$ E., leads westward of Cooper Shoal and the Aanvang Bank. To avoid the Carnbee Rocks, Blantoe Hill must not be brought to the North of N. by E.

Standing to the westward towards Hewitt Shoal, take care not to shut in the East point of South Island behind the East point of North Island; these points just open lead a mile eastward of the shoal. North Island should not be approached on the East side nearer than $1\frac{1}{2}$ mile, or Table Island brought to the East of S.S.E., to avoid the dangers off it; and Kasenga bearing S.E. $\frac{1}{2}$ E. will clear the reef off the East side of Table Island. Table Island should not be brought to the East of North until Saddle Island bears W. $\frac{1}{3}$ S., when a vessel will be southward of the dangers extending from Table Island and South Island; after which she may stand to the westward until the summit of South Island bears N.N.E.

Hancock Island bearing South leads eastward of Bliss Shoal, but Hancock and Shoal-water Islands must on no account be approached nearer than

$2\frac{1}{2}$ miles, or to a less depth than 10 fathoms, which will be not far from the shoals, the lead giving very little warning in this locality. When to the southward of Shoal-water Island Shoals, Shoal-water Island kept to the West of North will clear the dangers extending from the Branding Breakers to the Larabe Shoal; the lead, also, will give sufficient warning, as the 10-fathom line, on the edge of the bank, is 4 or 5 miles to the eastward of them.

NORTH-EAST COAST OF BANKA.

CAUTION.—The mariner cannot be too cautious in approaching this exceedingly dangerous coast. It was surveyed by the late Lieutenant James Robinson in 1819, but many dangers which front it are very imperfectly known, their positions depending for the most part upon the accounts of commanders of vessels who have found themselves too close in and entangled amongst them when running for Gaspar Strait in thick weather.

There are many hills along this coast near the sea, and some mountains inland; one of these, called the *Saddles*, 912 feet high, rises about 9 miles westward of Tanjong Brekat. At 9 miles westward of the Saddles is the conspicuous range of the *Padang Mountains*, the highest summit of which is elevated 2,630 feet. About 21 miles westward of Tanjong Riah, or in lat. $1^{\circ} 50' S.$, long. $105^{\circ} 53' E.$, is the double-peaked mountain *Gunong Marass*, 2,300 feet high, the largest mountain on the northern part of Banka.

The Coast from Brekat Point trends W. by N. 21 miles to *Lanka Point*, 4 miles westward of which is *Koba* village. This part of the shore may be approached as near as 4 miles in 7 to 8 fathoms water, as the shoals are not more than 2 or 3 miles from the land.

About 16 miles N.W. by W. from Lanka Point is the large village of *Koeraw*, from whence the coast trends N. by W. and N.N.W. to the *River Marawang*, near which stands the village of *Pankal Pinang*. The mouth of the river is in $2^{\circ} 4\frac{1}{2}' S.$

Tetawa Bank.—Fronting the coast between the village of Koeraw and the Marawang River is an extensive chain of banks, 15 or 16 miles long, and from 1 to 5 miles broad, known under the general appellation of Tetawa Bank, upon which are several scattered islands. Many of the patches become dry, and but few have as much as 4 fathoms water over them.

Pulo Boear, or *Colowy*, the outermost of the above islands, is very small, and lies near the S.E. end of the bank, in lat. $2^{\circ} 14\frac{1}{2}' S.$, long. $106^{\circ} 11' E.$

Pulo Passir is a small sandy islet lying W.N.W., distant $4\frac{1}{4}$ miles from Pulo Boear.

Pulo Tetawa is about the same size as Boear, from which it bears West-northerly, distant 8 miles. It lies near the S.W. extreme of the bank, the

edge of which is half a mile to the southward and 2 miles to the westward of it.

Pulo Panjang, the largest, lies on the northern part of the bank, N. by E. $\frac{1}{2}$ E., distant 7 miles from Tanjong Poyang, and E.S.E. 8 miles from the entrance of the Marawang River. The bank extends about three-quarters of a mile to the northward of this island, but other shoals, known as the Sullivan Patches, &c., extend to a distance of 5 miles between the bearings of N.E. and N.W., and for the distance of $3\frac{1}{4}$ miles in a W. by N. direction towards Tanjong Bunga, the nearest point of Banka.

Horse, *Mentawa*, and *Goat Shoals*, are to the eastward of Tetawa Bank. The Horse, lying E. $\frac{1}{2}$ S. $3\frac{1}{2}$ miles from Pulo Boear, is a small patch, nearly dry at low water.

The Mentawa Reef, lying about a mile N. by W. from the Horse, and E.N.E. 3 miles from Pulo Boear, is more extensive than the Horse. Goat Shoal lies 3 miles northward of the Mentawa Reef, and N.E. by N. 6 miles from Pulo Boear; 9 ft. is reported upon this shoal.

The Channel between Pulo Boear and the above shoals is shown on the charts to be about $2\frac{1}{2}$ miles wide, with depths of 7 or 8 fathoms in it; but it would appear that either other dangers must lie in the channel at the distance of a mile from Pulo Boear, or that the Mentawa or Horse Reef must extend much further to the westward than was supposed, thus rendering the channel exceedingly narrow:—

Fathool Barie Shoal.—The *Fathool Barie* struck on a rocky bank, with $2\frac{1}{2}$ fathoms on it, in lat. $2^{\circ} 4' S.$, long. $106^{\circ} 28' E.$, with Mount Pouak bearing N.W. $\frac{1}{4}$ W., Pulo Panjang W.S.W., Pulo Tetawa S.S.W., and Pulo Boear S. by E. $\frac{1}{2}$ E.

General Elliott Reefs.—The *General Elliott*, in August, 1811, found herself entangled among some reefs, with Panjang Island S. by W. $\frac{1}{4}$ W., 5 miles, and a point of Banka, being the eastern foot of the hill South of Koba, S.S.E. $\frac{1}{2}$ E., then being in 8 fathoms. More to the northward, this vessel ran over some 7-fathoms banks with probably shoaler spots; they lie in $1^{\circ} 55' S.$, 12 miles from Banka.

Sullivan Reefs, Hillsborough Rock.—The *Sullivan*, on returning from China, December, 1784, and trying to get sight of Banka during thick weather, ran as far in as $13\frac{1}{2}$ fathoms, rocky bottom, and there saw three patches of breakers, one bearing S.S.W. 3 miles; another S.E. by S. the same distance; and the third E.N.E. 4 miles. Between the breakers a few rocks were visible above water. The weather being thick prevented Banka being seen; but it was supposed the rocks were in $2^{\circ} 3' S.$, and North from Panjang Island.

The *Hillsborough*, in March, 1788, returning from China, and steering for Gaspar Strait, struck on a rock having 3 ft. water on its shoalest part, and while the bow was aground there were 13 fathoms under the stern. When

the vessel floated, she anchored in 14 fathoms to the westward of the rock, with the extremes of Banka N.N.W. and S.E., five small islands about South, and in about $2^{\circ} 3' S.$, the reef extended S.E. and N.E. from the vessel. It is manifest that the positions of these dangers are altogether uncertain. The soundings near the Sullivan Patches, where they are placed upon the chart, are but 7 and 8 fathoms.

The *Diederika Shoal*, with 3 ft. water over it, and 13 to 14 fathoms around it, is thought to lie 11 miles north-eastward of Pulo Panjang, and 5 miles to the southward of Palmer Reef, in lat. $1^{\circ} 59' S.$, long. $106^{\circ} 28' E.$

Roberts Shoal lies about $4\frac{1}{2}$ miles to the westward of Diederika Shoal. It has 12 ft. water over it, and 10 fathoms near it.

Between these shoals and Pulo Panjang, and from thence to the coast, there are numerous rocky shoals, with from 7 to 5 fathoms water between them, but, as before stated, their exact positions are unknown.

Palmer Reef, lat. $1^{\circ} 54\frac{1}{2}' S.$, long. $106^{\circ} 27\frac{1}{2}' E.$, is probably part of the northern bank over which the *General Elliott* passed.

Caution.—All these dangers may be avoided by keeping in not less than 16 fathoms, where there is generally a muddy bottom, whereas in 15 fathoms it generally becomes rocky.

TANJONG RIAH, on Banka, in lat. $1^{\circ} 52' S.$, long. $106^{\circ} 14' E.$, is distinguished by two hills, and from its S.E. and South sides an extensive reef projects, which makes it necessary to keep 6 or 8 miles in the offing.

Black Rock Reef, lying $5\frac{1}{4}$ miles to the South and S.E. of Tanjong Riah, is very extensive, with only 3 ft. water over it in some places. *Tate Rocks*, 4 miles S.S.E. from Tanjong Riah, are 14 ft. above water. Other shoals lie S.E. by S. 8 miles from Tanjong Riah; and E.N.E., 4 miles from it, is a patch of 5 fathoms water.

To avoid these dangers, keep Panjang Island to the westward of South, and go no nearer the shore of Banka than 7 fathoms water, when approaching Marawang Road.

Marawang, or *Pankal Pinang*, the chief town of one of the tin districts, is situated a few miles up the Marawang River, the entrance of which lies about W.N.W. 7 miles distant from Pulo Panjang, and can only be approached by vessels with the greatest caution, on account of surrounding dangers. *Good water* can be obtained at Pankal Pinang.

DIRECTIONS.—Vessels bound from Macclesfield Channel to the ports of Pankal Pinang or Roessah, pass between Tree Island and Brekat Point, and to the westward of the Columbian and Dutch Shoals, in 12 to 14 fathoms water, but in not a greater depth—as the Columbian lies in the stream of 17 fathoms—till Boear Island bears S.W. by S., and Panjang Island West; a depth of 16 fathoms must then be kept till Riah Point bears West. From thence steer direct for that point till in 7 or 8 fathoms, having Panjang Island S. $\frac{1}{2}$ W., on which bearing the island may be approached till the

N.W. peak of the Lappa Hills bears S.W. $\frac{1}{2}$ W., which course leads direct to the anchorage.

LIAT BAY, formed between Tanjong Lyang to the N.W., and Tanjong Riah, to the S.E., affords good anchorage with shelter from southerly and westerly winds in 5 fathoms, white stiff clay, about three-quarters of a mile off shore; but in the eastern monsoon the swell is very heavy. The anchorage is in $4\frac{1}{2}$ fathoms, with the mouth of the river W. by N. northerly, Lyang Point N.N.W. $\frac{1}{2}$ W., and Riah Point S.E. by S. From the river, nearly to the S.E. point of the bay, a fine sandy beach lines the shore, with gradually decreasing soundings. The town of Liat, usually known as Songi Liat, stands a short distance up the river, and is a chief town of one of the tin districts.

Fresh water here is very difficult to be procured, on account of the rocks in the mouth of the river, which can only be entered at high water. Wood and spars of any dimensions may easily be obtained on the South side of the bay, within half a mile of the shore.

The three following *dangers* are very much in the way of vessels frequenting this bay. *Liat Reef*, lying E. by S. $\frac{1}{2}$ S. $3\frac{1}{2}$ miles from Tanjong Lyang, has but 6 ft. water over it.

Circe Reef, discovered by H.N.M. schooner *Circe*, has $2\frac{1}{2}$ fathoms over it, and 6 or 7 fathoms around it. From the reef the hill on Lyang Point bears W. by N. $\frac{1}{2}$ N., Simbang Island N.W. $\frac{1}{4}$ W., and the hill on Tanjong Riah S.W. $\frac{3}{4}$ S.

At full and change it is high water in Liat Bay at 5 p.m., and the rise of tide is 9 ft.

Approaching Liat Bay from the northward, $5\frac{1}{2}$ or 6 fathoms will be found at 2 miles from Lyang Point, and in a southerly direction towards the anchorage.

Coming from the eastward, and being in 10 and 11 fathoms, bring Riah Point S.W. by W, and keep towards it till Lyang Point is N.W. by W. $\frac{1}{2}$ W., then steer W.N.W. and W. by N. towards the anchorage. A rock is marked on the charts $1\frac{3}{4}$ mile S.S.E. from Lyang Point and a mile off shore; the anchorage recommended is southward of the rock in $4\frac{1}{2}$ or 4 fathoms water.

The Coast from Tanjong Dyang runs N.N.W. to *Tanjong Tuen*, in lat. $1^{\circ} 35\frac{1}{2}'$ S., which has a hill on it, and there are several hills further inland. Close to the point is *Pongoh Islet*, which can be approached to half a mile. The coast to the southward of it forms a very shallow bay, in which, at about 6 miles S.S.E. from Tanjong Tuen, is a small island named *Pulo Simbang*. This part of the coast may be approached to 13 fathoms, and even less.

The coast from Tanjong Tuen runs about N.W. by W. for $10\frac{1}{2}$ miles to *Tanjong Crassok* or *Moncudu*, the northernmost point of Banka, where it turns sharply to the westward. A reef, with only $7\frac{1}{2}$ ft. water, lies about $1\frac{1}{2}$ mile from the shore, and nearly midway between Tanjong Crassok and Cape Tuen.

From the shoal, Crassock Point bears W. by N. $\frac{1}{2}$ N., Pulo Pongoh off Cape Tuen S.E. $\frac{1}{4}$ S., and Pakoe Point S. by E. A second reef is marked at 3 miles S.E. by E. from Tanjong Crassock. Nearly a mile off shore, distant $2\frac{1}{2}$ miles W. by N. from Tanjong Crassock, is the small island of Monecudu, before described, page 226.

DANGERS NORTHWARD AND NORTH-WESTWARD OF GASPAR STRAIT.

CANNING ROCK, in lat. $2^{\circ} 23' S.$, long. $107^{\circ} 13' E.$, on which, in April, 1825, the East India Company's ship of that name struck on returning from China, lies directly in the route of vessels proceeding towards Gaspar Strait, and therefore is very dangerous, there being only 3 fathoms on it, with 17 to 20 fathoms close-to. From the spot where this ship grounded, Gaspar Island bore W. by S. 10 miles; Brekat Point S.W. by W. $\frac{3}{4}$ W.; the hummock near that point S.W. by W. $\frac{1}{2}$ W.; the summit of Mendanao Island S.S.E.; and Hoog Island S. by E. $\frac{1}{2}$ E.

The danger consists of many coral heads, extending N.E. and S.W. about 100 yards, and East and West 50 yards. As it is greatly in the way of vessels coming from the northward toward the strait, Gaspar Island ought to be made bearing well to the southward, and should be approached within 5 miles, or nearer, before it is brought to bear W.S.W., in order to give a wide berth to this danger.

Sowerby Shoal, seen by Capt. J. Sowerby, of the ship *Montmorency*, April 1st, 1861, with apparently not more than 2 fathoms water over it; by good cross bearings the middle peak of Mount Tebalo (North end of Billiton Island) bore S. $32^{\circ} E.$, and peak of Gaspar Island S. $66^{\circ} W.$, which places it in lat. $2^{\circ} 13' S.$, and about long. $107^{\circ} 35' E.$ (or $107^{\circ} 28'$). This shoal is about 3 miles long N.W. and S.E., and a third of a mile broad, and is very dangerous, as it lies right in the track of vessels beating out of the Stolze Channel to the northward in the northerly monsoon.

Pare Joie Shoal.—A *rock* was marked doubtful on the charts, with the peak of Gaspar Island bearing S.S.E. $\frac{3}{4}$ E. $6\frac{1}{4}$ miles, and Tree Island S. by W. $\frac{3}{4}$ W. 9 miles. It is probably the same as that on which the *Pare Joie* struck in 1869. It is now placed in lat. $2^{\circ} 19' S.$, long. $107^{\circ} 3' E.$, or nearly 3 miles eastward of the position assigned to the doubtful danger. From the Pare Joie Shoal the summit of Gaspar Island bears S. $\frac{1}{2}$ E., distant 5 miles, and Tree Island S.W. by S. 10 miles distant.

Warren Hastings Reef is supposed to extend about $3\frac{1}{4}$ miles N. by W. and S. by E., and to have but 2 to 9 ft. water over it in some places. In 1788 the *Warren Hastings*, returning from China, grounded upon the S.E. projecting point of this reef, having a short time previously had regular soundings from 20 to 22 fathoms. Under the stem there were only 2 ft.

water, 4 fathoms amidships; the high land of Banka bore S.W. by W., the most distant visible land S.S.W. and S.W. by W. $\frac{1}{2}$ W., the centre of Gaspar Island S.E. by E. $\frac{3}{4}$ E., Tree Island, S. by E. $\frac{1}{2}$ E., the latitude by the sun's meridian altitude being $2^{\circ} 23'$ S. On examining the shoal with the boat there were in some places 3 and $1\frac{1}{2}$ fathoms. In 1845 the English vessel *Gondolier* was wrecked on this reef. The French vessel *Joseph* places it in $2^{\circ} 21'$ S., and $106^{\circ} 56' 43''$ E., with the centre of Gaspar Island S.E. by E.; Belvedere Rock, N.N.E.; and the wreck of the *Gondolier* S.S.W.

Chrysolite Rock, said to lie $1\frac{3}{4}$ mile eastward of the southern part of Warren Hastings Reef, is stated by Dutch authority not to exist. The following account is given of it:—"On the 10th of September, 1851, the *Chrysolite*, of Liverpool, while working between the Belvedere and Warren Hastings Shoals, saw a rock, which apparently did not carry more than 4 ft. water, with Tree Island bearing S. $\frac{1}{2}$ E.; Brekat Point S.S.W. $\frac{1}{2}$ W.; and the centre of Gaspar Island E. by S."

Columbian Shoal is marked doubtful on the chart, N. by W. $\frac{1}{2}$ W., distant 14 miles from Brekat Point, from the following report by Capt. G. Wakem, of the ship *Columbian*, who stated that his vessel struck upon it in April, 1845, but without being brought up, although the reef had not more than 10 ft. water upon it. Anchored immediately with Gaspar Island E. by S. distant 16 miles, and Tree Island S.E. by E. $\frac{1}{4}$ E. 12 miles. The next day the vessel was left in a sinking condition.

Belvedere Shoals.—The south-western end of these shoals is a reef under water, in lat. $2^{\circ} 14'$ S., long. $106^{\circ} 59'$ E., and from it Gaspar Peak bears S.S.E. $\frac{1}{4}$ E., distant 11 miles; from thence they extend to the north-eastward $4\frac{1}{2}$ miles. Near their middle is a sand-bank awash; there are besides on them many coral patches with 6 to 10 ft. water, and on their north-eastern extreme a black rock 10 ft. high and 40 ft. long. When there is a heavy swell the sea breaks on them, and by day they may easily be avoided by a good lookout, particularly as some of the patches are dry at low water. However, a vessel from New York was wrecked on these shoals, and shortly afterwards a Chinese junk. It was probably their breakers which were observed from the *Hawk* in 1785, bearing N.E. 6 miles, and E. by N. 3 miles, Gaspar Island S.S.E. $\frac{1}{2}$ E., and part of Banka S.W.

A reef was discovered lying N.N.W. $3\frac{3}{4}$ miles from the Belvedere Rock, also 17 miles distant from Gaspar Island, and 28 miles from Brekat Point, on Banka Island. The position given is in lat. $2^{\circ} 8'$ S., long. $107^{\circ} 1' 15''$ E.

Dutch Shoal (*Vansittart Shoal*), lies in lat. $2^{\circ} 10\frac{1}{4}'$ S., long. $106^{\circ} 44'$ E., with the peak of Gaspar Island bearing about S.E. by E., distant 24 miles.

The *Vansittart*, Capt. Lestock Wilson, struck on this shoal, and was with great difficulty run upon a sandy beach of Banka, to save the lives of the crew.

A shoal of 6 ft. water is marked on the Dutch chart N.W., distant $11\frac{3}{4}$ miles from the Dutch shoal.

Magdalen Reef, discovered in November, 1806, by the American vessel *Magdalen*, is very dangerous in thick weather for vessels bound to Gaspar Strait from the northward, for when the reef was first seen the vessel was only half a cable's length from it. The boat found it to consist of two coral rocks, about 160 yards in length and 30 yards in breadth, with deep water between them, 11 ft. upon them, and at half a cable's length from the shoal 19 to 21 fathoms.

Capt. Ross, in 1818, determined the position of this reef to be lat. $1^{\circ} 59' S.$, long. $107^{\circ} 1' E.$, the peak of Gaspar Island bearing from it S. $\frac{3}{4}$ E., distant nearly 26 miles.

Lanrick or Newland Shoal, with only 9 ft. water over it, lies 8 or 9 miles northward of the Magdalen Shoal. The clipper brig *Lanrick*, Capt. T. B. White, struck upon this shoal in 1852; and the ship *Asia*, Capt. Newland, in October, 1853. Both vessels took great pains to determine its exact position, and the mean of their observations places the danger in lat. $1^{\circ} 52' S.$, long. $107^{\circ} 1' 30'' E.$ Capt. White says:—"It is of very small extent, and exceedingly dangerous, the soundings giving no warning, for the next morning at anchor, and not more than $1\frac{1}{4}$ mile from its position, the boats after a two hours' search could not find, nor did they see any discoloured water, or get less than 17 fathoms." Capt. Newland remarks also that no discoloured water could be seen at the distance of a mile from the shoal.

Atwick Rock was discovered by an English vessel of that name, in August 1831. Its position was given in lat. $1^{\circ} 48' S.$, long. $107^{\circ} 30' E.$, or N.N.E. $\frac{3}{4}$ E. $44\frac{1}{2}$ miles from Gaspar Island.

Pratt Rock, in lat. $1^{\circ} 32' S.$, long. $107^{\circ} 26' E.$, is described as dangerous, extending N. and S. half a mile, and apparently level with the water's edge, having a rock (or dead tree, many of which were floating about) on its northern end.

Catharine Reef was discovered in 1840, by the ship *Catharine*, which anchored at 1 p.m. in lat. $1^{\circ} 31' S.$, long. $107^{\circ} 1' E.$, in 18 fathoms water. They observed breakers in a N.N.E. $\frac{1}{2}$ E. direction, at half a mile distant, on a reef which seemed to extend about 3 miles E. by S. Though the vessel remained at anchor till 5 p.m., it does not appear that any further observations were made. Its position is marked doubtful on the charts.

Actæon Rock.—H.M.S. *Actæon*, when proceeding to the northward through Gaspar Strait, passed Gaspar Island at sunset, July 7th, 1857, and at midnight, running 8 knots, struck on an unknown coral reef, which, when examined the next day, was found to be between 2 and 3 cables' lengths in extent, steep-to, with patches of 7 ft. on it, and 17 fathoms all around. Its position is lat. $1^{\circ} 39' 48'' S.$, long. $106^{\circ} 37' 58'' E.$, or East about 8 miles from the Severn Shoal. The land was observed from the masthead, whereas from the Severn Shoal the hills on Banka are said to have the appearance of separate islands.

Severn Shoal, discovered in May, 1802, by the American ship *Severn*, lies exactly in the track of vessels from Toty Island towards Gaspar Strait. It is placed on the chart in lat. $1^{\circ} 39' S.$, long. $106^{\circ} 30' E.$, but from the following account its exact position is very doubtful.

At sunset, Gaspar Peak bore S.E. $\frac{3}{4}$ S., 14 miles distant. From this situation the *Severn* steered N.W. $\frac{1}{2}$ N. 35 miles, and at daybreak struck on a coral reef, but got off after being lightened of 30 tons of ballast. The reef seemed to extend 2 or 3 miles N.N.E. and S.S.W., but where the vessel grounded there were 10 ft. water. The hills on Banka had the appearance of separate Islands, above which the Marass Mountain was visible, and the nearest land was computed to be about 20 miles distant. The *Columbian*, of New York, was wrecked on this shoal in March, 1824, when returning from China. The crew reached the harbour of Mintok in the long-boat, after having suffered much from deprivation and fatigue.

Ivon Shoal, with $2\frac{3}{4}$ fathoms water over it, appears on the charts at 7 miles West of the Severn Shoal, in lat. $1^{\circ} 39' S.$, long. $106^{\circ} 21' E.$ Like the Severn and Actæon Shoals, it is much in the way of vessels passing between Gaspar Strait and Toty Island. A *doubtful danger* is marked at 3 miles W. by S. of it.

Scheweningen Shoal.—The ship *Scheweningen* struck on an unknown bank in lat. $1^{\circ} 19' 12'' S.$, long. $106^{\circ} 39' 48'' E.$, about 14 leagues E. by N. from Crassock Point, the North extremity of Banka Island. Immediately after the ship struck, a sounding of 4 fathoms was obtained, and a second sounding showed a depth of 15 fathoms.

Celestial Reefs.—The American ship *Celestial* saw a bed of rocks under water in lat. $1^{\circ} 16' S.$, long. $106^{\circ} 50' E.$; sounded in 3 fathoms, but there appeared to be less water on the rocks; the next cast of the lead was 17 fathoms.

Vega Shoal was discovered in September, 1826, by Capt. Jose Antonio de Vega, of the Spanish frigate *Vellos*, which struck on it, but by carrying out an anchor she was hove off. It was described as being not more than a ship's length in extent, with 18 to 21 ft. water over it, and 9, 11, 17, and 22 fathoms around it. Capt. de Vega placed it in lat. $1^{\circ} 10' S.$, long. $106^{\circ} 34' E.$, by chronometers regulated the day previously at Gaspar Island.

The barque *Marquis of Hastings*, Capt. Ingram, grounded upon this bank in May, 1830, who placed it in lat. $1^{\circ} 6' S.$, and $106^{\circ} 31\frac{1}{2}' E.$, by chronometers. Horsburg says that this ship struck on this shoal in April, 1832, and that Mr. Harris made it at the same time in $1^{\circ} 4' S.$ and $106^{\circ} 37' E.$

H.M.S. *Rifleman*, in December, 1863, was employed with her tender for three days in searching for the Vega Shoal, but without success. A small rocky patch, with 7 fathoms water over it, and 13, 15, and 17 fathoms all around, was discovered in lat. $1^{\circ} 5' 30'' S.$, long. $106^{\circ} 35\frac{3}{4}' E.$ Bad weather compelled the *Rifleman* to relinquish the search.

A southerly current, varying from 1 to $1\frac{3}{4}$ knots an hour, was experienced the whole time the *Rifleman* remained in this vicinity.

Hawkins, or *Wild Pigeon Shoal*, we have no account of, and its position is also very doubtful. On the chart three positions are given: the first in lat. $1^{\circ} 8' S.$, long. $106^{\circ} 43' E.$; the second in lat. $1^{\circ} 9'$, long. $106^{\circ} 41\frac{1}{2}'$, with two fathoms marked against it; and the third in lat. $1^{\circ} 11'$, and the same longitude as the second position.

Deva Reef.—The ship *Deva*, Captain J. Pollock, at $5^h 30^m$ p.m. 23rd May, 1859, struck on a coral reef in about lat. $1^{\circ} 9' S.$, long. $106^{\circ} 52' E.$ The reef appeared to be about 60 yards in extent, N.E. and S.W., about 30 yards broad, with $3\frac{1}{2}$ fathoms on it, and 15 and 17 fathoms close-to. At daylight the next morning two reefs were in sight from the masthead; the one the vessel grounded on, and the other, which was much the largest, considerably to the westward.

Caution.—Probably the Deva and the Celestial are the same reefs, but until examined, this neighbourhood must be navigated with great caution; and the whole group of the Vega, Hawkins, Celestial, and Deva Shoals, should be given a berth of 9 or 10 miles.

DIRECTIONS FROM GASPAR STRAIT TO THE NORTHWARD.—Most vessels bound to the northward from Gaspar Strait, prefer passing eastward of Gaspar Island, which is the safest route; but some vessels, especially when bound to Singapore by Rhio Strait, prefer the less safe but more direct route through the shoals westward of that island.

To proceed Eastward of Gaspar Island with a fair wind, as before directed in pages 239, 240, and 256, 257, steer about N. by E. $\frac{1}{2}$ E. if she passed through Macclesfield Channel, or about N. by W. or N.N.W. if she passed through either Stolze or Clements Channels, to pass 2 or 3 miles eastward of Gaspar Island, and 5 or 6 miles westward of Canning Rock. Having passed Gaspar, steer to the northward until it bears S. $\frac{3}{4}$ W., upon which bearing it should be kept as long as it can be seen. A N. $\frac{2}{3}$ E. course from Gaspar will lead midway between Catharine Reef and Pratt Rock, and if Gaspar be brought on the opposite bearing soon after it is passed, it will afford a good opportunity to judge of the effect of the current, by noting the course that must be steered to preserve the proper bearing of the island; and will also assist in forming a judgment as to the proper course to steer to pass midway between Catharine Reef and Pratt Rock, after Gaspar Island has sunk below the horizon, and will no longer serve as a guide.

If the wind should prevent a direct course from being steered, Gaspar Island should not be brought westward of N.N.W., until the vessel is northward of the Akbar Shoal; and, after Gaspar is passed, it must be kept westward of S. by W., in order to avoid the Pare Joie Rock, the Belvedere, and the Magdalen Shoals.

To proceed Westward of Gaspar Island between the Glassa Rock and Tree Island, from a position midway between them, steer to the northward until the peak of Gaspar Island bears S.E.; when a N.W. course will lead be-

tween the Warren Hastings Reef on the port hand, and the Pare Joie Rock and Belvedere Shoals on the starboard hand. When Brekat Point bears S. by W., or the Saddles S.W. by S., a vessel will be westward of the Warren Hastings and Belvedere Shoals, and a N. by W. or N.N.W. course, according to the set of the tide, will lead westward of the Magdalen and Newland Reefs, and eastward of the Actæon Rock. When nearing the Actæon Rock, the soundings should not be shoaled under 20 fathoms; after passing it, a course may be shaped for Toty Island.

Gaspar Island, when 3 or 4 miles distant, kept between S.E. and S.E. by E. $\frac{1}{4}$ E., will keep the vessel clear of the Pare Joie Rock, and of the Warren Hastings Reef.

Brekat Point bearing S. by W., or the Saddles S.W. by S., leads westward of the Warren Hastings and Belvedere Shoals, and Gaspar Island S.E., leads 3 miles eastward of the Dutch Shoal; but when westward of the Warren Hastings and Belvedere Shoals, it will be wise to edge away to the northward—always carefully guarding against tide and currents—taking care not to bring Gaspar Peak to the South of S. by E. $\frac{1}{2}$ E., to avoid the Magdalen Reef.

If proceeding between Brekat Point and Tree Island, the point may be passed at the distance of 3 or 2 miles, and the island at a mile; then proceed to the N.N.W., taking care not to bring Tree Island to the South of S.E. by S., to avoid the S.W. end of Warren Hastings Reef. Brekat Point bearing S. by W. $\frac{1}{4}$ W., leads clear to the N.W. extreme of that reef; and bearing S. $\frac{1}{2}$ E. leads eastward of the reported positions of the Columbian and Dutch Shoals. When Brekat Point bears S. $\frac{1}{2}$ W., a northerly course may be steered, proceeding as before to pass eastward of the Actæon Rock.

Horsburgh states that Capt. R. Scott, in the *Warren Hastings*, after passing Brekat Point, coasted along to the northward, keeping generally in 11 or 12 fathoms water, without any appearance of danger, but a good mast-head lookout was kept. The passage, however, near the Banka coast is so beset with dangers, whose exact positions are unknown, and there may be others of which we at present know nothing, that we would strongly advise vessels to give this exceedingly dangerous coast a wide berth, especially as nothing is to be gained by approaching it. At p. 262 directions are given to proceed along this coast to Tanjoing Riah.

Directions to approach Gaspar Strait from the Northward.—In consequence of the northern entrance of Gaspar Strait being so near the equator, the winds, even in the strength of the monsoon, are very uncertain, producing a corresponding uncertainty in the direction and force of the tides and currents. A vessel approaching the strait from the northward will, therefore, have to be principally guided by the winds and currents which she may herself fall in with, rather than by relying upon experiencing those which are here mentioned as most likely to be met with at certain seasons.

In the early part of the monsoon, that is, from the middle of November to the middle or end of December, northerly and north-westerly winds are said to prevail, but Horsburgh mentions an instance of vessels meeting with strong West and W.S.W. winds in December. As the monsoon gathers strength and becomes more regular, the wind draws to the eastward of North, and late in the monsoon, easterly and south-easterly winds are often met with between Banka and Billiton.

In thick weather it will always be an anxious time for the navigator whilst approaching Gaspar Strait, for unless good sights can be obtained, he can never be certain of his exact position; and we would again strongly advise him, under any circumstances, to steer for Banka Strait, where the soundings on the edge of the bank extending from the Sumatra coast will enable him to proceed with safety, although he may be quite unable to distinguish the land.

Vessels returning from Singapore or China early in the northern monsoon, and intending to go through Gaspar Strait, prefer the Macclesfield Channel, passing between Toty and Docan Islands; but it is better to go 12 or 14 miles to the eastward of the latter, and even more, when the wind is easterly; but early in the monsoon the wind is generally North or N.W.

Having passed Toty Island, steer about S.E. by E., so as to get on the meridian of Gaspar Island before reaching the parallel of $1^{\circ} 50' S.$ Gaspar is visible in clear weather at a distance of 30 miles. Directly it is seen, steer towards it on a S. $\frac{3}{4}$ W. bearing, and, passing eastward of it, steer to the south-westward for the entrance of the Macclesfield Channel.

The above directions apply only to vessels returning from China early in the monsoon. In general, and especially returning late in the monsoon from China, when the S.E. and easterly winds are often met with between Banka and Billiton, it will be better to go 10 or 12 miles to the westward of St. Barbe Island, and endeavour as soon as possible to get on the meridian of Gaspar Island, but not to the westward of it when near the parallel of the Catharine Reef, which should never be passed at night. When Gaspar is seen, bring it on a S. $\frac{3}{4}$ W. bearing, and proceed as before.

Returning from China late in the monsoon, S.S.W. winds are often met in the southern part of the China Sea, and oblige vessels to pass between the islands near the West coast of Borneo. If this should happen in May or June, it would be very tedious to get to the southward; in such case, steer for the north-western end of Billiton, and pass through Stolze Channel.

CHAPTER VII.

CARIMATA STRAIT.

CARIMATA STRAIT, the easternmost of the channels leading between Sumatra and Borneo, is bounded on the eastern side by Carimata, Soruetou, and the other islands adjacent to the southern part of the West coast of Borneo; and on the western side by the East coast of Billiton, with the adjoining islands and dangers. It is often used by vessels from Malacca Strait, proceeding to China by the eastern passages, but although much broader than either Banka or Gaspar Straits, it is not nearly so much frequented as either of those channels by vessels proceeding to and from China by way of Sunda Strait. It is, however, not unfrequently used by vessels returning from China, which, from the effects of winds or currents, find it difficult to get to the westward.

This strait has not been properly surveyed. Capts. Ross and Maughan, of the Indian Navy, determined the positions of many of the dangers on each side of it, but much of the information which we possess has been derived from accounts furnished by vessels that have passed through it. In using it, therefore, a vessel must keep a good lookout, and be as far as possible prepared to meet with unknown dangers.

Besides the Main Channel, limited to the south-eastward by the islands of Soruetou and Carimata, and to the south-westward by the Montaran Islands and Billiton, there are several other channels between the numerous islands lying eastward and north-eastward of Carimata, between it and the Borneo coast, through which vessels have occasionally passed. One of these, known as the Inner Channel, and situated between the islands of Panambungan and Mayang, is much frequented by vessels working through the strait against the monsoon, for a regular tide will be found near the Borneo coast, which enables them to work through the Inner Channel when it is quite impossible to work through the Main Channel against a strong monsoon, and a continuous rapid current setting to leeward.

Currents and Tides.—The currents in Carimata Strait appear to set mostly

to the southward in the northerly monsoon, for many ships have found it almost impracticable to beat to the northward in that season. Captain Ross, in the *Discovery*, found a constant southerly current in this strait; on February 15th he was off Pulo Mankap, and from hence continued beating along the West coast of Borneo, and afterwards on the South and West sides of Carimata and its adjacent islands until March 16th, when he got round the western end of Soruetou. In the southerly monsoon it does not appear to be so difficult to get to the southward, for there are regular tides along the West coast of Borneo, and also off the East coast of Billiton in this season, which seem to extend in some degree across Carimata Strait, the flood apparently setting 12 hours to the northward, and the ebb about 12 hours in the opposite direction. The rise of tide, as experienced by Captain Ross, was about 9 or 10 ft., at full and change of the moon.

A DESCRIPTION of that portion of the dangers southward of Billiton, which lie contiguous to Gaspar Strait, is given at page 250. The following islands and dangers lie nearer Carimata Strait, and are important to vessels approaching it from the southward.

KEBATOE, or SHOE ISLAND, in lat. $3^{\circ} 48' S.$, long. $108^{\circ} 4' E.$, is nearly half a mile long in an East and West direction, and 400 yards broad; it is conical in shape, thickly wooded, 346 ft. high, and visible 18 or 19 miles from a ship's deck in clear weather. The island is steep-to, with a coast or fringing reef extending 1 cable from the North and West sides; and half a cable from the South and East sides. *White Island*, 57 ft. high, having a few stunted trees on the top, lies S.W. 1 mile from Kebatoe Island. A *small shoal*, with 6 ft. water, lies N.E. $\frac{1}{2} E.$, 3 cables from White Island.

Zephyr Rock, supposed to lie W. $\frac{1}{4} S.$, 4 miles from Kebatoe Island, was searched for by the boats of H.M.S. *Nassau* in 1876, when a depth of 14 fathoms (mud bottom) was obtained in that position; but, at three-quarters of a mile W. by S. from Kebatoe, and 6 cables N.N.W. $\frac{1}{4} W.$ from White Island, a rock, on which the sea generally breaks, having 3 feet over it, was found, and this position has been assumed for that of the Zephyr Rock.

A *rock*, said to exist N.W. by W. $\frac{1}{2} W.$, 8 miles distant from Kebatoe Island, was carefully searched for by the boats of H.M.S. *Nassau*, but could not be found. The depth of 14 fathoms, mud bottom, was obtained. From the nature of the examination non-existence of the rock in the position assigned to it is assured.

Karang Kawat, or Grace Reefs, consist of two coral reefs, the centres of which lie N.E. by N. $4\frac{1}{3}$, and $6\frac{1}{2}$ miles respectively from Kebatoe Island.

The *southern reef*, on which the sea breaks heavily in moderate weather, is awash at low water; this reef is $3\frac{1}{2}$ cables long in an East and West direction, and 2 cables broad, with 12 to 17 fathoms at the distance of three-quarters of a cable. The *northern reef* is 3 cables long in an East and West

direction, 2 cables broad, dries 4 ft. at low water, and has 13 to 16 fathoms at the distance of half a cable.

Between Kebatoo Island and the southern Karang Kawat there is a clear channel $3\frac{3}{4}$ miles wide, with depths of 14 to 17 fathoms, mud bottom; and between the southern and northern Karang Kawats there is a channel $1\frac{3}{4}$ mile wide, having also 14 to 17 fathoms, mud; the holding ground in both these channels is good.

A ship ought never to attempt the passage inside Shoe Island, except in very clear and favourable weather.

Heroine Shoal is in lat. $3^{\circ} 37'$ S., long. about $107^{\circ} 52'$ E., or in lat. $3^{\circ} 37'$ S., long. $107^{\circ} 49'$ E.; its exact position is, however, doubtful, and it was not seen by the officers of H.M.S. *Nassau* in 1876. It is reported to be an extensive shoal with breakers upon it. It was passed at about the distance of $1\frac{1}{2}$ mile, when Two-peaked Mountain on Billiton bore N.N.W.; a small island N.E. by E. $\frac{1}{2}$ E.; and shoe Island, seen from the mizen-shrouds, S.E.

Katapang Island, in lat. $3^{\circ} 23'$ S., long. $107^{\circ} 57\frac{1}{2}'$ E., is low and wooded, about a third of a mile in diameter, and surrounded by a reef. Around it are soundings of 8 and 9 fathoms, and the same depths between it and the shore, where, however, no vessel should venture.

The whole of the coasts of Billiton are but very imperfectly known, but it is certain that they are fronted by many dangers, and vessels are strongly advised to avoid them.

SOUTH COAST of BILLITON.—From Karawang Point, the S.W. extreme of Billiton, the coast trends to the eastward for 2 or 3 miles, and then turns sharply to the north-eastward, forming a deep bay, the eastern horn of which is the most southern point of the island, and is distant 21 miles eastward from Karawang Point. This bay is named *Telok Batoh*, which in the Malay language signifies rocky bay, and it appears from the chart to be full of dangers, with others extending some 2 or 3 miles outside its chord. Southward and westward from the eastern horn of the bay are some small islets lying within the margin of the reef which projects from the point.

EAST COAST.—From the eastern point of Telok Batoh Bay the coast trends East-northerly for 6 or 7 miles, to the S.E. point of the island, 9 or 10 miles N.E. of which is a prominent point named *Sakapar*. Between these two latter points is a bay, in which are several islands; and fronting it are also several islands. N. by E. $\frac{1}{4}$ E. 17 miles from Sakapar Point is *Mangar Point*, having a hill upon it, the coast between forming a bay 2 or 3 miles deep. Northward of Mangar Point is another small bay.

The *East and N.E. sides* of Billiton are fronted by several groups of small islands, most of them being surrounded with or connected by rocks, sands, and shoals; the outernmost of these shoals has been recently reported in $25^{\circ} 9'$ S, $108^{\circ} 21'$ E., or $13\frac{1}{2}$ miles N.E. by E. from Sakapar Point.

These dangers are so imperfectly known, that it is not possible to give any accurate description of them here. They do not lie in the track of ordinary navigation, and if a vessel ventures near them she must do so with caution and judgment, and without placing too great confidence in the chart.

SCHARVOGEL ISLANDS are a group of seven islands, the easternmost of which by the chart is in lat. $3^{\circ} 18' S.$, long. $108^{\circ} 28' E.$ The islands are from 90 to 120 ft. high, and thickly wooded, having between them numerous reefs and sandbanks. The relative positions of these islands with each other is uncertain. Between the northern island and the Meray group is a channel 3 or 4 miles wide, with 5 to 9 fathoms water in it. It is bounded on either side by the reefs which extend northward from the islands.

Northern Coasts of Billiton.—From the N.E. point of Billiton the coast rounds gradually to the North, and then takes a general direction about N.W. by W. to the N.W. Hook or Point. The aspect of the coast is high, uneven land, visible in clear weather 24 or 25 miles off.

Outer Dangers off the North Coast of Billiton.—*Pigeon Island*, lying 3 or 4 miles off the coast, with the N.E. extreme of Billiton bearing S.E. by S., and the N.W. hill on Nangka Island E. by N. $\frac{1}{2}$ N., distant 21 miles, is very small, and surrounded by rocks or patches of reef, which also extend 3 miles to the south-eastward of it. About N.E. by E. $\frac{1}{2}$ E. 5 miles from the island, a small *sandbank* was seen by the *Bellhaven* in 1857, probably at high water. A small rock or patch, with 2 fathoms water over it, is placed on the chart, N.N.E., 7 miles from the Pigeon Island, and a second at the same distance E.N.E. of it. At 5 miles eastward of Pigeon Island is the West end of a sandbank, which thence extends for 5 miles to the E.S.E., with an average breadth of $2\frac{1}{2}$ miles. On one spot on its N.E. side, in lat. $2^{\circ} 37' S.$, long. $108^{\circ} 18' E.$, it is reported to dry.

There are other islets and dangers between Pigeon Island and the N.W. point of Billiton; their exact positions, however, are not well known.

Krang Island lies 13 miles West from Pigeon Island, and 3 miles off shore, N.N.W. 2 miles from it, is a sandbank. *Djoeroh Dajong Rocks* lie 2 miles West from the sandbank, and 2 miles N.N.E. from Maleh Island. The *Hydrograf Rock*, of 9 ft., 6 miles off shore, is marked in $2^{\circ} 28' S.$, $107^{\circ} 53' E.$, at $5\frac{1}{2}$ miles N.W. of it is a rock recently discovered in 1877, the outermost off this coast. At 3 miles West of the Hydrograf Rock is a 3-fathom patch, and W.S.W. $5\frac{1}{2}$ miles from the 3-fathom patch is the Seloeting Reef, of 2 fathoms, which lies N.E. $\frac{1}{2}$ E. 8 miles from Cape Bienga, the N.W. cape of Billiton.

ISLANDS AND DANGERS IN THE FAIRWAY.

Discovery West Bank (*Ayer Masein*), in lat. $3^{\circ} 38' S.$, long. $108^{\circ} 44' 30'' E.$, was examined by Captain Ross, I.N., in the surveying ship *Discovery*. It is of coral, about 6 cables in extent North and South, and 2 cables broad, having near its western edge a small sandbank, awash at high-water springs. There are depths of 16 to 20 fathoms around Discovery West bank at a distance of three-quarters of a cable.

Discovery Reef lies N.E. by E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Discovery West Bank, and is in lat. $3^{\circ} 35' 45'' S.$, long. $108^{\circ} 49' 25'' E.$; this reef is 2 cables in diameter, having several coral heads awash at high water, and 14 to 22 fathoms around it at the distance of 1 cable.

Discovery East Bank* (*Mampango*), in lat. $3^{\circ} 34' 40'' S.$, long. $109^{\circ} 12' 35'' E.$, is $4\frac{1}{2}$ cables long in a North and South direction, and $1\frac{1}{2}$ cable broad, having in its centre a decayed white coral ridge 2 cables long, a few yards broad, and 5 ft. above high water; there are 14 to 24 fathoms, sand, around this bank, at a distance of 1 cable. Discovery East Bank is visible from aloft on a clear day at a distance of 7 to 8 miles.

Lavender Bank (*Dyuruh*), in lat. $3^{\circ} 24' S.$, long. $109^{\circ} 1' 30'' E.$, was discovered by Captain Lavender, of the ship *Roman*, who passed it bearing East about a quarter of a mile distant, in soundings from 20 to 26 fathoms. It is 7 cables long in a N.N.W. and S.S.E. direction, and 2 cables broad. It is composed of coral, with several large boulders awash at high water. Around this bank there is a depth of 20 fathoms, sand and shells, at the distance of a cable. During a south-easterly breeze the sea on Lavender Bank has been observed from aloft to break at a distance of 6 miles.

Cirencester Sandbank (*Batuan*), in lat. $3^{\circ} 14\frac{1}{2}' S.$, long. $108^{\circ} 59' E.$, is about half a mile in extent N.N.W. and S.S.E., and 1 cable broad. It is chiefly composed of live coral heads, with 1 to 3 fathoms between them; at $1\frac{1}{2}$ cable within the northern extreme of this bank there is a flat circular patch of dead coral awash at low-water springs, 1 cable wide, having on its western edge a boulder awash at high water. The depth of water increases towards the bank, there being 25 fathoms close off the North end, 32 fathoms off the South end, and 35 fathoms about three-quarters of a mile to the westward; with a good lookout it may be seen from the mast-head about 3 miles at low water, but probably not above 3 or 4 at high tide. Two miles east-

* From the following remarks in possession of Captain Stephen Stocker, R.N., who was mate of H.M.S. *Hecate* in 1813, it would appear that this bank was discovered by that vessel:—"Steering to the southward out of Carimata Strait, we discovered a dry sandbank, 12 or 13 ft. above water, in about lat. $3^{\circ} 40' S.$, long. $109^{\circ} 4' E.$ Passed about three-quarters of a mile eastward of it, and had soundings of 21 to 25 fathoms."

ward of the bank the *Cirencester* had very irregular soundings, from 16 to 20 fathoms, changing at almost every cast of the lead.

Shoal.—Captain Irwin, of the *Arica*, in 1869, intending to lay-to for the night, southward of Scharvogel Islands, came suddenly close to a rock, from 50 to 60 ft. long, the shoalest part having about 6 ft. water, from that to 18 feet over the remainder. Position, South from the South Island and S. by W. $\frac{1}{2}$ W. from the eastern islet, in about lat. $3^{\circ} 31' S.$, long. $108^{\circ} 25' E.$

Bower Shoal, discovered by H.M.S. *Nassau* in 1876, is in lat. $3^{\circ} 28' 45'' S.$, long. $108^{\circ} 40' 30'' E.$ It is a coral patch, three-quarters of a cable in extent, having 9 ft. water on it, and 9 to 11 fathoms close around.

Osterly North and South Shoals were examined by H.M.S. *Discovery*, and afterwards, in 1874, by Lieut W. Pearce, in H.M.S. *Sylvia*. *Osterly South Shoal*, in lat. $3^{\circ} 19' S.$, long. $108^{\circ} 37' E.$, is 2 cables in extent North and South, with 6 to 12 ft. water on it, and 10 to 14 fathoms close around; near the centre of the shoal there is a white dead coral islet, about 40 ft. long, and 3 ft. above high water. *Osterly North Shoal*, situated about 19 cables N.E. from the islet on Osterly South Shoal, is about a quarter of a mile in extent, awash at low water, and has from 10 to 15 fathoms close around. By day this shoal may be distinguished from the greenish tint of the water; but at night it is exceedingly dangerous to vessels passing eastward of the Scharvogel Islands. In the vicinity of these shoals the ebb tide was observed to set to the southward, and the flood to the northward.

The *Discovery* anchored in 11 fathoms, soft ground, with North Shoal East 2 miles, when the boat had from 5 to 7 fathoms rocks on another shoal, bearing S. $\frac{1}{2}$ W. from the ship about a quarter of a mile. From the *Discovery* the extremes of the Scharvogel Group bore W. $15\frac{1}{2}^{\circ} S.$ to W. $15^{\circ} N.$, the nearest island distant about 8 miles, and a high distant hill N.W. When *Discovery* was anchored in the above position, breakers were seen from the mast-head bearing S.S.E. distant about 4 miles (?), on what is named Osterly South Shoal. Many eddies were also seen around.

Cirencester Rock, or *Shoal*, in lat. $2^{\circ} 54\frac{1}{2}' S.$, long. $108^{\circ} 56' E.$, was seen by the *Cirencester* on the same day that she discovered the sand-bank described above. The least depth found upon it was 2 fathoms at low water, and there is probably $3\frac{1}{2}$ fathoms on it at high tide; close around the soundings were 17, 16, and 15 fathoms. The shoal is narrow, and not more than 100 yards in length, North and South. It was not discovered by the boats sounding for it until the rocks were seen under the bottom.

Admiral Protet Reef, &c.—A reef, with about 6 or 7 ft. water, lies near the assigned but doubtful position ($2^{\circ} 58\frac{1}{4}' S.$, $108^{\circ} 34\frac{1}{4}' E.$, or $3^{\circ} S.$, $108^{\circ} 30' E.$) of a shoal named *Admiral Protet*; from it Slandak Island bears W. $\frac{3}{4} S.$, and Liendorg, one of the Scharvogel Islands, S.S.W.; the position given is in lat. $2^{\circ} 59' S.$, long. $108^{\circ} 38' E.$

MONTARAN ISLANDS, lying off the N.E. part of Billiton, consist of three straggling groups, which, with the many dangers that lie near them, are very imperfectly known, and appear to be most inaccurately laid down upon the chart. The navigator is therefore cautioned to be very vigilant when near these islands. Lieut. W. Pearce, R.N., examined East Island, Catherine Reef, and Small Island, in H.M.S. *Sylvia*, in 1874.

Nangka, or *Tokokemo*, the largest and highest of the Montaran Islands, has a high hill on each extreme; and, being low in the middle, appears like two islands till within 8 or 9 miles of it; but it cannot be mistaken when a vessel is 17 or 18 miles to the northward, as none of the low islands near it are seen at that distance. Close to the North point of this high saddle island of Nangka lies an islet covered with bushes, and they are united by a reef which extends about $1\frac{1}{2}$ mile to the northward; a reef projects also about half a mile from the South point of the island.

West Group.—About $2\frac{1}{2}$ miles S. by E. from Nangka are three low islands, named West Group, with apparently much broken water about them, and a dry sand-bank about 4 miles south-eastward of them; there is also a high white *sand-bank* about 4 miles south-eastward of them.

Between West Group and Middle Group the water is shoal, and a dangerous reef very little above water lies midway between them. A second doubtful danger, named High Bank, is marked at 3 miles south-eastward of Gampal, the southern island of the Western Group. *Napier Island* lies 4 miles W. $\frac{1}{2}$ N. from Gampal; it is wooded, and 185 ft. high. Some islets and rocks lie between $1\frac{1}{2}$ and $3\frac{1}{2}$ miles southward of it, and a sandbank a mile long between 1 and 2 miles S.E. of its eastern extremity.

The **Middle Group** consists of four or five islands, lying from 6 to 12 miles to the eastward of the West Group. The southernmost island is in lat. $2^{\circ} 36' S.$, and when approached by the *Fox* frigate, it appeared to be inhabited, and the water very shoal around. It appears to have been upon one of the reefs off these islands that the *Abercrombie* was lost, a fine ship of 1,200 tons burden, belonging to Bombay.

East Island, or *Pesemot*, at the eastern extremity of the group, was examined by Lieut. W. Pearce, in H.M.S. *Sylvia*, in 1874. It is in lat. $2^{\circ} 29' S.$, long. $108^{\circ} 51' 40'' E.$, and about half a mile in extent North and South. The island is of coral formation, thickly wooded, and surrounded by a sandy beach, the trees in the centre forming a sharply pointed summit, 130 ft. high, making the island conspicuous and easily recognised when seen from a distance. On the western side of the island rocks were seen above water about 1 cable from the shore; there is also a sand-bank about 1 mile N. by W. from this island. Skeletons of turtle were seen on East Island, so that it may be assumed they visit to deposit their eggs.

A *sand-bank* is marked at 1 mile N. by W. from East Island.

Luctor Shoal.—The Dutch barque *Luctor* and *Emergo* touched on a reef,

from which Nangka bore West, East Island E. $\frac{3}{4}$ N., and the westernmost island of the Middle Group S. by E., which places the rock in lat. $2^{\circ} 32' S.$, long. $108^{\circ} 44' E.$

Small Island, $1\frac{3}{4}$ mile S.S.W. $\frac{1}{2}$ W. from East Island, flat and covered with trees in the centre, appeared to be about the same length as East Island. The channel between these islands is said to be shallow.

Dangers Eastward of East Island.—A *sand-bank*, having a few patches above water, was seen from the *Sylvia's* boat, about 1 mile E. by S. from East Island; the bank appeared about three-quarters of a mile long, in an East and West direction, but it was not examined.

A *sand-bank*, according to an old report, lies S.E. by E. $\frac{3}{4}$ E. about 4 miles from East Island. About a hundred yards all round this bank the depths were from 10 to 18 fathoms, shoaling suddenly towards it. In the centre of the bank there is a coral rock (3 ft. above water.)?

Catherine, or Evans Reef.—On December 17th, 1840, a ship, commanded by Captain E. M. Smith, was wrecked on a coral reef, in lat. $2^{\circ} 30\frac{1}{2}' S.$, long. $108^{\circ} 59\frac{1}{2}' E.$ In no part was it within a fathom of the surface, and in calm weather no breaker nor any indication of the reef could be perceived, the current running to the N.E. 4 or 5 knots. Again, the ship *Catherine*, Capt. Evans, at 2^h 15^m p.m., struck on this ledge of rocks, with East Island bearing W. $\frac{1}{2}$ N., distant 8 miles, and Carimata Peak N. $4^{\circ} W.$ It is formed of sharp coral rocks, extends N.W. and S.E. a cable's length, and the least water found on it was 2 fathoms. Soundings were obtained in different directions; they were 4 to 9 fathoms about N.W. of the ship, and to the S.E. a little less than a cable distant. Though a strong current was setting to the southward, there was no appearance of broken or discoloured water. Capt. Evans places the reef in lat. $2^{\circ} 31\frac{1}{2}' S.$, long. $108^{\circ} 57' E.$

Catherine or Evans Reef was unsuccessfully searched for by the boats of H.M.S. *Sylvia*, in 1874, in the position given by the master of the *Catherine*, namely with East Island bearing W. $\frac{1}{2}$ N., distant 8 miles, and Carimata Peak N. $4^{\circ} W.$ During the examination, however, a shoal, having $4\frac{1}{2}$ fathoms on it and 8 to 17 fathoms close around, was found at $4\frac{1}{2}$ miles E. $\frac{1}{4}$ S. from East Island, or in lat. $2^{\circ} 31' 30'' S.$, long. $108^{\circ} 54' 30'' E.$ (From this position Carimata Peak bears N. $3\frac{1}{4}^{\circ} W.$) Although $4\frac{1}{2}$ fathoms was the least depth obtained by the *Sylvia*, it was considered probable that less water might be found. Also, that other shoal ground existed in the neighbourhood.

Corsyra Shoal.—The *Coreyra*, Capt. Walison, in August, 1858, discovered a shoal of 15 ft. water, about half a cable's length in circumference, with Round Hill on Billiton bearing S. $57^{\circ} W.$, and the northernmost small island of Nangka, just open of the large one, N. $61^{\circ} W.$; but those bearings will not lay down upon the chart. Reputed position, $2^{\circ} 31' S.$, $108^{\circ} 30' E.$

Maas en Waal Shoal, discovered by the steam ship of that name, has 18 ft.

water over it. From the shoal Pulo Sambilan is in line with the South peak of Pulo Nangka, bearing E. $\frac{1}{2}$ N., distant about 6 miles. The position of this shoal was reported as lat. $2^{\circ} 32' 30''$ S., long. $108^{\circ} 27'$ E. It is marked on the Admiralty chart 6 miles westward of this position.

Condor Reef.—The ship *Condor* struck on this shoal, but did not stop to examine it; the ship, however, made water immediately after she struck. It lies N. by E. $\frac{1}{2}$ E. $8\frac{1}{2}$ miles from Nangka Island, in lat. $2^{\circ} 22' 20''$ S., long. $108^{\circ} 37' 15''$ E. Some rocks lie 8 miles S.W. of Condor Reef.

Ontario Reef, the centre of which is in lat. $2^{\circ} 1\frac{3}{4}'$ S., long. $108^{\circ} 39'$ E., is very dangerous, as it lies in the direct tract formerly recommended to ships when passing between Soruetou and Billiton. It was discovered by Captain Whetten, in the American ship *Ontario*, which was lost on it January 4th, 1799. It is composed of sharp spiral rocks, with the tops of some of them dry at low water spring tides; but the small break against their sharp points cannot be distinguished from the topping of a common sea; and the shoal is steep-to, having 18 and 19 fathoms at a ship's length from the rocks. From the wreck of the *Ontario* the north-eastern end of the Quoin (on the western part of Soruetou) was just shut in with the western end of Soruetou; the East end of Soruetou bearing N.N.E. was open about a quarter of a point from the West end of Carimata. No other land in sight from the reef. The soundings are no guide in the approach to this dangerous shoal, there being 23 and 24 fathoms close to it on the North and East sides, 18 to 25 fathoms nearly close to the rocks on the West side, and 25 fathoms clay, at the distance of a cable's length. The shoal was examined by Capt. Ross, I.N., who found it half a mile in extent W.N.W. and E.S.E.; and one of the Montaran Islands was visible from the main-top, bearing S. $6\frac{1}{4}^{\circ}$ W.

Waller Rock.—There is said to be a coral rock, with 3 fathoms water over it, at 5 miles to the westward of the Ontario Reef.

Rival Reef we have no account of. It is marked on the chart with $5\frac{1}{2}$ fathoms over it, rocky bottom, in lat. $1^{\circ} 47'$ S., long. $108^{\circ} 15\frac{1}{2}'$ E.

Florence Adelaide Reef.—The British ship *Florence Adelaide*, bound from Cardiff to Singapore, in 1863, was reported to have been wrecked on a supposed coral reef, lying in about lat. 2° S., long. 108° E. The reef had 16 ft. water on it in the place where the vessel struck, but its extent and the least depth over it was not ascertained.

Hooghly Rocks.—The master of the French ship *Hooghly*, in 1872, sighted three rocks in lat. $1^{\circ} 35'$ S., long. $108^{\circ} 12'$ E. They bore East and West of each other, and from the westward appeared as a haycock, a sugar-loaf, and a small tree; the haycock, 16 ft., being the highest out of the water. The position was determined by observations of the Peak of Carimata.

SORUETOU ISLAND, about 6 miles long East and West, 2 miles wide, 1,400 ft. high, and visible 28 or 30 miles off, forms the north-eastern limit of the broad main channels of Carimata Strait. The western point of the island

is in lat. $1^{\circ} 42\frac{1}{2}'$ S., long. $108^{\circ} 39\frac{1}{2}'$ E., and on it is a hummock, which has been mistaken for a small island, and called the Quoin, from its appearance. About 2 or 3 miles off the West end of the island the depths are 20 to 26 fathoms.

Breakers are said to have been seen from the mast-head of the ship *Aurora*, bearing S. by W. $\frac{1}{2}$ W., distant about 3 miles, when the eastern extremity of Soruétou bore E. by N. $\frac{1}{4}$ N., the other extreme being obscured by clouds.

At a sandy beach on the South side of Soruétou, and near the East point, there is a good *watering place*, but high tide is required for a large boat to get over a reef. It is said, however, that fresh water can only be got at the West end of the island, at the foot of a hill of moderate height, where a ship may anchor in 10 fathoms.

CARIMATA ISLAND lies north-eastward of Soruétou, from which it is separated by a narrow channel. It is about 11 miles in extent East and West, 7 miles North and South, and near its centre is a peak rising to an elevation of 2,000 or 2,986 ft., which may be seen at the distance of about 45 miles. On the S.W. end of the island are some hot springs.

Reefs and dangers extend off the East and South coasts of Carimata; and at $6\frac{1}{2}$ miles S.S.E. from the South point of the island is a *gravel patch*, having 4 fathoms water over it. Two rocks above water, with others below the surface, appear to lie 3 or 4 miles off the middle part of the West coast; and off the N.W. point of the island are numerous islets and rocks, the outer of which, Tongado Island, is 3 miles westward of the point.

The channel between Soruétou and the reef which extends from the South coast of Carimata is about 2 miles wide, with depths of 10 to 17 fathoms; but no object is to be gained by using it.

Jamsetti Reef, with 19 ft. water over it, lies 7 miles N. by W. $\frac{3}{4}$ W. from the North point of Carimata Island, and N.E. $\frac{1}{2}$ N. $10\frac{1}{2}$ miles from Tongado Island.

Leema Isles are a group of small islets lying North about 18 miles from the northern side of Carimata; near them the soundings are 12 to 14 fathoms.

Wellesley Shoal is said to lie in lat. $1^{\circ} 18'$ S., long. $108^{\circ} 34\frac{1}{2}'$ E., but its position is doubtful. *Crescent Shoal*, also of doubtful existence, is said to lie in lat. $1^{\circ} 10'$ S., long. $108^{\circ} 38'$ E.

Erikson Shoal, of $4\frac{3}{4}$ fathoms, is placed on the chart in lat. $1^{\circ} 5'$ S., $108^{\circ} 29\frac{1}{2}'$ E.

China Reef.—The commander of the *China* reported, in 1871, that his ship struck on a reef, 4 miles North of the last named, on which there is 10 ft. of water. It is about a quarter of a mile long, and stretches out from N.W. to S.E. Its position is in lat. $1^{\circ} 1' 15''$ S., long. $108^{\circ} 30'$ E.

GREIG SHOAL was discovered by Capt. William Greig, of the ship *Lord Minto*, who found it to extend from lat. $0^{\circ} 52'$ to $0^{\circ} 58'$ S., long. $108^{\circ} 37'$ E.; the longitude, however, cannot be relied upon as being correct. Five fathoms

water were found within the extent given above, but on the extremes of the shoal the vessel was often in nearly the same depth of water as she was drawing, 13 feet, and this was in steering between much shoaler spots, with the body of Carimata then seen from the deck, bearing between S.S.E. $\frac{3}{4}$ E. and S.E. by S.; the least water found was 12 ft.; but, in a more recent examination, a spot with 8 ft. water only was found, in lat. $0^{\circ} 55' 30''$ S., long. $108^{\circ} 28'$ E.; from this spot Penambangan Island bears E.S.E., and the peak of Carimara Island S.S.E. $\frac{3}{4}$ E. The shoal is circular in shape, and about $1\frac{1}{4}$ cable in diameter.

Columbus Shoal.—On the 24th of November, 1869, the ship *Columbus*, G. Croot, master, in lat. $0^{\circ} 51'$ S., long. $108^{\circ} 16'$ E., struck soundings in 5 fathoms, hard sand or rock; the ship then tacked and stood to the N.W.; on standing back again, and when about 5 miles S.S.W. of the first position, soundings in 6 fathoms were again obtained; tacked and stood off to 17 fathoms, after which no shoaler water was found. The weather at the time was squally, and no land in sight.

WEST COAST OF BORNEO, ETC.

The southern part of the West coast of Borneo, from Sambar Point (its S.W. extreme) to abreast of the Masien Tiega Islets, is very imperfectly known. Two of its ports Sinkawang and Pontianak, are visited by the Netherlands Indian Steam Navigation Company's steamers, but the trade of the coast is mostly carried on by small vessels, owned and commanded by Chinamen or Malays connected either with the Dutch settlements in Borneo or Java, or with Singapore.

SAMBAR POINT is in about lat. $2^{\circ} 56' 30''$ S., long. $110^{\circ} 15'$ E., and *Mount Minto* in $2^{\circ} 14'$ S., $110^{\circ} 3'$ E., and between them the coast falls back and forms two bays. *Mount Minto* is upon the North point of the northern bay, and about 16 miles S.E. by E. $\frac{1}{2}$ E. from it is a high peak. The islands of Mankap, Laag, Kumpal, and some smaller ones, together with several dangers, lie off this part of the coast, and are described hereafter.

N. $\frac{1}{2}$ W., distant 22 miles from *Mount Minto Point*, is *Bree Point*, the coast between forming a bay 5 or 6 miles deep, in which are several small rivers. Close to the northward of *Bree Point* is the *Pawang River*, which has two entrances, separated by an island 3 or 4 miles in breadth.

From the entrance of the *Pawang* the coast trends with an irregular outline in a general North direction for about 45 miles, to the entrance of the large river *Simpang*. On this part of the coast are several small rivers, and about midway between the *Pawang* and *Simpang* are the islets *Sepadian*, *Tjampedak*, *Dato*, &c., with the islands of *Joanta* and *Batoang*, 7 or 8 miles

in the offing. About 7 miles southward of the entrance of the Simpang is the island of *Palintoan*, lying close to a point of the coast, inside of which on a small river is the town of *Pambarawang*. Two or three miles southward of *Pambarawang* is the town of *Succadana*.

Succadana, or *Sukadana*, "Parrot's Gift," is an unimportant place. It is a part of the Netherland province on the West coast of Borneo, and was once a Javanese state.

There is good anchorage in 3 or 4 fathoms in the roadstead off these towns, with a group of small islands to the southward.

The coast above described is low land, and it has seldom been approached under 12 or 10 fathoms, being fronted by islets or rocky ground in some parts.

From the entrance of the Simpang River, the coast trends for about 40 miles in a W.N.W. direction to a point about 4 miles north-eastward of the *Masien Tiega* Islands. On this part of the coast are several other islands, and separated from it by a very narrow channel is the large island of *Mayang*, which is principally low land, but near its south-western end is a high hill, *Mount Marang*; and near its north-western end a long range fronting the sea, named *Mount Mayak*.

The *West Coast of Borneo*, from a point 10 miles northward of the *Masien Tiega* Islets, takes a general direction about N.N.W. for a distance of 50 miles, when it trends towards the *Pontianak* River. Two or three small islands are shown on the chart as lying close to this part of the coast, and the entrance of the *Sanjavay*, one of the branches of the *Pontianak*, is about 15 miles to the southward of the main entrance of the latter river. The following remarkable phenomenon was experienced by Captain Pearson, of the brig *Lady of the Lake*, in the months of May and June, while sailing along this coast on two different voyages:—

"June 2nd, 1833, at daylight, when sailing along the coast in 10 fathoms water, experienced a singular incident; fresh water on one side the vessel, and salt water on the other, which continued for an hour whilst sailing about 2 miles on the boundary line of salt and fresh water. We filled all our empty casks with good drinkable water on one side of the vessel, when it was quite salt on the opposite side; our distance then $2\frac{1}{2}$ or 3 miles off shore, lat. $0^{\circ} 8' S.$, with the appearance of the mouth of a great river abreast, which must be navigable for large vessels, as the water deepened in crossing its direction." This was probably the *Sanjavay* River, one of the branches of the *Pontianak*, several of which reach the sea between the equator and lat. $0^{\circ} 20' S.$

PONTIANAK RIVER entrance is in lat. $0^{\circ} 2' N.$, long. $109^{\circ} 10' E.$, and distant 35 miles E. $\frac{2}{3}$ S. from *Pulo Datoe*. The anchorage in the road is in $3\frac{1}{2}$ to $5\frac{1}{2}$ fathoms, with the river's mouth bearing E. by S. $\frac{1}{2}$ S., or E.S.E., *Pulo Datoe* W. $\frac{1}{4}$ N. or W. $\frac{1}{2}$ N., and the extremes of Borneo from S. $\frac{1}{4}$ E.

to N.N.W. $\frac{1}{2}$ W., off shore about 4 or 5 miles. A shoal mud-bank projects some distance from the mouth of the river, and although the bar is nearly dry at low water, there are 8 or 10 ft. on it at high spring tides. The town is about 12 miles from the entrance, and has a fort; and at Balu Lagong, about 7 miles up, there is a fort on each side. These two places are sometimes visited by Bengal traders.

Buoys.—Outside the poles which mark the channel of the Pontianak River, two Herbert's buoys are placed. A *white* buoy in 3 fathoms water, with Pulo Batoe bearing W. 4° N., and Pulo Temadyo showing over the low foreland, N. 29° W. The second buoy is *black*, moored in $2\frac{3}{4}$ fathoms water N. 12° E. from the preceding buoy, and with Pulo Datoe bearing W. 2° N., and Pulo Temadyo N. 30° W. These buoys are moored about W.N.W. $2\frac{1}{2}$ miles from the mouth of the river.

Pontianak, a Malay town and state, is the chief place of the Netherlands Administration of their western province of Borneo. There is a considerable trade with Batavia and Singapore. The river is said to be navigable by the light draught steamer stationed upon it, for a distance of 200 miles.

Some bullocks and hogs may be procured at Pontianak, and also at Mampawa; but boats must go far up the Pontianak to procure fresh water during the dry season, which makes watering at this river very inconvenient.

TANJONG MAMPAWA is in lat. $0^{\circ} 19\frac{1}{2}'$ N., long. $108^{\circ} 54'$ E., and bears N.W. 23 miles from the entrance of the Pontianak, the coast between forming a bay. About 4 miles eastward of the point is Mampawa River, which is only navigable for proas; there is a fort at the town of *Mampawa*, a few miles inside the entrance. The anchorage in the road is in 5 to 8 fathoms, about 3 or 4 miles off shore, with the mouth of the river N. by E. $\frac{1}{2}$ E.; or to the westward of the point at discretion, bearing in mind that the soundings decrease rather suddenly under a depth of 10 fathoms.

H.M.S. *Rifleman*, in 1862, anchored off Mampawa Point, but could not find the landing-place mentioned in Horsburgh as being there. Her boats went up to the town of Mampawa, and succeeded in obtaining a few fowls and eggs.

The Tides in Mampawa Road run about 2 miles per hour, nearly E.S.E. and W.N.W.

The coast from Mampawa Point takes a general direction nearly N. by W. for 28 miles, to Tanjong Batoe Blad. At 9 miles from Mampawa Point is *Tanjong Samoedin*, and between these points is a bay, about 2 miles deep, with a small round islet in the depth of it. The western part of this islet was used as an observation spot by the officers of H.M. surveying-vessel *Rifleman*, and its position was ascertained to be in lat. $0^{\circ} 24'$ N., long. $108^{\circ} 56'$ E. At 13 miles northward from Samoedin Point is *Tanjong Sangoa*, having a small islet close to it, and Samassu Island and Kran Islet lying about half a mile off it. On either side of Sangoa Point, the coast line

curves gently back, forming bays, towards which the soundings decrease gradually.

Mountains.—The coast between the Pontianak River and Batoe Blad Point is marked by many remarkable mountains, some rising boldly up near the sea, and others several miles back from it. A long continuous range runs eastward from Tanjong Sedow Malang (5 miles north-eastward of Tanjong Batoe Blad) for a distance of 12 or 13 miles.

Pulo Sitenga, its centre in lat. $0^{\circ} 22' N.$, long. $108^{\circ} 44' 40'' E.$, is small, three-quarters of a mile long N.N.E. and S.S.W., nearly half a mile broad, and moderately elevated. Close around it are 6 to 8 fathoms water, and from 11 to 16 fathoms, clay bottom, at a short distance from it.

Pulo Damar, lying N.E. $\frac{2}{3}$ E., $2\frac{3}{4}$ miles from Sitenga, is a small, round islet, moderately elevated, and covered with large trees. Close around it are $5\frac{1}{2}$ to 8 fathoms, increasing to 10 and 14 fathoms at a short distance to the westward.

PULO TEMADJOE, lying about $2\frac{1}{2}$ miles westward of Tanjong Samoedin, is about $2\frac{1}{2}$ miles long, North and South, and $1\frac{1}{2}$ mile broad. It is considerably elevated, of an irregular shape, forming a point at its South end, and having its greatest breadth on its N.W. side, where are two small bays, with white sandy beaches; there is also a rather deep bay on its West side.

The soundings decrease gradually towards Temadjoe, from 14 and 12 fathoms to 7 and 6, and close to it are 4 and 3 fathoms, except on its East side, where a reef appears to project about a quarter of a mile. The channel between the island and the main is quite clear, with depths of 7 or 8 fathoms, decreasing regularly towards the main, and there is good anchorage anywhere under the lee of the island.

Pulo Baroe, in lat. $0^{\circ} 35\frac{1}{4}' N.$, long. $108^{\circ} 45\frac{1}{3}' E.$, is only about a third of a mile in extent. The soundings are very irregular, 18 to 5 fathoms, close to it, and close to its North end is a patch of $1\frac{1}{2}$ fathom.

A *shoal patch*, of only $2\frac{3}{4}$ fathoms water, and 12 to 16 fathoms around it, lies half a mile N.N.W. from Pulo Baroe.

Pulo Samassu, three-quarters of a mile long N. by W. and S. by E., and a quarter of a mile broad, lies off Tanjong Sangoa, half a mile distant from the coast, but some distance inside the 3-fathoms edge of the bank extend from the shore. The soundings decrease rather suddenly towards this island, which should not be neared under a depth of 8 or 6 fathoms.

About N.W. $\frac{1}{2}$ N., distant one-third of a mile from the North point of Samassu, is a small islet named Pulo Kran.

Four-fathoms Patches.—A shoal patch, having this depth over it, and 8 to 11 fathoms around it, lies with the South point of Samassu bearing East, distant $3\frac{1}{2}$ miles; and the West part of Pulo Kaboen, shut in behind the N.E. part of Pulo Penata Ketchil, bearing N. by W., westerly. There is another 4-fathoms patch at half a mile southward of Penata Ketchil.

BOERONG ISLANDS are a group of five islands lying to the westward of Tanjong Batoe Blad and the coast adjacent to it.

Pulo Landean, the southernmost of the group, is a mere islet, barely a quarter of a mile in diameter, lying about three-quarters of a mile S. by E. from the South point of Lamokatan. Near to it are depths of 4 fathoms, and 10 to 12 fathoms at a short distance westward of it.

Pulo Lamokatan, the largest island of the group, is $4\frac{1}{2}$ miles long N.N.W. and S.S.E., but its greatest breadth is only a little over a mile. It is high, with several peaked hills upon it, the heights of which, however, are not known. The water is deep, 15 or 16 fathoms, close to its West side, and there appears to be a deep water channel between it and Pulo Landean. Shoal water extends about a quarter of a mile from the North part of the island.

There is anchorage in 5 or 6 fathoms abreast of two small bays on the East side of Lamokatan, but it will be necessary to approach the shore with caution, the soundings decreasing rather suddenly from 17 or 16 fathoms.

Pulo Penata Besar, 2 miles long N. by W. and S. by E., and two-thirds of a mile broad, lies about $1\frac{3}{4}$ mile eastward of Lamokatan, the South extremes of both islands being in the same latitude. Close to the East and West sides of Penata Besar are from 4 to 8 fathoms water, except off its North point, where there are but $1\frac{3}{4}$ fathoms. In the channel between these islands the water is deep, 22 to 33 fathoms, but decreasing to 15 and 14 fathoms northward of the parallel of the North point of Penata Besar.

Pulo Penata Ketchil, about half a mile in extent, lies a mile eastward of the middle part of Penata Besar. A point projects in a south-easterly direction from the island, upon each side of which is a small bay. Close to the island are 8 to 13 fathoms, but, as before stated, there is a patch of 4 fathoms at half a mile to the southward, having 6 and 7 fathoms near it.

A *Shoal* or bank, over which the least water appears to be $3\frac{1}{4}$ fathoms, lies (its southern extreme of 4 fathoms) about one-third of a mile N.N.W. from the North point of Penata Ketchil, and from thence extends about N. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile. Close to the West side of this bank are 7 to 16 fathoms, but on the East side, soundings of 5 fathoms extend nearly a mile from it, when the depths suddenly increase to 12 and 19 fathoms.

It would seem necessary to exercise caution when crossing over or passing near to this bank, for the chart does not exhibit sufficient soundings to make it certain that the least water upon the bank has been obtained.

Pulo Kaboen, the N.E. island of the Boerong Group, lies E.N.E. about 4 miles from the North end of Lamokatan, and W. by N. $\frac{1}{2}$ N. nearly 3 miles from Tanjong Batoe Blad. It is a high island, about $1\frac{1}{2}$ mile long, N.E. by N. and S.W. by S., and a mile broad. Close to its South end are $3\frac{1}{4}$ fathoms, and there are depths of 4 fathoms about three-quarters of a mile from it. A

patch of 4 fathoms lies about half a mile off its N.W. point, elsewhere the soundings close to the island are 6 to 8 fathoms.

TANJONG BATOE BLAD, the westernmost extreme of Borneo, is in lat. $0^{\circ} 47' 35''$ N., long. $108^{\circ} 50' 10''$ E. It is a prominent point from the land approaching it from the southward in a N.N.W. direction, and then falling from it in a north-easterly direction, and also from a range of hills behind it, running 12 or 13 miles to the eastward. The point itself appears, from the Dutch chart, to be low, with three hills immediately behind it; some rocks lie off it, and the 3-fathoms line which marks their edge is nearly half a mile from the point.

A *shoal*, of small extent, but over which there are but $2\frac{3}{4}$ fathoms water, lies N.W. $\frac{1}{2}$ N. $1\frac{1}{2}$ mile from Batoe Blad Point, and West-southerly from the North point of Kaboen Island. Around the shoal there appears to be 11 fathoms water, and 8 or 9 fathoms between it and the shore bank; between the shoal and Kaboen are 12 and 15 fathoms.

Directions.—Vessels will frequently find it convenient to keep pretty close to the coast of Borneo, just described, especially when working to windward against the N.E. monsoon, for favourable tides will be found near the shore when a strong current is running to the southward some distance from it. Between the Massa Tiega Islets and Mampawa Point, a vessel may stand towards the coast, guided by the lead, into 7 or even 6 fathoms; farther out, in a line between the Greig Shoal and Datoe Island, the depths are 18 or 20 fathoms. Small vessels may pass in safety between Temadjoe Island and the main, the channel being a mile wide, with depths in it of 7 and 8 fathoms. Large vessels, however, had better pass outside that island. Between Temadjoe and Samassu, vessels of any size may stand towards the coast into 7 or 6 fathoms, and pass on either side of Baroe Island and the shoal near it as convenient. The Boerong Islands may be boldly approached from the westward, and large vessels had better pass outside them; but small vessels may often with great advantage pass inside those islands, taking care to avoid the $3\frac{1}{2}$ -fathom shoal to the northward of Penata Ketchil, and the $2\frac{3}{4}$ -fathom patch about $1\frac{1}{2}$ mile N.W. of Batoe Blad Point.

The *Coast* from Tanjong Batoe Blad takes a north-easterly direction for about 5 miles to Tanjong Sedow Malang, where it falls back East for 2 or 3 miles, and then curving round and forming a long bay, runs in a N.N.W. direction towards Tanjong Biela, the southern point of entrance to the Sambas River.

Several rivers disembogue upon this part of the coast, the most important of which are the *Singkawan*, about 5 miles from Sedow Malang Point, and the *Slakouw*, about two-thirds of the distance between Sedow Malang and Biela Point. The town of Singkawan, situated some miles up the Singkawan, is the principal military station of the Dutch upon this coast, and

there are usually about 500 soldiers, Europeans and natives, quartered there.

SHOAL PATCH.—The soundings along this part of the coast appear to decrease regularly towards the shore, except at one spot which lies S.S.W. $\frac{3}{4}$ W. from Biela Point, and nearly West, distant 5 miles from the entrance of the Slakouw River; upon this spot, which is just inside the edge of the 5-fathom line, there are only $2\frac{1}{2}$ fathoms water.

SAMBANG or **SAMBAS RIVER** has a wide entrance, in lat. $1^{\circ} 11' N.$, long. $108^{\circ} 58' E.$, with some small islets close to the North point, and two hills on the other. The town is about 30 miles up the river on the South branch, which has many windings near the town. The principal branch is wide, running directly eastward, having many lateral branches. The sea flowing into the river makes the water brackish 13 or 14 miles up, so that ships in want of water are obliged to get it from a great distance. The anchorage in the road is with the mouth of the river bearing East or E. $\frac{1}{2}$ N., in any convenient depth, from 15 to 5 fathoms, the decrease being regular over a soft bottom to 4 fathoms about $1\frac{1}{2}$ or 2 miles off shore; the soundings are regular along this part of the coast.

Sambas is one of the places on the Borneo coast formerly visited by ships employed in the eastern trade from Bengal; it was fortified by a piratical Rajah, who was driven to the interior by a British force sent from Batavia in 1812. Since the late treaty with the Netherlands Government, the Dutch have claimed as their right most of the trading ports along this coast, where they have placed commercial residents and some troops.

The *Coast* from the Sambas River trends in a gradual curve to Tanjong Pajang, or Somoet, which bears from Tanjong Biela N.N.E., northerly, 25 miles. The soundings off it decrease gradually towards the shore from 17 or 16 to 8 and 4 fathoms; but shoal water extends more than $1\frac{1}{2}$ mile from Tanjong Pajang.

From Tanjong Pajang the coast falls back 2 or 3 miles to the eastward, and then runs north-eastward 13 or 14 miles to the entrance of the Palo River, from the North point of which it forms a small bay, curving to the northward to Tanjong Api. The coast between Pajang and Api Points has been but very imperfectly surveyed, and must be approached with great caution, for shoal banks appear to extend 6 or 7 miles from it.

TANJONG API, the north-western extreme of Borneo, is described hereafter.

Hector Bank.—Dangerous patches extend many miles to the southward of Sambar Point, the South extreme of the coast just described, the most southern of which is the Hector Bank, which is a $3\frac{1}{2}$ -fathom patch of doubtful position, but placed on the chart in lat. $3^{\circ} 46' S.$, long. $110^{\circ} 8' E.$ Around it are from 6 to 10 fathoms.

Fox Shoal is shown on the chart as two rocks awash N.W. by W. $\frac{1}{2}$ W. and S.E. by E. $\frac{1}{2}$ E. of each other, about $1\frac{1}{2}$ mile apart, with a large patch with only 2 fathoms water over it, to the north-eastward of them, and 9 to 19 fathoms close-to on their West and South sides. The westernmost rock is in lat. $3^{\circ} 32' S.$, long. $110^{\circ} 7\frac{3}{4}' E.$

Aruba Shoal, taken from the Dutch chart, is said to lie 3 or 4 miles N.E. by E. from the Fox Shoal, and to have 3 fathoms water over it.

Clemencia Reef, in lat. $3^{\circ} 24' S.$, long. $110^{\circ} 7\frac{3}{4}' E.$, is nearly dry; around it are 7 to 17 fathoms.

From the Clemencia Reef, shoals appear to extend all the way to Mankap Island, and vessels should be very cautious not to get too near them. Between Fox Shoal and Hector Bank there is a good channel by keeping between lat. $3^{\circ} 36'$ and $3^{\circ} 42' S.$; but when the vessel's position is not correctly known, it is advisable to pass to the southward of the Hector Bank.

Although the bottom near and among these shoals is generally a mixture of red and green clay, with mud, yet the soundings are very irregular, with overfalls, making it prudent not to come under 15 or 16 fathoms towards them.

Den Briel Shoal, reported by the steam-vessel *Den Briel* to have been seen above water, and placed on the charts in lat. $3^{\circ} 23' S.$, long. $109^{\circ} 27' 30'' E.$, was thoroughly and unsuccessfully searched for by H.M.S. *Nassau* in 1876,—depths of 18 to 22 fathoms, mud, having been obtained.

A *doubtful Rock (Euphrosine)* is marked on the chart in lat. $3^{\circ} 25\frac{1}{2}' S.$, long. $109^{\circ} 41' E.$, or S.S.W. 16 miles from Oliviera Reef. It was reported in 1869 by the Master of the English barque *Euphrosine*, who says it is a mile in diameter.

Oliviera Reef, from a Dutch chart of 1842, lies W. by S., $24\frac{1}{2}$ miles from Mankap Island, or in lat. $3^{\circ} 10' S.$, long. $109^{\circ} 47\frac{1}{2}' E.$ H.M.S. *Nassau*, in 1876, passed $1\frac{1}{2}$ mile East, and $1\frac{1}{2}$ mile North of the position assigned, without observing any indication of shoal water; depths of 16 to 19 fathoms, sand, were obtained.

PULO MANKAP or **MANCO**, in lat. $3^{\circ} 5' S.$, long. $110^{\circ} 13' E.$, and distant about 8 miles S.W. of Sambar Point, is a small low island, which may be seen 15 miles from the deck of a large ship. Near to it, to the N.N.E., are three other small isles, which appeared to Capt. Ross, when examining the surrounding shoal, as three bush islets or rocks. It was noticed in the last page that there is shoal water to the southward of Mankap Island, as far as the Clemencia Reef; shoal water also extends far to the westward of it, and vessels must be cautious in approaching the island from both those directions. Captain Ross, in the *Discovery*, with the island bearing East, distant 10 miles, got suddenly into 4 and $3\frac{3}{4}$ fathoms, hard sand, on the shoal bank that encircles the island; when it bore N.E. about 7 miles, the sound-

ings were $3\frac{3}{4}$ fathoms, fine sand; and when bearing N.N.E. $\frac{1}{4}$ E. 10 or 12 miles, seen from the deck, the vessel struck on the ground.

Horsburgh says, Mankap Island ought not to be brought to the northward of N.E. by N. while in sight from the mast-head, for if it bear N.N.E. $\frac{1}{4}$ E., about 18 miles distant, a vessel will suddenly get into shoal water on some of the spits that stretch far to the southward, having from 10 to 17 fathoms, soft bottom, near them.

Gelam or Laag Island (Low Island), is the largest of a group of islands lying north-west 9 or 10 miles from Sambar Point. The whole are encompassed with reefs, and the shoal bank, which extends 10 or 11 miles westward of Mankap Island, also extends 5 or 6 miles westward of the Laag group.

KUMPAL or RENDEZVOUS ISLAND.—The West point of this island, by Capt. Ross, is in lat. $2^{\circ} 44\frac{1}{2}'$ S., long. $110^{\circ} 2\frac{1}{2}'$ E., but Sir Edward Belcher, who visited it in H.M.S. *Sulphur*, October, 1840, places a ledge of rocks on the West point in long. $110^{\circ} 7' 39''$ E., or $6^{\circ} 16' 21''$ East of Singapore, and $9^{\circ} 16' 24''$ West of Macassar.

The *Sulphur* took up a safe berth within 1 mile of the West point of the island; and her tender, the *Starling*, occupied a position within one-eighth of a mile from the shore, but had rocky bottom. A plan was made of the anchorage, and the results of the examination proved it to be much safer and more convenient than the chart or sailing directions led to expect, admirably adapted to replenish fuel or correct chronometers, and with this object in view some pains were taken to connect it with the meridian of Singapore. The rocky portion of the island is composed of a mixture of contorted slaty and sandstone schist, traversed by veins of quartz, exhibiting slaggy indications at the point of contact, apparently ferruginous, but on examination did not affect a very delicate needle. Wood is abundant, but the search for water was unsuccessful.

This island was, in former times, the rendezvous for the China convoys in case of separation. The following is from Horsburgh:—The island extends about 12 miles to the north-eastward, and a chain of small islands and reefs nearly joins it to the main; this chain stretches also southward along the coast to Pulo Mankap, and is fronted with shoal water. About 6 miles S. by W. from the West point of the island is a bank with 3 or $3\frac{1}{2}$ fathoms, which makes it proper in leaving the anchorage at the N.W. part of the island to haul off to the south-westward, to give a berth to this bank. In July land and sea breezes prevailed, the former at East and E.S.E., veering to S.S.E. in a breeze. The island shows in hummocks, but cannot be seen above 16 or 17 miles, and the West point forms in a bluff, when viewed from the S.W. or southward.

The *William Pitt*, in July, anchored in $4\frac{3}{4}$ fathoms, about 4 miles off

shore, with the West point of Pulo Kumpal S. $\frac{1}{2}$ W., its North point E. by N. $\frac{1}{2}$ N., a small isle off the latter part E. by N. $\frac{3}{4}$ N., another isle E.N.E., a third small isle with trees on it North, just visible from the poop, and the North extreme of Borneo N.N.E. The first two isles are united by a coral reef, which extends 2 miles N.N.W. from the second island, having near its extremity a large rock 20 feet above water; from this rock, in a N.E. direction, there is another island about 4 miles long, surrounded by coral reefs.

Although coral reefs, with sharp-pointed rocks visible at low water, project from 1 to 3 miles from most parts of Pulo Kumpal, yet the western side appeared tolerably clear, with a sandy beach. From the West point of the island the land forms an elbow, by which there is shelter from all winds from the eastward, with smooth water.

Water.—Sir Edward Belcher did not find any water on the island, but Horsburgh states that the crew of the *William Pitt* dug wells above high water mark on the sandy beach on the West side of the island, from which very good water was obtained.

The tides were found to be more regular here than at any other part of the West coast of Borneo; the rise and fall was 8 or 9 ft.

Rocks awash.—In a Dutch chart by J. G. Tindal, 1842, some rocks awash are placed in lat. $2^{\circ} 20\frac{1}{2}'$ S., about S.W. by W., 12 miles from Mount Minto.

Gilbert Rocks and Elliot Sand.—In lat. $2^{\circ} 14'$ to $2^{\circ} 16'$ S., and 4 or 5 miles off Mount Minto Point, lie the Gilbert Rocks, or Toekan Mengkoedoe, with Mount Minto bearing about E. $\frac{3}{4}$ N., and High Peak about E. by S. $\frac{1}{2}$ S.

A mile or two S.E. of Gilbert Rocks is a dry bank, named *Elliot Sand*.

BIRDS NEST ISLANDS (Vogelnest Islands), are a group of small islands 3 or 4 miles in extent, and surrounded by a reef. The northernmost island, named Boorong, is in lat. $1^{\circ} 43'$ S., long. $109^{\circ} 15\frac{1}{2}'$ E.

Amur Shoal, of 9 ft., discovered in 1875, is about half a mile in diameter, and lies 3 miles W.N.W. from Boorong Island.

Black Rock (*Zwarte Rots*) is 4 or 5 miles to the S.W. of the Birds Nest group. There is a rock under water about half a mile eastward of it, a rock awash nearly a mile to the southward, and another awash the same distance to the south-westward.

South Island (*Krawang*), about a mile in extent, lies about $4\frac{1}{2}$ miles N.E. from the Birds Nest Islands. A smaller island lies close to its N.W. side, and a rock off its S.E. side. *Ginting*, *Mintano*, *Grisse*, and *Bisi*, are four small islands, the most eastern of which, *Ginting*, is in lat. $1^{\circ} 41'$ S., long. $109^{\circ} 4\frac{1}{2}'$ E.

Bisi is about $3\frac{1}{2}$ miles from Carimata, to which it appears to be almost connected by a projecting reef. *Bold* and *Tongue Islands* form a group of

four small islands. Bold, the most southern and western island of the group, bears North 3 miles from Ginting. The eastern Tongue Island is very small. The North Tongue Island has a reef projecting from it nearly 2 miles in a N.N.W. direction. The middle Tongue is about twice the size of the other two islands. A reef, about a mile in extent, lies 2 miles north-westward of Bold Island.

Pyramid, or *Boan Island*, is about $1\frac{1}{2}$ mile in extent, and its centre is in about lat. $1^{\circ} 29\frac{1}{2}'$ S., long. $108^{\circ} 59'$ E. *Nibong* and *Helinet* are much smaller islands, lying about a mile northward of Pyramid.

The **OSTERLY CHANNEL**, through which the ship of that name passed, lies westward of the Birds Nest Islands, Black Rock, Bold Island, and the reef north-westward of it, Pyramid, Nibong, and Helinet Islands; and eastward of Ginting, the islands and reefs N.E. of Bisi, and the East coast of Carimata. The narrowest part is between Bold Island and the reefs extending eastward of Bisi, where it is but $1\frac{1}{2}$ mile broad, with depths of 5 or 6 fathoms; westward of Black Rock the depths are 10 to 12 fathoms; and from 10 to 13 fathoms between Carimata and Pyramid Island. The *Oosterly* found this route very intricate, and several times had rocky bottom and very shoal water.

PAPAN ISLANDS form two small groups, between which is the Papan Channel, about a mile wide, with 9 to 12 fathoms water. Maleidong, in lat. $1^{\circ} 31'$ S., long. $109^{\circ} 22'$ E., is the largest of the islands, and with two islets near its North side form the eastern group. The western group is said to consist of (three or) four islands, nearly of the same size, the southernmost bearing about South from the one next it; the remaining three are in line when bearing about N.E. by E. and S.W. by W.

Spirit of the North Shoal.—The ship *Spirit of the North*, Charles Wise, commander, September 21st, 1861, was reported to have struck on a shoal lying 2 to $2\frac{1}{2}$ miles N.W. of the middle island of the western Papan group; the shoalest water obtained was 12 ft. There was no ripple on it, but small round white patches were indistinctly seen under the vessel's bottom.

Passage Islands (*Goerong*) are two small islands lying close together, 10 miles N.W. by W. $\frac{1}{2}$ W. from the western group of the Papan Islands.

A rock is marked on the chart in lat. $1^{\circ} 30'$ S., long. $109^{\circ} 5\frac{1}{2}'$ E., 4 miles S.W. of the Western Goerong Island, but its position is doubtful.

Tallack Shoal.—On the 2nd of March, 1871, the British barque *Mary Tatham*, struck on a shoal in lat. $1^{\circ} 21'$ S., and long. $109^{\circ} 6'$ E. On examination of the danger 20 ft. was the least water found, with 20 fathoms close to on all sides. The following bearings were observed from the shoal:—Soeka, the southern of the Melapies group of islands, N.W. $\frac{3}{4}$ N., distant about 2 miles; Pyramid Island, S.W. $\frac{3}{4}$ S.; and Zattak Point, half open of the North side of Meledan or Button Island.

MELAPIES ISLANDS comprise a group about 5 miles in extent, lying to

the S.W. of the high island of Panambungan. Three islands of the group are tolerably large and high, with several contiguous islets, the north-eastern of which, Double Island, lies about $2\frac{1}{2}$ miles from the S.W. extreme of Panambungan.

Rodgers Reef.—In 1857 Mr. Rodgers, master of an English ship, discovered a shoal with probably less than 4 fathoms water on it, the East point of Carimata Island bearing S. $\frac{1}{2}$ W., and the Leema Islands W. by N. $\frac{1}{2}$ N.

Button Island (*Meledan*) lies about 9 miles eastward of the Melapies group, and about $6\frac{1}{2}$ miles E. by S. $\frac{1}{2}$ S. from the S.W. point of Panambungan.

PULO PANAMBUNGAN is high, 5 miles in extent N.E. and S.W., and its western point is in lat. $1^{\circ} 12' S.$, long. $109^{\circ} 10' E.$ There are four small islets off its eastern extreme, the outermost of which is 4 miles N. by W. $\frac{1}{2}$ W. from Button Island; there is also a small islet, named Sirie, lying off its south-western extreme.

There is good anchorage off the north-western side of Panambungan, in $5\frac{1}{2}$ or 6 fathoms, with shelter from southerly winds. *Fresh-water Bay*, at this part of the island, has two runs of good water, the westernmost of which is the largest, where the water is obtained behind a large black rock on the beach, which consists of fine sand. All the watering places are fronted by fine sandy beaches, and easily discerned. There are spars fit for topmasts on the island, but the trees seem to be too heavy.

Baroe and Ananas Islands are the largest and outermost of a group of small islands lying off the north-western extreme of Mayang Islands.

Masien Tiega are three small islands, the outer or westernmost of which is in lat. $0^{\circ} 55' S.$, long. $109^{\circ} 12' E.$ The chart shows a reef extending from them to the S.W.

Greig Channel is the passage between Panambungan and Melapies Islands, and the route by it and among the islands to the south-eastward, although narrow in some parts, has moderate depths with generally good anchorage, and seems preferable to the route westward of Carimata and Soruetou, for ships that have to work along the coast against the monsoon, whether bound northward or southward.

Directions.—Being to the northward of the dangers off Minto Point (page 290), the Borneo coast may be approached to 8 or 9 fathoms of water, and to 7 or 6 fathoms when nearing the Papan Islands. The Birds Nest Islands should not be approached under 10 fathoms, or nearer than 2 miles. A vessel may pass on either side of the two groups of the Papan Islands, observing that the water quickly shoals to 5 fathoms eastward, or inshore of them. If passing westward of them, remember the Spirit of the North Shoal (p. 291). Between South Island and the Papan Islands the depths are 10 to 12 fathoms, decreasing pretty regularly towards the Borneo coast;

and between the Papan and Passage Islands there are 7 to 12 fathoms. Northward of the Papan Island the soundings appear to shoal rather suddenly from 8 to 5 fathoms, but gradually under that depth. The Greig channel appears to be bold towards either shore, with depths from 14 to 20 fathoms in the fairway.

When northward of Panambungan, the Borneo coast may be approached to 9 or 8 fathoms at discretion, but under 8 fathoms the soundings seem to decrease rather quickly. A vessel may stand off to 15 fathoms near the Leema Islands, and to 17 or 20 fathoms when to the northward of them, but remember the Wellesley, Crescent, and Greig Shoals.

The Inner Channel, between the East end of Panambungan and the S.W. extreme of Mayang Island, may be used by small vessels, as it has regular soundings of 3 or 5 fathoms, soft bottom.

Directions through Carimata Strait from the Southward. Approaching Carimata Strait from the southward, a vessel will have to depend principally upon the correctness of her reckoning, for the soundings are so irregular, that they will afford but very imperfect guidance, and the land is too distant to be of service in determining her position. If to the westward of about long. 108° to $108^{\circ} 20'$, a good lookout should be kept to get sight of Shoe Island (page 272), which, if seen, will determine her position, and enable her to steer to pass into the strait, either by the main route eastward of the Discovery, Lavender, and Cirencester Shoals, or by the route westward of those dangers, between them and the Osterly Shoals.

Should the vessel be to the eastward of $109^{\circ} 30'$, and approaching the parallel of 4° S., the greatest care must be observed to keep to the westward of the dangers which extend about 42 miles S. by W. from Mankap Island; and the navigator must be guided by circumstances as to whether he shall proceed eastward or westward of Doubtful Rock and Oliviera Reef. It is often advantageous, on account of the tide, to pass inside those dangers, but it is much better, if possible, to keep the main channel. Having passed Pulo Kumpal (or Rendezvous Island), a course may be shaped to pass on either side of the Ontario Reef. Carimata, Soruetou, and the adjacent islands will afford good objects for determining the vessel's position if she pass northward of the reef, and the Montaran Islands will answer a similar purpose, if she pass southward.

Vessels passing through Carimata Strait and bound to Singapore during the months of December, January, and February, generally keep near the coast of Borneo (where the tides are said to be regular) to avoid the strong southerly current; and pass into the China Sea through Greig Channel.

From the Northward.—Coming from the north-westward towards Carimata Strait, if intending to pass outside or southward of Ontario Reef, having brought Soruetou to bear N.E., distant 25 miles, steer S.E. by E., to give a berth to the supposed rock westward of the Ontario Reef. To keep to the

westward of this supposed rock, it would appear to be necessary to sink the West end of Soruetou from the deck of a large ship before it bears North of N.E. by N. Keep the West end of Soruetou to the eastward of N. by E., until past Ontario Reef, or 25 miles to the southward of Soruetou, or sink the West end of the island from the deck of a large ship, bearing about N. by E.; continuing the S.E. by E. course the Montaran Islands will be seen, if the weather is favourable; pass to the eastward of them at 15 or 16 miles distance. From this position a S.S.E. course will lead in the fair track, between the Cirencester and Discovery Shoals on the West side of the channel, and the Oliviera Reef and Doubtful Rock on the East side. If not certain of the longitude, the best guide is to borrow towards the coast of Borneo, to get a sight of the land, if circumstances admit, and taking a departure from Rendezvous Island, steer to the southward between Oliviera Reef and the Mankap Shoals.

The best track for ships bound to the southward, particularly in cloudy weather, is to pass northward of Ontario Reef, by keeping within 10 or 12 miles of Soruetou, until its West extreme bears N. $\frac{1}{2}$ W.; then observing to keep it to the West of N. $\frac{1}{2}$ W., in steering to the S.S.E., until the reef is passed. Proceeding to the southward, borrow towards the eastern side of the strait, where the soundings will generally be from 17 to 14 fathoms, within from 30 to 20 miles of the coast of Borneo, deepening in some places as the shoals are approached on the West side of the strait, but not always affording a certain guide. To the southward of Rendezvous Island the depths will increase from 19 to 21 fathoms irregular soundings, when about 30 or 33 miles to the south-westward of Pulo Mankap, which is as near as any large ship should approach the shoals that extend far out from it in this direction.

Sailing vessels making the passage from Singapore to the ports in Java during the S.E. monsoon, as a rule, sight Soruetou Island, pass eastward of Discovery East Bank, and thence round Hector Bank.

CHAPTER VIII.

BANKA TO SINGAPORE.

THE routes between Singapore and the western straits, Banka, Gaspar, and Carimata, leading from the Java Sea, pass either eastward of, or within the line of islands and reefs which run generally in a parallel direction to the coast of Sumatra.

This S.W. portion of the China Sea, between Borneo and Sumatra, has not been systematically surveyed; but as it has been the great maritime highway for so many years, it is believed that all its dangers are ascertained, and tolerably well defined. A portion near the coast of Borneo was surveyed by Lieutenant Blommendal, of the Dutch Royal Navy; other parts, including the Tambelan Islands, were surveyed by Lieutenant J. W. Reed, R.N., in H.M.S. *Rifelman*, in 1862, &c. Other portions are by Mr. Stanton, R.N. Rhio Strait, partially surveyed by the Dutch, was afterwards, in the years 1865—1868, examined by Lieut. J. W. Reed, in H.M.S. *Rifelman*; the Linga Islands, also, by the Dutch, by A. C. Edeling, 1863, and afterwards by Lieut. Reed. Lieutenant Melvill Van Carnbee, also executed some portions. From these and many other authorities the following directions, as given in the *China Sea Pilot*, have been derived.

This chapter will include descriptions of the space and the islands between Borneo and Sumatra, including the passages between the groups which lead to Singapore Strait.

1.—DETACHED ISLANDS AND ROCKS.

TOEJOE, or Seven Islands, lie in two groups, between the parallels $1^{\circ} 16'$ and $1^{\circ} 5' S.$, and the meridians $105^{\circ} 13\frac{1}{2}'$ and $105^{\circ} 20\frac{1}{2}' E.$ They are high and woody, and visible 25 or 26 miles, and surrounded by rocks and reefs. They are uninhabited, but occasionally visited by proas.

Pulo Joe, the southernmost of the islands, is very small, but rises to a height of 270 ft.; a short distance N.E. of it is a sunken rock. *Pulo Lalang* is an islet about a mile N. by E. from Pulo Joe; and a mile W.S.W.

from it is another islet surrounded by a reef. *Pulo Sato*, the most western of the islands, is small, 105 ft. high, and bears from Pulo Joe about N.W. by N., distant 5 miles. *Pulo Meranti*, also a small island surrounded by a reef, is 117 ft. high, and lies between Lalang and Sato. *Pulo Tjebia*, the largest island of the southern group, is about a mile in extent, 373 ft. high, and surrounded by a reef which projects a little more than a mile from its S.E. extreme.

Pulo Katjangang, the north-easternmost and largest of the Seven Islands, is 4 miles long N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E., but only half a mile broad, and rises to several peaks, the highest of which is 526 ft. above the level of the sea. It is surrounded by a reef, within the limits of which are some rocks above water, especially off its S.E. end. There are some wells on its West side. About $2\frac{1}{2}$ miles N.W. by W. $\frac{1}{2}$ W. from its N.W. extreme, is *Pulo Tukonkembong*, a small islet, 120 ft. high, and surrounded by a reef. About $1\frac{1}{2}$ mile W.N.W. from Tukonkembong are the *N.W. Rocks*, the middle one of which is above water.

DOCAN ISLAND, in lat. $0^{\circ} 58' S.$, long. $105^{\circ} 39' E.$, is about three-quarters of a mile in extent, surrounded by a reef, and a small islet with some rocks project nearly a mile from its north-eastern extreme.

Two reefs lie off the South point of Docan, the outer one of which, lying S.S.E. distant 2 miles from the point, was discovered in January, 1823, by the ship *Mary* striking on it. There are 2 fathoms water over each of these dangers, and around them 14 to 18 fathoms.

The channel between the Toejoe Islands and Pulo Docan is 21 miles wide, and has regular soundings of 14 to 16 fathoms.

TOTY ISLAND, or *Pulo Laut*, in lat. $0^{\circ} 55' S.$, long. $105^{\circ} 47\frac{3}{4}' E.$, is small, and surrounded by a reef, which on the East side projects half a mile. The passage between Toty and Docan is 6 miles wide, and appears to be free from danger.

When passing between Banka and the Toejoe Islands, the latter should not be approached to less than 10 fathoms water, nor Banka nearer than 4 miles; for its dangers are all 2 or 3 miles in the offing, and nearly awash. Near the Hyu and Doyang Rocks the bottom is rocky, and the depths irregular.

Vessels keeping to the southward of Toty and Docan Islands, in order to cross over to Borneo, must take care to avoid the Mary Rock, lying S.S.E. 2 miles from Docan Island, and also the Vega and other shoals.

From October to March, during the N.W. monsoon, the currents run with force to the S.E., and during the other months to the N.W. It has, however, occurred that vessels going to Banka in June and July have experienced strong southerly currents. Along the North shore of Banka, in regular weather, there are generally two ebbs and two floods in the 24 hours.

PULO TAYA, the centre of which is in lat. $0^{\circ} 44' S.$, long. $104^{\circ} 54' E.$,

rises to a double peak 630 ft. above the sea. Both peaks, when in line on a N. by E. and S. by W. bearing, show as a single triangular peak. The whole shore of the island is steep, and may be approached to a distance of 3 cables. The island is uninhabited, of granite formation, and covered with wood.

There is a spring of *excellent water* on the western side of Taya, and a boat at high tide can approach it to 40 ft., but at low tide rocks extend nearly a cable's length from the sand. The knowledge of this is important to the mariner, as no similar facility for watering occurs between Banka and Rhio Strait. In the fine season, boats come here from Linga seeking turtle.

Castor Bank, lying to the north-eastward of Pulo Taya, is a long ridge of coral and sand, nearly a mile wide, and 13 miles long in a N.N.E. direction. The general depths on it are 10 to 6 fathoms, but on one part, N.E. $\frac{1}{2}$ N. 10 miles from Pulo Taya, there is a ridge about a mile in extent, and its eastern side steep-to, carrying only 5 fathoms. The bank is famous for a red species of fish, called from their colour *Ikan Merah*.†

ILCHESTER, or *Alang Kalem Bank*, on which the ship *Ilchester* struck, was examined by Capt. D. Ross, I.N., who found it to be in lat. $0^{\circ} 26\frac{1}{2}'$ S., long. $104^{\circ} 58'$ E., to extend N. by E. and S. by W. about $2\frac{1}{2}$ miles, and $1\frac{1}{2}$ mile in breadth, and to have but 1 fathom water on its shoalest parts. Pulo Taya bore from the shoal S. $\frac{1}{2}$ W.; Maralie Islet, off the East point of Linga, N. by E.; the East point of Linga, N. $\frac{1}{2}$ E., distant 8 or 9 miles. The depth of water decreases nearly all around from 18, 16, or 15 fathoms, suddenly to 6 and 3 fathoms, on the edge of the shoal.

When passing this danger, Maralie Islet must not be brought to the eastward of North, and Pulo Taya should be kept to the westward of S. by W.

PULO SINKEP, PULO PUNOEBO, and two islands to the westward, appear from a distance like one large island, being separated only by narrow channels. They lie off the south-western part of Linga, and, together with some adjoining islets and shoal spots, cover a space from 20 to 24 miles. Sinkep, the largest island of the group, is of very irregular shape, and of considerable elevation, having on its eastern side a range of hills, with a peak 1,440 ft. high near the centre of the range. It is only the East and N.E. coasts of Sinkep and the dangers off it which will be noticed here: the other

* In old charts a shallow spot of $2\frac{3}{4}$ fathoms, hard bottom, was shown at 22 or 23 miles southward from Taya Island, and W. $\frac{1}{2}$ N. from Toejoë Island, said to have been discovered by the English vessel *Thomas Harrison*, Capt. E. Smith, but it could not be found by Mr. Stanton, in the *Saracen*.

† *Cowman Bank*, said to lie $6\frac{1}{2}$ miles N.E. by N. of the *Castor*, was searched for by the *Saracen* in vain. It is expunged from the charts.

portions of the group belong to the Inner Route, by Varella and Durian Straits, and are described hereafter.

Dangers.—At $3\frac{3}{4}$ miles E. by S. $\frac{1}{4}$ S. from the S.E. point of Sinkep is the South end of a shoal, which from thence extends N.N.E. for 5 miles, but is only about $1\frac{1}{2}$ mile broad. At the South end of the shoal is a patch of $2\frac{1}{4}$ fathoms, and another of $2\frac{3}{4}$ fathoms at the North end; between these patches are depths of $4\frac{1}{2}$ and 5 fathoms. Tanjong Boekoe (the South point of Sinkep), bearing West, leads a mile southward of this danger; and the eastern point of the island bearing North leads about the same distance eastward.

Rocks and shoal water extend nearly a mile from the East point of Sinkep, and the *Saracen's* soundings show a bank projecting 5 miles in a north-easterly direction from it, on the extremity of which there are but 4 fathoms water. As no soundings have been taken near the N.E. coast of Sinkep, it should be approached with caution. There are some rocks awash off the East sides of the small islets lying between the N.E. point of Sinkep and Ponoebo.

LINGA ISLAND, lying about midway between Banka and Singapore Straits, is about 35 or 36 miles in extent, in a W.N.W. and E.S.E. direction. Upon its southern part is a remarkable mountain, the peak of which, rising to an elevation of 3,920 ft., is split in two, forming a sort of double peak, "rising like spires from the summit of the mountain," but which is more generally thought to resemble asses' ears, visible many miles in all directions. Viewed from the sea, this mountain presents a most beautiful and imposing appearance, which is sure to arrest the attention even of the most careless observer.

The north-eastern coast of the island is formed of numerous hillocks, from 200 to 300 ft. high, which give it a uniform appearance; the contour of the coast line is, however, very imperfectly known.

The East extreme of Linga, called by the natives *Tanjong Eung*, from its prominent position and pyramidal peak, 750 ft. high, is very conspicuous, and visible in clear weather 30 miles off. *Tanjong Roe* may be known by a saddle hill, 630 ft. high, near it. The southern coast of Linga, between these points and between Tanjong Roe and the town of Linga, being all low land, both points make like islands when above 13 miles distant.

Pulo Maralie is an islet lying three-quarters of a mile off shore, in a S.E. by E. direction from the hill on Tanjong Eung. *Pulo Kaka*, a larger islet, lying about half a mile off shore in a South direction from the same hill, is surrounded by a reef which off its S.W. point extends a mile.

LINGA ROAD and TOWN.—The bay forming Linga Road is exposed to southerly and easterly winds, and large ships are obliged to lie far out on account of shoal water extending from the mouth of the river around Pulo Colombo and its adjoining islets. Pulo Colombo, the largest of these islets, lies S. by E. $\frac{1}{4}$ E. nearly 2 miles from the entrance of the river. Anto and

Ballang Islets are both small, the former lying about a mile S.E., and the latter the same distance E. by S. from Colombo. W. by S. $2\frac{1}{4}$ miles from Colombo is another small islet named Badas, which is almost connected by reefs to Pulo Mapar, a larger islet about a mile to the northward, with a grove of cocoa-nut trees on it; the village here contains about 300 Malays and Chinese, chiefly fishermen.

H.M.S. *Saracen* anchored in Linga Road in 4 fathoms, mud, Pulo Badas bearing N.N.E. half a mile; Sinkep Peak, 1,440 ft. high, S.S.W.; and Ponoebo Peak, 935 ft. high, W. $\frac{1}{2}$ S. Horsburgh says that the safest anchorage for strangers is 3 or 4 miles off shore, with Pulo Taya S.S.E. $\frac{1}{2}$ E., and the South point of Linga East, southerly. Linga Peak just to the eastward of Colombo, N.W. $\frac{1}{2}$ W. or N.W. $\frac{3}{4}$ W., with Ponoebo Peak bearing about W. $\frac{1}{4}$ S., and the peak of Sinkep S.W. by W., appear also to be good anchorage marks.

The *Town of Linga*, called by the natives *Dyak*, is prettily situated on the banks, and nearly a mile within the entrance of the fresh water river. The high, rugged, fantastic peak of Linga in the background, together with the rakish appearance of the country prahus, all moored to cocoa-nut trees and areca palms, their rich foliage almost obscuring the houses, give to the whole a picturesque appearance.

The town is said to contain (in 1860) about 4,000 Malays, and 1,500 Chinese. The former prefer their usual style of houses constructed on poles, but some of the Chinese have substantial buildings of stone. The produce is rattans, pepper, and gambier, which is carried to Singapore and Rhio by country vessels and prahus. Gold is found in small quantities after heavy rains. Tin has not yet been found, but the neighbouring island of Sinkep produces some. There are no Europeans on the island. The Sultan is nominally under Dutch protection, and the Resident of Rhio pays him an annual visit.

Water.—The *Saracen* obtained good water, but with difficulty, from a well in the interior of Mapar Island.

In Linga Road it is high water, full and change, at 7 p.m., and the rise is 7 ft. The flood runs at the rate of 2 knots to the westward.

Directions.—A vessel proceeding toward Linga Road from Banka Strait, should pass westward of Pulo Taya, and steer for the high land to the eastward of Linga Peak, giving the eastern coast of Sinkep a berth of at least 5 or 6 miles. In working, by not bringing the East point of Sinkep to the eastward of North, will avoid the shoal off the East side of that island; and by not bringing the S.E. point of the island to the southward of S.W. until Linga Peak bears N.N.W. $\frac{1}{2}$ W., will avoid the shoal bank which extends 5 miles in a north-easterly direction from the East point of Sinkep. When standing towards the South coast of Linga, care must be taken to avoid the *De Hes Rock*, with 16 ft. water over it, which lies with the South

extreme of Pulo Singa bearing E. $\frac{3}{4}$ N., distant 4 miles; Linga Peak, N.W. by W. $\frac{1}{2}$ W.; Sinkep Peak, W. by S. $\frac{1}{3}$ S.; and the nearest points of Linga bearing respectively N.E. by N., northerly, distant 2 miles, and N N.W., westerly, distant $2\frac{1}{4}$ miles; close to the rock are 12 or 14 fathoms. The right extreme of Pulo Kaka just open of the right extreme of Pulo Singa, bearing about E.N.E., leads a mile to the S.E. of the De Hes Rock, and Linga Peak N.W. by W. leads to the S.W.

Bound to Linga Road from the north-eastward, round the East point of Linga Island at a moderate distance, and then steer to the westward for the anchorage.—(*Mr. Stanton, R.N.*)

The **NORTH EAST COAST** of **LINGA** is formed of numerous hillocks, from 200 to 300 ft. high, which give it a uniform appearance; but neither it nor the adjacent islets are safe to approach at night, being as yet but imperfectly surveyed. The soundings obtained by the *Saracen* in this locality, were confined to those above a depth of 10 fathoms, as vessels can gain no advantage by keeping close in shore.

EAST DOMINO, or *Selentang*, is an islet lying about 8 miles northward of Tanjong Eung, the East point of Linga. Horsburgh says that this islet is 80 ft. high, and that rocks awash project from it to the southward, to the distance of $2\frac{1}{2}$ miles; but the Dutch chart only shows a reef extending about a mile North and South of the islet, and a smaller islet close to the westward of it; a rock awash is placed about $2\frac{1}{2}$ miles South of it. The soundings close to the eastward of the islet are 14 fathoms, increasing to 16 and 17 fathoms at the distance of 3 or 4 miles.

DOMINO HILL, or *Boediang Island*, is about 2 miles in extent, and a peaked hill near its centre bears W. by S. $\frac{1}{4}$ S., 4 miles from the East Domino.

GREAT DOMINO, or *Kongka Island*, is larger than Domino Hill, from which it bears N.W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles. It is said to be moderately elevated, and the chart shows a peaked hill on its western side.

Crocodile Rock, about 15 ft. above water, and visible 5 miles off, lies N.E. $\frac{3}{4}$ N. 4 miles off a conspicuous conical hill on the N.E. part of Great Domino.

Brisbane Rock.—The barque *Brisbane*, under the command of Captain Robert Hudleston, grounded on this danger in May, 1876. On examination the rock was found to extend a mile in a S.E. and N.W. direction, with depths of 2 to $2\frac{3}{4}$ fathoms, coarse gray sand. From it, Crocodile Rock bears S.E. by E. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles, and the small island off the North end of Kongka, S.W. $\frac{1}{2}$ W. The rock is steep-to, with depths of 6 and 7 fathoms around it.

Reef.—Captain Hudleston also found a very dangerous reef of coral and sand, awash at low water, with Crocodile Rock bearing E. by N., and Small Island at North end of Kongka Island, S.W. $\frac{3}{4}$ W., by compass. The reef

lies in a N.N.W. and S.S.E. direction, about three-quarters of a mile in length, and one-third of a cable in breadth.

KINTAR ISLAND—Three other islands, with one or two contiguous islets, extend from $4\frac{1}{2}$ to 8 miles in a north-westerly direction from the Great Domino. The large island next northward of Great Domino, named Kintar, has on its southern end a fine bluff, and when coming from the northward, before the contiguous islands to the southward are visible, it much resembles the hill on the East end of Linga.

A rock lies N.W. by W. $\frac{1}{2}$ W., distant 2 miles from Pulo Kapas, which is a small islet surrounded by a reef, and the north-westernmost of the group extending from Kintar.

Fly Bank is a small patch of 2 fathoms, lying N.N.W. $\frac{3}{4}$ W. $10\frac{1}{2}$ miles from Crocodile Rock, with the high bluff of Kintar bearing South a little westerly, distant $7\frac{3}{4}$ miles, and Pulo Kapas W.S.W. $5\frac{1}{2}$ miles; close to it are depths of 9 to 13 fathoms.

Pollux Rock lies N.W. about 4 miles from Fly Bank, with the high bluff of Kintar bearing S. by E. $\frac{1}{4}$ E. 11 miles, and Pulo Kapas S.S.W. $5\frac{1}{2}$ miles; close to it are depths of 10 and 11 fathoms.

RODONG PEAK.—North-westward of Linga Island are many small islands. The most conspicuous of them is *Pulo Rodong*, or *Merodong*, which has a high conical peak, 724 ft. above the sea, the only hill of this feature in the vicinity. This peak is one of the principal objects which will enable a stranger to make out the entrance to Rhio Strait. It may, however, occasionally be useful to vessels working to or from Singapore by the Outer Route.

The Entrance to Rhio Strait between these islands and Pulo Gin to the N.N.E. of them is 23 miles wide. The space between is free from danger. S.S.E. 16 miles from Pulo Gin is the southern part of a bank carrying 7 and 9 fathoms water. It is 17 miles in length, N.N.E. and S.S.W., with its eastern side steep-to, and at its northern end Pulo Ruig bears N.N.W. $\frac{1}{4}$ W., which bearing clears also the Geldria and Frederick Reefs. In the N.E. monsoon much rain and thick weather are experienced, and this bank is a good guide to clear these reefs, and will save anchoring in deep water.

FREDERICK REEF, in lat. $0^{\circ} 37' N.$, long. $105^{\circ} 9' E.$, is awash at low water springs. It consists of two rocks about a cable's length apart, near the middle of a coral bank 3 cables in length North and South, and nearly 2 cables in breadth, having 20 to 22 fathoms all around, except at the N.E. side, where irregular soundings from 10 to 13 fathoms extend half a mile from it. From the centre of the reef Pulo Ruig, or Ragged Island, bears N.W. $\frac{2}{3}$ N. 22 miles, and Pulo Borean W.N.W. $21\frac{2}{3}$ miles.

In the vicinity of this reef in light winds the discolouration of the water is the only guide, and in fresh breezes it is difficult to distinguish breakers from the swell. Breakers on the reef can only be distinguished when the

tide is setting against the wind with a comparatively smooth sea. Off Bintang Island, at the change of the monsoon in April, the flood tide runs for 18 hours, and the ebb 6 hours. In June the tides are reversed, consequently a tide against the wind will only take place a few hours each day.

As this most dangerous reef lies in the direct track of vessels, the utmost care is necessary to avoid it. A vessel will clear it to the eastward by not going into less than 25 fathoms, and to the westward by keeping Gin Peak (a conspicuous hill, 337 ft. high), Gunong Kwas (857 ft. high on Bintang), and Pulo Borean well in sight, until the latter bears W. by N. The high peak of Linga Island, S.S.W. $\frac{1}{2}$ W., or Pulo Ruig bearing from N.N.W. to N.W. by N., will also lead clear.

From a close examination by Mr. Stanton, in H.M.S. *Saracen*, soundings having been taken in every direction to the extent of 7 miles eastward, and from 4 miles southward of the reef to the Geldria Bank, he was led to believe that the other reefs which were said to exist near are identical with it, and that the Frederick Reef is the only danger in this vicinity.

EAST COAST of BINTANG.—Numerous islands and dangers lie off the southern part of the East coast of Bintang, among which no vessel should venture. Vessels making passages between Banka and Singapore Straits should pass outside or to the eastward of the whole of these islands and dangers; and it is, therefore, only necessary here to notice the outermost of them. The whole coast and the islands off it are, as a rule, fringed with coral.

PULO GIN, or *Great Island*, about 4 or 5 miles in extent, lies about 3 miles south-eastward of the S.E. extreme of Bintang. Although appearing as but one island, it is really made up of three small islands separated from each other by narrow channels, which together form the largest Island off this part of Bintang. There are several hills on it from 200 to 300 ft. high, and one, named *Gin Peak*, rising about the centre of the south-eastern portion of the island, is 337 ft. high.

Pulo Terobi, the most southern of a cluster of small islets lying to the eastward of Pulo Gin, is 112 ft. high, and bears E. by S. $2\frac{1}{3}$ miles from the S.E. extreme of Gin. *Pulo Borean*, or *Saddle Island*, is one of the outer islands lying 3 or 4 miles to the eastward of Pulo Gin, inside the Geldria Banks, and bears from Pulo Terobi, N. by E. $\frac{3}{4}$ E. 5 miles. Being saddle-shaped, it is conspicuous and easily recognised.

Pulo Ruig, or *Ragged Island*, appropriately named from the irregular appearance of the trees on its summit, is the outer and easternmost island off the East coast of Bintang. It is about the same size and height, 315 ft., as Pulo Borean, and is steep-to at 3 cables' lengths off.

Geldria Bank is the outermost of a dangerous group of shoals lying 13 or 14 miles eastward of Pulo Gin, well out in the fairway of vessels proceeding between Banka and Singapore Straits, especially such as pass inside Frede-

rick Reef. Its North extreme is in lat. $0^{\circ} 48' N.$, long. $104^{\circ} 58' E.$, from which it extends S.W. by S. about 2 miles, having 2 to 4 fathoms water over it, 19 to 20 fathoms nearly close to the eastern side, and 8 to 12 fathoms, irregular depths, near the S.W. and West sides.

Raleigh Shoal lies W. by S. $\frac{1}{4}$ S. 3 miles from the south-eastern extreme of the Geldria. It has only 2 fathoms water over a coral bottom, from which Pulo Borean bears W. by N. $\frac{1}{2}$ N. 5 miles, and Pulo Ruig N. by E. 11 miles.

A *shoal patch*, with only 2 fathoms water over it, coral and sand, lies S.W. by W. $\frac{1}{2}$ W. nearly 6 miles from the South extreme of the Geldria. It is nearly a mile in length and half a mile in breadth, and from its centre Pulo Borean bears N.W. $\frac{1}{2}$ N., distant $4\frac{1}{2}$ miles.

There are several other knolls, with 4 and 5 fathoms over them, between this patch and the Geldria, of which they are considered to be a continuation; they should be avoided by vessels of heavy draught.

Pulo Terobi, the southern islet off Pulo Gin, bearing W. $\frac{1}{4}$ S., clears the southern extreme of the above shoals; and the Boat Rocks in line with Pulo Borean W. by S. $\frac{3}{4}$ S., or Pulo Ruig N.N.W. $\frac{1}{4}$ W., clears the northern extreme. No good marks can be given to clear the eastern side, which is steep-to, but the high peak of Linga bearing S.S.W. $\frac{1}{2}$ W., is a broad and distant clearing mark, and leads over the large sand-bank, carrying 7 to 10 fathoms, south-eastward of Pulo Gin.

Boat Rocks, lying about $2\frac{1}{2}$ miles N.W. $\frac{1}{2}$ N. from the North end of the Geldria Bank, are three low rocks, visible about 4 miles from a ship's deck.

A *rocky patch*, with 3 fathoms water over it, lies between the northern extreme of the Geldria Bank and the Boat Rocks, the latter bearing N.W. by W. distant 1 mile. A *coral bank*, with 3 to 5 fathoms over it, and about 1 mile in extent, lies W.S.W., $5\frac{1}{4}$ miles from Pulo Ruig. Pulo Borean, or Saddle Island, bearing S.S.W., clears its eastern side.

PULO PANJANG, which in the Malay language signifies Long Island, lies about 9 miles off the East coast of Bintang. It is a large irregular-shaped island, about 5 miles in extent. Rocks extend off its S.E. point, the outer ones of which, named *Bare Rocks*, are 55 ft. high.

On the N.E. side of the island the coral reef is absent, leaving a small sandy bay, where vessels may anchor in 8 or 9 fathoms, about three-quarters of a mile off shore. Wood and water may be procured in this bay, and boats can approach close to the beach at all hours of the tide.

Pulo Ruig, 315 ft. high, lies $3\frac{1}{2}$ miles E. by S. $\frac{1}{4}$ S. from Bare Rocks. It is nearly a mile long in a N.W. and S.E. direction.

Passage Rock, 55 ft. high, lies about three-quarters of a mile to the northward of the N.E. point of Panjang.

Pulo Suto, *Middle Rock*, *Black Rock*, and *Pulo Blanhap*, lying North and N.W. of Pulo Panjang, form a sort of chain, stretching from outside the

dangers off the North coast of that island to the shore of Bintang, and to the southward of which no vessel, except under extraordinary circumstances, should attempt to pass.

North-east Coast of Bintang.—From Tanjong Blanhap to Tanjong Brakit, 8 miles to the N.N.W. $\frac{1}{4}$ W., the N.E. coast of Bintang forms a bay about 2 miles deep, indented with several small bights or coves. Over a point about a mile N.W. of Tanjong Blanhap is a conspicuous tree, the top of which is 252 ft. above the sea; 2 miles W.N.W. of the tree is a hill, 420 ft. high. Three-quarters of a mile northward of this hill, close to the coast line on the deepest part of the large bay, is another, named *Double Tree Hill*, 334 feet high. Two or three small streams of fresh water appear to discharge themselves near the middle of this bay.

Tides.—It is high water, full and change, at Horsburgh Lighthouse, Singapore Strait, at 10^h 10^m p.m.; at Tanjong Brakit, the N.E. point of Bintang, at 11^h 0^m; at Pulo Suto, at 3^h 40^m; at Pulo Panjang, at 4^h 20^m; at Pulo Borean, at 6^h 0^m; and at Pulo Terobi, at 1^h 0^m p.m. The rise is 9 ft., but on extraordinary occasions it is 12 ft.

During the shifting months of the monsoons the tidal streams are regular, but during their strength the surface current will be always more or less governed by the wind.

The flood tidal wave comes from the northward, and runs nearly parallel to the East coast of Bintang, along its southern side towards Abang Strait, and to the northward of Rhio Strait, meeting another tide from Singapore Strait near the town of Rhio.

The flood sets to the southward along the East coast of Linga, and close to Tanjong Eung, its south-eastern extreme; from thence it runs West to Ponoebo Strait, and obliquely across Linga Bay to Varella Strait. From Tanjong Eung to Pulo Taya, and onwards to Banka Strait, its direction is nearly South. Another stream from about 2 miles South of Taya sets towards Varella Strait.

The ebb stream sets in the opposite direction, and the meeting of this stream from Banka and Varella Straits was observed to take place near the supposed position of Smith Bank.

ISLANDS, ETC., BETWEEN BORNEO AND SINGAPORE STRAIT.

PULO DATU, the peak of which, 1,042 feet high, is in lat. 0° 10' N., long. 108° 35' 50" E., is an oblong-shaped island, 1½ mile in extent N.E. and S.W., and three-quarters of a mile broad. It is a conspicuous object when approached from the southward, and is visible from the anchorage in Pontianak and Mampawa Roads. Close to the island are depths of 6 to 14

fathoms; to the westward the soundings are 16 to 19 fathoms, but 29 and 30 fathoms a mile to the eastward of it.

DIRECTION ISLAND, or *Pulo Panecky Ketchil*, in lat. $0^{\circ} 14' 39''$ N., long. $108^{\circ} 1' 53''$ E., is of conical form in the centre, and has a small hill on its North end. The island is 639 ft. high, and visible in clear weather at 30 or 33 miles off.

A small island lies nearly half a mile off the S.E. extreme of Direction Island, and in the channel between are depths of 10 to 17 fathoms.

ST. BARBE ISLAND, or *Pandjangkang*, is high, of triangular form, about 3 miles long, and when first seen appears like two or three islands, being lower at the centre than at the N.E. and West parts. The highest hill on its N.E. end is 762 ft. high, and in lat. $0^{\circ} 8' 6''$ N., long. $107^{\circ} 13\frac{1}{2}'$ E. The hill on the South end is 684 ft. high.

The South point of the island is cliffy and bold, but a reef fills up the first bay on its East side. The West side of the island is divided into two small bays. Off the N.W. point of the island are two or three small rocks a few feet above water, and a reef projects about a quarter of a mile from the point to the northward of it. A small rock above water lies near the middle of the large bay on the North side of the island, and a third of a mile North of this rock is another sometimes awash, with 10 and 17 fathoms close to it. A small rock above water also lies close to the East side of the North point of the island.

Water, wood, &c., may be procured in a bay on the East side of the N.W. point of St. Barbe, and also near the S.E. point. As the shore is fronted by a reef, boats can only land at high tide, at which time fresh water may be rafted off. Water may also be obtained from the bay at the North point of the island, abreast of which is the best anchorage in the southerly monsoon. Wood may also be procured upon the island, and turtle sometimes found upon its sandy beaches.

Welstead Rock was discovered in 1825 by Captain G. Welstead, commanding the ship *General Harris*, which grazed over it. This officer took great pains to ascertain its exact position, which is lat. $0^{\circ} 32'$ N., long. $107^{\circ} 53'$ E.

The shoal extends half a mile in an E.N.E. and W.S.W. direction, its breadth being about a cable's length. It consists of a number of pinnacle rocks, with varying depths of 7 to 3 fathoms; clore around it are 17 to 23 fathoms.

Ebeling Shoal.—Captain Ebeling, commanding the Chilian ship *Mercedeo*, in 1863, reported having sounded in $4\frac{1}{2}$ fathoms upon a coral shoal, and whilst the lead was being hauled in, the vessel passed over one side of a patch upon which there appeared to be as little as 16 or 18 ft. water. The bearings given were:—St. Barbe Island, S. 28° W., middle of St. Esprit group,

N. 79° W. ; Pulo Gigang, or Jarrang (Tambelan group), N. 14° E., which places the shoal in lat. $0^{\circ} 31'$ N., long. $107^{\circ} 26'$ E.

The *St. Esprit Group* (or *Watas Islands*) consists of 13 or 14 small high islands and islets, extending about 12 or 13 miles in a W.N.W. and opposite direction, between the parallels of $0^{\circ} 31'$ and $0^{\circ} 39'$ N., and the meridians of $106^{\circ} 58'$ and $107^{\circ} 11'$ E. ; between the islands are deep and generally clear channels.

S.E. Island, 145 ft. high, in lat. $0^{\circ} 30\frac{3}{4}'$ N., long. $107^{\circ} 8\frac{1}{2}'$ E., is a mere islet, a quarter of a mile in extent, and connected by a reef to a low white rock, which lies a quarter of a mile northward of it.

S.W. Island, 305 ft. high, in lat. $0^{\circ} 33\frac{1}{4}'$ N., long. $106^{\circ} 58\frac{1}{4}'$ E., is a mere islet, bold-to ; close to the southward of it are soundings of 30 to 34 fathoms.

Howqua Shoal is a doubtful danger, said to lie 4 miles S. $\frac{2}{3}$ W. from S.W. Island.

Brace Islands comprise two small islets, about three-quarters of a mile apart, and a third islet, about twice their size, and 572 ft. high, a mile to the N.W. of them. The easternmost island, which is also the easternmost of the group, is in lat. $0^{\circ} 33\frac{3}{4}'$ N., long. $107^{\circ} 10\frac{3}{4}'$ E. A 3-fathom patch, with 7 and 8 fathoms around it, lies about half a mile W.S.W. from the northernmost and largest of the *Brace Islands*.

Head Island, 372 ft. high, lies near the centre of the group, W.N.W. 2 miles from *Round Island*, about a mile in extent. The channels on either side of *Head Island* appear to be clear of danger, and to have depths of 35 to 45 fathoms water in them ; but with the N.E. extreme of *Head Island* bearing S.S.W. $\frac{1}{2}$ W., distant a mile, and the apex of the northern *Brace Island* S.E. by E. $\frac{1}{4}$ E., a little over 4 miles, is the *Royalist Rock*, close to which are depths of 38 and 40 fathoms.

Centre Island is the name of a small round islet, 169 ft. high, lying W. by N. $\frac{1}{2}$ N. $2\frac{3}{4}$ miles from *Head Island*, and about two-thirds of a mile from the S.E. extreme of the largest island of the *St. Esprit* group.

The largest island of the *St. Esprit* group (which is not named upon the charts) is also the northernmost one. It is $1\frac{3}{4}$ mile long North and South, and three-quarters of a mile broad, and the hill on its southern end, 825 ft. high, is in lat. $0^{\circ} 37' 51''$ N., long. $107^{\circ} 0' 50''$ E.

Bush Island, the westernmost island of the group, lies about W.S.W. 2 miles from the largest island. Its apex, 393 feet high, bears nearly North of S.W. Island ; the two islands are a little over $2\frac{1}{2}$ miles apart. An islet, 120 feet high, named *Clump*, lies about half a mile northward of its North point.

Discoloured water has been observed at 20 miles westward of *Bush Island*.

GREEN ISLAND is small, square-shaped, about a third of a mile in extent, covered with trees, and has a white sandy beach. It lies in a direct line between the easternmost of the *St. Esprit* group and the *Tambelan*

Islands, and is surrounded to a short distance by a reef, near to which are from 17 to 32 fathoms; its centre is in lat. $0^{\circ} 44' 43''$ N., long. $107^{\circ} 18' 52''$ E.

Rodger Rock, upon which the ship *Ellen*, Capt. Alexander Rodger, struck in 1845, is of very small extent, and is about 100 yards square; but at low water springs there is but 3 ft. water on it. Its position is lat. $0^{\circ} 41' 15''$ N., long. $107^{\circ} 31' 12''$ E., and from it Tambelan Peak is seen over the right summit of Pulo Gigang, or Jarrang, and bears N. $\frac{1}{4}$ E.; Green Island, W. by N. $\frac{1}{4}$ N., $12\frac{2}{3}$ miles; the eastern extreme of the Tambelan group, N. by E.; and the western extreme N.N.W. $\frac{1}{2}$ W.

This is an exceedingly dangerous rock, for there are regular soundings of 19 to 22 fathoms close to and for miles around it. The *Rifleman* was steaming in its vicinity for four days before it was discovered; it was ultimately found by the weather tide causing a slight ripple.

There is little doubt but this is the rock seen by Mr. Robert Loney, Paymaster, R.N., when in command of the *Rose Ellis*, and marked by that name in the Admiralty charts. The rock is so far from the islands that the least error in bearing would cause the discrepancy in the positions given by Captains Rodger and Loney.

White Rock, about 80 ft. high, lies E. by S., 5 miles from the South end of Pulo Gigang, or Jarrang, the southernmost island of the Tambelan group, and on its S.W. side are two small pinnacle rocks, about 12 ft. above high water.

TAMBELAN ISLANDS lie about 27 miles to the north-eastward of the St. Esprit group, between the parallels of $0^{\circ} 52'$ and $1^{\circ} 7'$ N., and the meridians of $107^{\circ} 21'$ and $107^{\circ} 35\frac{1}{2}'$ E. They comprise a considerable number of islands, and form two groups or chains, each extending N.W. and S.E. about 13 or 14 miles, and were surveyed by Commander Ward, R.N., in H.M.S. *Rifleman*.

South-Western Group.—*Pulo Gigang Besar* (or *Jarrang*), the most south-eastern island of this group, is $1\frac{3}{4}$ mile long North and South, two-thirds of a mile broad, and is bordered to a short distance by a reef. It is a high island, rising to a peaked hill in the centre, and having a lower one near each extreme. *Gigang Ketchil*, an island about a quarter the size of *Gigang Besar*, lies a mile westward of it, and is also fronted by a reef, which, off its North end, projects nearly a quarter of a mile.

A coral shoal, of 3 fathoms (probably the *Constance Shoal*), was found lying off the S.W. end of *Gigang Ketchil*, being separated from that island by a narrow channel of 17 to 22 fathoms water. From its shoalest patch of 3 fathoms water, which is on the western extreme of the shoal, the S.W. end of the island bears E. by S. $\frac{1}{2}$ S., 9 cables' lengths.

Several other shoal patches and dangers were found near the Tambelan Islands, but they lie quite out of the ordinary track of vessels.

Three miles N.W. of the *Gigang* Islands is a group of small islands, the

north-eastern of which, *Harbour Island*, or *Pulo Smot*, limits the narrowest part of the channel between the two main groups of the Tambelan Islands. Two-thirds of a mile westward of it is a much larger island, *Pulo Bedua*, which has four hills upon it, rising N.E. and S.W. of each other, the highest hill, 408 feet, being near its West end. The channel between the Gigang Islands and the Bedua group is free from danger, with soundings of 16 to 23 fathoms.

Bunoa, by far the largest island of the south-western group, is nearly 4 miles long N.W. and S.E., and $2\frac{1}{2}$ miles broad. Its highest part, near its N.E. end, is elevated 915 ft., and there are several other undulating hills upon it, from 300 to 700 ft. high. The North shore of the island forms a bay, in which vessels may anchor in 10 to 16 fathoms, and find excellent shelter in the S.W. monsoon. Close to the East side of Bunoa are two smaller islands, *Selindang* and *Gilla*; *Selindang* is a remarkable cone-shaped island, rising to an elevation of 681 ft.; *Gilla* is about a third of the height of *Selindang*.

The group of ten islands extending nearly 5 miles to the north-westward of Bunoa, are all tolerably elevated, and *Mundaga*, the outermost of them, is 697 ft. high. The channels between them are deep and generally free from danger, but that between Bunoa and *Ebul* (the island next to the north-westward of Bunoa) cannot be recommended as being perfectly safe. A reef extends some distance from the North and N.E. part of *Ebul*, which renders the channels between that island and *Tamban** and *Pening* Islands dangerously narrow. A rock awash lies about a third of a mile from the S.W. extreme of *Leso*, the island lying close to the western part of Bunoa; elsewhere these islands appear free from danger, and may be approached to a half or a third of a mile with safety.

North-Eastern Group.—TAMBELAN, or Great Tambelan, the largest island of the Tambelan group, is of somewhat triangular shape, nearly $4\frac{1}{2}$ miles in extent N.W. and S.E., and about the same N.E. and S.W. Upon its N.E. coast are several hills, the highest of which, *Tambelan Peak*, in lat. $1^{\circ} 1' 5''$ N., long. $107^{\circ} 32' 22''$ E., rises to an elevation of 1,300 ft. *Low Peak*, 643 ft. high, is on the N.W. end of the island; and a short distance to the eastward of *Tambelan Peak* is *Thumb Peak*, a remarkable sloping hill 953 ft. high. *East Peak*, a sharp cone 950 ft. high, rises near the eastern extreme of the island.

Tambelan Island is nearly divided into two parts by a creek, which runs in a north-easterly direction into its western side. The creek is nearly a mile wide, but fringed with reefs and encumbered with several rocks. A breakwater, composed of coral, crosses its upper part, about $1\frac{1}{2}$ mile within the

* The principal observatory station of the *Riflemen's* survey was upon the North point of *Pulo Tamban*, which was found to be in lat. $1^{\circ} 9' 27''$ N., long. $107^{\circ} 24' 10''$ E.

entrance, leaving but a narrow boat channel, through which the tide rushes with great force. Behind the breakwater is a stockade, and a fort stands upon the shore near the West end of the breakwater. The whole of these works have been constructed to defend the village, which is about half a mile beyond the breakwater on the western bank of the creek, from the attacks of the Llanun pirates, who occasionally visit these islands, and carry off into slavery any of the natives they can lay their hands upon.

A reef extends from the East point of Tambelan Island, and upon its edge, half a mile southward of the point, is a rock above water. The N.E. coast is almost free from reefs. A reef, with a rock awash on its extreme, extends about one-third of a mile from the S.W. point of the island, and then trends away, fronting the coast, into Tambelan Creek.

Pulo Bungin, 253 ft. high, is a small island lying $1\frac{1}{4}$ mile westward of the N.W. point of Tambelan. *Sedua Besar*, 860 ft. high, and *Sedua Ketchil*, 650 feet high, are two islands which extend from $1\frac{1}{2}$ to $3\frac{1}{2}$ miles north-westward of Tambelan Island, separated from each other by a very narrow, deep channel; both islands are bold close-to.

Sendulang Besar and *Sendulang Ketchil*, lying 3 miles north-westward of the Sedua Islands, are two small, round-shaped islands, surrounded to a short distance by reefs, and separated by a very narrow channel. *Sendulang Besar*, the western and larger island, rises to a sharp cone 749 ft. high; the smaller island is only 309 ft. high.

Pulo Way, the north-westernmost island of the Tambelan group, is about 2 miles in extent, and rises to several peaked hills, the highest of which, near its eastern end, is elevated 1,057 ft.

Anchorage.—There is good anchorage anywhere between the two groups of the Tambelan Islands, which form an extensive basin or harbour; the depths being generally 17 to 20 fathoms, and the bottom of mud and sand; here and there are places where the soundings are a few fathoms more or less. In the N.E. monsoon a vessel may anchor in the entrance to Tambelan Creek, but she must go but a very little way inside the edges of the reef, on account of a pinnacle rock with 2 fathoms water over it, which lies S.S.E. nearly a quarter of a mile from Suicides Point, the North entrance point to the creek. This position would be unsafe in the S.W. monsoon; the best anchorage at that season being under Bunoa, in 14 to 18 fathoms if in the bay between Pulo Gilla and Bunoa, and in from 9 to 14 fathoms if in the bay on the North side of the latter island, which is the best anchorage.

Supplies.—Ships cannot depend upon procuring supplies at the Tambelan Islands. The officers of the *Rifleman* were only able to obtain a few fowls, and those few with great difficulty. There is a well of good water just to the northward of the mound on the South side of the entrance to Tambelan Creek, and another on the North side about 2 cables' lengths northward of Suicides Point. The village in the creek is inhabited by about 500 Malays,

and the other islands of the group are temporarily inhabited for the purpose of collecting cocoa-nuts. Goats are also bred upon these islands, but at the period of the *Rifleman's* visit none could be purchased.

EUROPE SHOAL is about a mile in extent N. by E. and S. by W., and the least water on it 3 fathoms, is about the middle of the shoal, in lat. $1^{\circ} 11' 19''$ N., long. $107^{\circ} 25' 27''$ E., the Rocky Islets bearing W. $\frac{1}{4}$ S. $12\frac{1}{2}$ miles; Gap Rock E. $\frac{3}{4}$ N. 9 miles; summit of Pulo Way S. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles; western extreme of the Tambelan Group S.S.W. $\frac{1}{4}$ W. $6\frac{1}{2}$ miles; and eastern extreme S.E. southerly $15\frac{1}{4}$ miles.

ROCKY ISLETS, lying N.W. by W. $\frac{1}{2}$ W., 12 miles from Pulo Way, are merely two barren rocks, the resort of sea birds. They are bold close-to, and occupy a space about 2 cables in extent. The northern and larger rock, 134 ft. high, is in lat. $1^{\circ} 11' 9''$ N., long. $107^{\circ} 13'$ E. Between them and the Tambelan Group the depths are 33 and 34 fathoms.

GAP ROCK, in lat. $1^{\circ} 12' 30''$ N., long. $107^{\circ} 34' 20''$ E., and distant $12\frac{1}{2}$ miles N. $\frac{1}{2}$ W. from the eastern extreme of the Tambelan Group, is very remarkable. It consists of two large boulders lying upon a flat rock, the larger of which is 124 ft. above the water. A shoal extends about 2 cables' lengths from its South side.

ST. JULIAN, in lat. $0^{\circ} 55' 40''$ N., long. $106^{\circ} 43' 30''$ E., is a remarkable island, being nearly a mile long E.S.E. and W.N.W., and 200 yards broad. It is low in the centre, rising to a hill 318 ft. high on the South end, and to another, 537 ft. high, on the North end, which latter forms an exceedingly bold cliff to seaward. There is deep water close-to on all sides.

CAMELS HUMP, in lat. $1^{\circ} 11' 46''$ N., long. $106^{\circ} 53'$ E., is about half a mile long, East and West, and a third of a mile broad. It is well named, the highest part of the island forming a sort of hump, elevated 574 ft. above the sea. No danger was discovered in its vicinity.

SADDLE ISLAND, in lat. $1^{\circ} 19' 21''$ N., long. $107^{\circ} 2' 17''$ E., is only half a mile long, and a quarter of a mile broad. This island is also well named; the hills forming the saddle are in line on a S. $\frac{3}{4}$ W. and opposite bearing, the higher one on the North side being 387 ft. high.

BARREN ISLAND is a whitish rock, 80 ft. high, and its summit (by the *Rifleman*) is in lat. $1^{\circ} 31' 50''$ N., long. $106^{\circ} 25' 35''$ E. It is justly denominated Barren, having not the slightest trace of vegetation, and is bold-to, with 10 fathoms close alongside. It appears to be the resort of varieties of sea-fowl, which, in the season of incubation, deposit great quantities of eggs, —the tern, kittiwake, and gulls occupying the summit, the booby, or gannet, the base. The Malay fishermen resort here for these eggs, and from the stores found *en cache* cannot be very particular as to their freshness. Of the eggs, those of the tern were not inferior to plover, and those of the gannet nearly equal to the duck, making very acceptable omelettes and puddings.—

On the N.W. side of Barren Island is a natural reservoir, containing about

10 gallons of water. It is asserted that it is used by the Malays possibly by previous cleansing of the reservoir. Landing is easy on the western side.

VICTORY ISLAND, in lat. $1^{\circ} 34' 46''$ N., long. $106^{\circ} 18' 40''$ E., is densely wooded, and rises to a hill in the centre, 285 ft. high.

HUGHES SHOAL.—The *Rifleman*, in April, 1863, searched for the Doubtful Reef, said "to have been seen in the brig *Bombay Merchant*, commanded by Mr. Hughes, in January, 1825, and was nearly in one with Victory Island, bearing N.E. 5 or 6 miles."

The *Rifleman* anchored on a shoal—the island bearing N.E. $\frac{3}{4}$ E., distant half a mile—in $3\frac{1}{2}$ fathoms, reduced to low water springs, which was the least water found. This shoal is of coral, one-third of a mile long, N.E. and S.W., and a quarter of a mile broad, its outer edge in 8 fathoms lying S.W. $\frac{1}{4}$ W. three-quarters of a mile from the island.

Acasta Rock, lying N. by W. 4 miles from Victory Island, is just under the surface of the water, and in calm weather presents exactly the appearance described in Horsburgh, "the central part of a very brown colour, declining to a pale green around." The least swell breaks on it.

ST. PIERRE ISLANDS are wooded, and appear to be connected by a reef. St. Pierre Rock, South, nearly $1\frac{3}{4}$ mile distant from the southern tree-covered island of St. Pierre, and in lat. $1^{\circ} 51' 44''$ N., long. $108^{\circ} 33' 57''$, ($4^{\circ} 47' 39''$ East of Fort Fullerton, Singapore), is about 30 yards in length, 20 yards in width. It is very steep-to, and is never less than 6 ft. above water, the dry surface being completely blackened. It is, indeed, formed of a close-grained, black basalt, and is not to be confounded with the coralline incrustations about it. Close around its margin are 14, 15, and 19 fathoms. The space between the islands and the rock is safe, having depths of 20 fathoms.

Tides.—The ebb tide between the St. Pierre Group and Tanjong Api sets to the southward. The current of flood, which prevailed during the examination of St. Pierre Rock, set to the N.E. The rise of tide did not exceed 4 ft.

General Remarks.—As the *Rifleman* was constantly shifting her position during the operations of the survey, no good opportunity offered for obtaining a series of tidal observations. Such as were procured were so irregular, that no general conclusion could be formed from them. It was observed, however, that during the S.W. monsoon (from the middle of July to the middle of September), and also during the N.E. monsoon (in the month of December), that the tides set to windward every day against the prevailing current, although they were uncertain as to commencement and time of duration.

The weather was very fine, and the winds generally light. Sailing vessels would frequently shorten their passages through this part of the China Sea, if they kept a kedge ready to let go during light airs and calms, and when

both current and tide would otherwise be setting them back over the ground they had with difficulty gained.

Directions from Singapore Strait to Tanjong Api in Borneo.—Quitting the Romania Islands and Shoals, where there are pretty regular tides, the current off shore will be found to run about N.N.W. in the S.W. monsoon, and having gained 50 miles easting, its greatest strength will be found setting between Pulo Timoan and the Anamba Islands.

In order to obviate the effect of this set or current, it is considered prudent to make good the course for Saddle Island, by which, should light airs prevail, the option will be afforded of steering clear of Victory or Barren Islands, and avoiding the Acasta Rock. This caution may appear as unnecessary, the distance between Barren and Camel Islands being 33 miles. But a very little consideration will satisfy the navigator that, upon the course shaped to counteract the current, running strong in the vicinity of these islands (to the north-eastward as near as could be determined by the lines of scum viewed from the summit of Barren Island), he would not, even with a fair wind, pass more than 10 miles to windward of Victory and Barren Islands. On leaving Barren Island, a course should be shaped to pass well to the southward of the St. Pierre Islands.

In the N.E. monsoon the current will generally be found setting about S.S.E., a few miles outside the entrance of Singapore Strait, taking a more south-easterly direction as the distance from the land is increased. For directions for leaving Singapore Strait during this monsoon, see page 56.

The soundings off St. Pierre Rock, and in the direct course for Tanjong Api, range between 20 and 15 fathoms, and approaching this headland the first cast under 15 fathoms at night should be deemed *the warning*. If in a sailing vessel, deep water to the northward must be sought for. By day, as the land is neared, the vessel's position may readily be determined by the relative position of the coast hillocks, with the mountain range behind, and if clear, the land of Tanjong Datu should be clearly made out before attempting to close, or communicate with, Tanjong Api.—*Sir Edw. Belcher*.

2.—RHIO STRAIT.

General Description.—The route outside Linga and through Rhio Strait, is the one now commonly adopted by vessels proceeding either way between Sunda Strait and Singapore, for the reason that Rhio Strait is “safe, sheltered, and easily navigable, the Dutch Government having placed beacons on many of the dangers; whereas the route outside Bintang is exposed in both monsoons, and the fairway encumbered with many rocks and shoals, which render it necessary for vessels to keep a great distance from the land.”

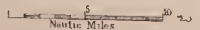
This route is particularly convenient for vessels leaving Singapore for

The Raffles Lighthouse on Cross Islet Area is a height from high tide 22.25 meters (72.8 feet) not visible from N.W. to W. nor north to E.S.E.

The Borahburg Lighthouse on Pulau Brava is a granite tower 35 feet high, and Area of lighted rock on hill at an elevation of 45 feet above the sea, visible every way at 4.5 miles (7.2)



STRAITS OF SINGAPORE, DURIAN, AND RHIO



Europe in the N.E. monsoon, and few navigators now adopt any other; as by proceeding through Rhio Strait, they avoid the delay and inconvenience frequently experienced during that season in getting to sea by the main channel of Singapore Strait, past Horsburgh lighthouse. In the S.W. monsoon, also, vessels are frequently able to proceed to the southward much quicker by Rhio Strait than by the route outside Bintang.

The following directions are taken from those drawn up by Lieutenant J. W. Reed, R.N., who together with Lieut. Tizard and the officers of H.M.S. *Rifleman*, surveyed the strait between the years 1865 and 1868.

Caution.—As the buoys in Rhio Strait have at times been reported out of position, too much reliance must not be placed on them.

WEST SIDE OF THE STRAIT.

MISSANA ISLAND, which with the opposite island of Talang forms the southern limit of the strait, is somewhat peculiar in shape, consisting of two narrow ranges of hills, moderately elevated, which running in different directions form an elbow; the longer range extends from the South point of the island $4\frac{1}{4}$ miles in a N. by W. $\frac{1}{2}$ W. direction, and the shorter range E. by S., 2 miles from the northern part.

Niamok, a small square-shaped island, lies $1\frac{1}{4}$ mile south-eastward of the South point of Missana, and between them is a rocky islet, and several dangers which block the channel. A small, thickly-wooded islet lies a quarter of a mile south-eastward of the East point of Missana, forming with the eastern side of that island and Niamok a bay, which appears to offer excellent anchorage; but it is treacherous, and must be entered with caution, for a reef extends nearly a mile in a north-easterly direction from Niamok, while the shore of Missana is fronted by a reef which projects in places nearly three-quarters of a mile, and just embraces the small islet off the East point. Vessels may, however, find safe and convenient anchorage anywhere in the bay, in from $5\frac{1}{2}$ to 8 fathoms, by avoiding to bring the eastern part of the small islet to the eastward of N.E. by E. $\frac{1}{2}$ E., and the eastern side of Niamok to the eastward of S. by E. $\frac{1}{4}$ E.; the South point of Missana bearing W. by S. clears the reef which projects from Niamok.

The shore reef extends but a short distance from the north-eastern part of Missana, but from the North shore it projects about half a mile, and a 2-fathoms patch lies some distance outside the edge of the reef, which makes it dangerous to approach that shore nearer than a mile. A mass of rocks above water lies 2 or 3 cables westward of Observation Point, the N.W. point of the island, westward and south-westward of which other dangers extend more than half a mile.

RODONG PEAK, 797 ft. high, bears S.W. by W. $4\frac{1}{2}$ miles from the N.W. point of Missana. Viewed from the southward, it presents a conical appearance, and being the only hill of this feature in the vicinity is very conspicuous. It is one of the principal objects which will enable a stranger to make out the entrance to Rhio Strait, for it can nearly at all times be seen over Missana as the strait is approached. The hill, from the peak, forms a shoulder to the north-westward, and then gradually slopes away in that direction, so that as Missana is passed the conical shape disappears.

BINAN ISLAND, lying W.N.W. $3\frac{1}{4}$ miles from Missana, is easily recognised by a conspicuous hill, 269 ft. high, at the S.E. end. A reef fronts the greater part of Binan, extending a quarter of a mile off the North part, and more than double that distance off the N.W. extreme.

Rifleman Shoal, a patch of hard sand 3 cables in extent, lies about a mile off the centre of Binan; the least water upon it is 2 fathoms, and from this spot the hill on the island bears S.W., and the N.W. extreme W. by N.

Katang Linga lies $1\frac{1}{4}$ mile N.W. by W. from Binan; it is a bold, bluff-looking island, 246 ft. high, nearly a mile long, and half a mile broad; a shore reef fronts the greater part of it, extending off in some places nearly $1\frac{1}{2}$ cable. A *shoal*, having but three-quarters of a fathom water over it, lies three-quarters of a mile W.S.W. from the North point of Katang Linga.

The straits and islands dividing them, which lie to the westward of Missana, Binan, Katang Linga, &c., are hereafter described.

Selanga Islands, three in number, are mere islets, but elevated and conspicuous; they lie to the north-westward of the Tetampan Group, the northern one bearing from the North end of Katang Linga W. by S., distant 3 miles. Vessels working should not stand within a line drawn between Katang Linga and the North Selanga, which will keep them clear of the shoal W.S.W. of the first named island, and of a reef, having a rock with a tree upon it, which lies between the Tetampan Group and the Selangas; and a 2-fathom patch lies 2 cables North of the North Selanga.

Oedek Island is small. It lies N.W. by W. $\frac{1}{4}$ W., $3\frac{1}{2}$ miles from the North Selanga, and E. by N. from the North end of the long island of Pangallap. This island, as well as the Selangas, lies quite out of the track of steamers, or of sailing vessels proceeding through Rhio Strait with a fair wind, but it may sometimes be found convenient when working through to stand so far to the westward, in which cases ships should not pass a line drawn between the North Selanga and Oedek, in order to avoid a rock awash which lies W. $\frac{1}{4}$ N., $1\frac{3}{4}$ mile from the former island.

PULO DUMPO or **RONDO**, 129 ft. high, lies N.W. $\frac{1}{2}$ W. $7\frac{1}{2}$ miles from Katang Linga, and about $1\frac{1}{2}$ mile south-eastward of the South end of Galang Island. It is a remarkable little island, showing very round and bold against the adjacent land, and is one of the most useful objects for recognising the entrance to the narrow part of the strait when coming from the

southward. A patch of 2 fathoms, named *Haai Shoal*, lies a quarter of a mile to the south-eastward of it; and there is a *rock above water* a good quarter of a mile to the north-westward.

Great Bank.—Galang terminates to the southward in a long narrow point. projecting in a S.S.E. $\frac{1}{2}$ E. direction, and half a mile to the eastward are three small islands lying in a line parallel to it; between the point and outer island is a coral patch with 2 fathoms water over it, and 7 to 9 fathoms round about. Between these islands and the large one of Selatan, about 3 miles north-eastward of them, is a deep bay fronted by a bank, named by the Dutch, Groote or Great Bank. This bank has $2\frac{1}{4}$ to 3 fathoms over it, $3\frac{1}{2}$ to 5 fathoms between it and the small islands, and 4 to 8 fathoms between it and Selatan. The anchorage in the bay inside the bank was formerly considered to be good, but large reefs and shoals extend, both from Galang and Selatan, which render it anything but a safe and convenient place for large vessels seeking a temporary anchorage to resort to.

East Bank lies N.N.E. $\frac{3}{4}$ E. $4\frac{3}{4}$ miles, from Pulo Rondo, its outer or northern part being a third of a mile S.E. $\frac{1}{2}$ E. of Tanjong Dempoe, the eastern point of the adjacent islands. It is a little more than half a mile in extent, with $\frac{3}{4}$ to $1\frac{1}{2}$ fathom water over it, and 10 to 12 fathoms near it.

Tjassens Shoal is an extensive bank, with $1\frac{1}{4}$ to 3 fathoms water over it, lying between Pulo Taron (the island close to the northward of Selatan) and the southern part of Great Garras Island; the S.E. extreme, which is nearly in the line between Dempoe Point and the East end of Great Garras, terminates in a reef which dries at half-tide. Former charts exhibited a clear channel on each side of Tjassens Shoal, but the northern one is very narrow at the western end, does not afford a greater depth than 3 fathoms, and is only available for small vessels; the southern channel is good, being nowhere less than three-quarters of a mile wide, with depths of 6 to 13 fathoms. Navigators using it, however, must be careful, when avoiding the shoal, to give a berth to a small patch of reef which lies a third of a mile off the N.E. part of Tarong, and after the West end of Great Garras is brought to bear N.E., that island must be approached in order to avoid the bank extending from the opposite shore, and upon which are some patches of reef; the northernmost of these patches has a small islet upon it, and lies N.W. a little over a mile from the West end of Great Garras.

LITTLE GARRAS ISLAND and **LIGHTHOUSE** marks the entrance of the narrow part of Rhio Strait. It is but a quarter of a mile long East and West, formed of two small hills, and encompassed by a narrow fringe of reef. On the eastern hill is the lighthouse, painted white, from which is exhibited a *fixed bright light*, elevated 114 ft. above the sea, and visible 8 miles. This light is very useful for guiding vessels into the narrow part of the strait by night, and leading them between Pankel and the Moebet Islands, and northward until Sau light comes in sight.

Ditloffs Reef, lying about three-quarters of a mile S. by E. from the eastern extreme of Little Garras, has from $4\frac{1}{2}$ to 10 fathoms water close to it; and between it and that island is a patch with 2 to 3 fathoms water over it.

GREAT GARRAS ISLAND is $3\frac{1}{4}$ miles long W. by N. and E. by S., and three-quarters of a mile broad; it has a flat summit, and terminates with abrupt points. A reef encircles it, and extends in places a quarter of a mile off. A *patch of reef* lies about a third of a mile from the N.W. point of the island, and from that point halfway along the North coast of the island, a bank, with but 2 to 3 fathoms water over it, projects nearly a mile, and for half a mile farther in the same direction the soundings are under 5 fathoms; large vessels should not, therefore, stand inside a line drawn between Little Garras and East Moebet Island.

Tarong Point, the N.E. extreme of Galand Island, bears N.N.W. $\frac{3}{4}$ W. $2\frac{1}{2}$ miles from the West end of Great Garras; it has on its northern side a small bay, in which is a native village. A reef fronts the point at a distance of a quarter of a mile, and outside of it a shoal bank rounds away to the small islet opposite Great Garras.

MOEBOET ISLANDS.—At 6 miles N.W. $\frac{1}{2}$ N. from Little Garras is the larger and higher of the two Moeboet Islands, readily distinguished by its prominent position, and the deep inlets to the westward and southward. It rises to a round peak, with the greatest declivity on the eastern side; whilst the smaller island, or West Moebet, is considerably lower towards its centre. Dangerous reefs and shoals extend from these islands $1\frac{1}{2}$ mile to the southward. The West end of Great Garras bearing S. by W. clears them to the eastward, and the extreme of Tarong Point in one with the extreme of a point a mile westward of it bearing W. by N. $\frac{1}{4}$ N., clears them to the southward. Shoals also extend more than a mile north-westward of East Moeboet. The North and East extremes of Sembolang Point in one bearing about N.W. is a close mark for the eastern side of them, and the South end of Pankel, bearing E. by S. $\frac{3}{4}$ S., clears them to the northward.

SEMBOLANG POINT, the eastern extreme of Rempang Island, is the next prominent object on the western side of the main channel after passing northward of the Moeboet Islands. It is fronted by a reef, close to which are 5 to 9 fathoms. From this point the land trends to the westward, increasing the width of the strait.

TIEMARA BANK lies N.W. $\frac{3}{4}$ N. $3\frac{1}{4}$ miles from Sembolang Point, and about $1\frac{1}{4}$ mile eastward of Tiemara Island; it is about half a mile in extent, with $1\frac{1}{4}$ fathom water over it, and 7 to 9 fathoms near it. A *black* buoy with *white* ring is moored on the eastern side of the bank, in 3 fathoms, with the N.E. point of Tiemara bearing N.W. by W., and the East point of Pulo Loban N.N.E. To avoid the bank, Sembolang Point should not be brought

East of S.S.E., nor the eastern extreme of Little Tiemara Island to the North of N.W.

TIEMARA ISLAND is elevated 341 ft., and when first seen appears like a bold point projecting from Rempang; it is surrounded at a short distance by a reef. *Little Tiemara Island*, lying about a mile N. by W. $\frac{1}{2}$ W. from the N.E. point of Tiemara Island, is about a third of a mile in extent, and surrounded by a reef which on the East side of the island projects a quarter of a mile; near the reef are 12 to 21 fathoms water. Between the Tiemara Islands are several reefs, which render the channel unnavigable.

At $2\frac{1}{2}$ miles N.W. from Little Tiemara is Antu Islet, off the North and East sides of which a reef extends for a quarter of a mile, and forms the southern side of the eastern entrance to Bulang Strait. To the eastward of a line joining Little Tiemara, and a little islet on the reef eastward of Antu Islet, there is a shoal which fills up the bay lying eastward of Pulo Kantylil and Ayer Radya.

Innang Reef bears from Little Tiemara Island N.N.W. $\frac{1}{4}$ W. distant nearly 3 miles. It is marked by a *white* buoy with *black* ring in $5\frac{1}{4}$ fathoms, on its eastern point, with the South point of Pulo Loban bearing E. by S. $\frac{1}{4}$ S., Sau light N. $\frac{1}{2}$ W., and the South point of Pulo Innang W. $\frac{1}{2}$ S. Near it are depths of 10 fathoms, and southward and south-westward of it is a small bank of $4\frac{1}{2}$ and 5 fathoms.

INNANG ISLAND, $1\frac{1}{2}$ mile northward of Ajer Radja, forms the northern side of the entrance to Bulang Strait. A reef fronts the island to the distance of a third of a mile. Sau lighthouse, if not brought to the northward of N. by W. $\frac{1}{2}$ W., will keep a vessel clear of Innang Reef and the tongue of rocks and sand extending from Sau.

SAU ISLAND and **LIGHTHOUSE**.—Sau Island is larger than Innang, and lies to the northward of it. Inside these two islands are several small islands, with channels between them into Bulang Strait. A detached rocky patch lies S.S.E., a quarter of a mile from the eastern point of Sau. The lighthouse, painted *white*, is erected on the East point of Sau Island, from it a *fixed bright light* is exhibited at an elevation of 118 ft., visible 8 miles off.

Little Innang Island and **Van Gogh's Shoal**.—Little Innang is a small island lying off the N.E. part of Sau, opposite West Point, Bintang, from which it is distant nearly 2 miles; it is encompassed by the reef which runs in a northerly direction from the East point of Sau.

Dangerous shoals extend for $2\frac{1}{2}$ miles to N.N.W. from Little Innang Island; and *Van Gogh's Islet*, N.W. by W. $\frac{1}{2}$ W. from the East point of Little Innang, is situated on a coral reef. The East point of Sau in line with the East point of Little Innang clears all these dangers to the eastward, and Malang Yarong (an islet on the opposite coast) bearing E. $\frac{1}{4}$ S. clears them to the northward. The soundings decrease rather quickly under a depth of 10 fathoms near the dangers just described, and in the event of a vessel

standing towards the southernmost of them getting a cast of 10 fathoms or less, she should tack immediately.

Malang Orang Reef.—The N.E. coast of Battam, from abreast Sau Island to *Nongsa* or *Boerong Point*, which forms the western point of the North entrance to Rhio Strait, is fronted by a reef, extending in some places to the distance of three-quarters of a mile from it. The Malang Orang Reef lies nearly three-quarters of a mile from the Battam shore, and about E.S.E. from Malang Orang Point. It is nearly half a mile in extent North and South, with 5 to 8 fathoms near it. It is marked by a *black* buoy with *white* ring on its eastern edge, in 9 fathoms, with Pan beacon bearing N.E. $\frac{1}{4}$ E.

PAN REEF, lying nearly in the middle of the northern entrance of Rhio Strait, is extensive and rocky, and visible at low water, when it appears as a long ridge of black stones. It is half a mile long N.E. $\frac{3}{4}$ N. and S.W. $\frac{3}{4}$ S., and 2 cables broad; and close to it are depths of 5 to 7 fathoms, except at the S.W. end, where it is not so steep. A large *screw pile beacon* is placed near the N.E. end of the shoal, and a *black* buoy with *white* ring, in 8 fathoms, on the S.W. point of the reef, with Sau light bearing South, and Pan beacon N.E. The other edges of the shoal are sometimes marked by small basket beacons, but they are not to be depended upon. There is a safe passage on either side of the shoal, but the native pilots, who generally conduct vessels through Rhio Strait, seldom use the eastern channel, where the depths are inconvenient for bringing up in case of bad weather.

Barbukit kept North, or N. $\frac{1}{4}$ W., leads eastward of the Great Pan, and Johore Hill bearing about N. by W. $\frac{3}{4}$ W. leads westward; but Sau lighthouse in line with the East extreme of Little Innang, bearing S. $\frac{1}{2}$ E., is a good leading mark for passing between the Pan Shoals; and the lighthouse bearing S. $\frac{3}{4}$ W. leads to the eastward of the Great Pan. In passing eastward of the shoal, when Tanjong Nongsa (Boerong Point), the northern extreme of Battam, bears W. by N., or when Pulo Nongsa is just shut in behind Tanjong Nongsa, a vessel will be to the northward of it, and has entered the Strait of Singapore.

Riondo Shoal, said to lie about N.W. $\frac{1}{2}$ W., distant $1\frac{1}{2}$ mile from the Pan Shoal, does not exist; the locality has been thoroughly examined.

LITTLE PAN REEF lies N.W. $\frac{1}{2}$ N., $2\frac{1}{4}$ miles from the Pan Reef. It is a small oval-shaped coral patch, with depths of $3\frac{1}{2}$ to 7 fathoms close around it. It is marked by a *black* buoy with *white* ring, in 3 fathoms, at its northern extremity, with Pan Reef beacon bearing S.E. by E., and Boerong Point W. by N. Pulo Nangsa just open of Nongsa Point leads just clear to the northward; and Sau Point open of the land southward of Malang Orang Point leads close to the eastward.

EAST SIDE OF THE STRAIT.

Talang, or Long Island, may be known by a square hillock over its S.E. end, 350 ft. high, which, with a sharper peak westward of it, forms a saddle; the land from this to the western end of the island is nearly of the same elevation.

Gin, or Great Island, lies 2 miles to the eastward of the northern part of Talang, and forms one of the objects which serve to mark the entrance of Rhio Strait.

Hendrik Jan Rock, on which a Dutch ship of that name struck in February, 1861, is a dangerous pinnacle, nearly awash at low water, and steep-to, having 9 and 10 fathoms close around it. It lies S.E. three-quarters of a mile from the south-eastern point of Talang, with the summit of South-west Hill just shut in by the south-western extreme of Talang.

This rock is of small size, and there was great difficulty in finding it. Several other shoal patches were found in the channel between Talang and Gin; but they all, except the *Hendrik Jan*, lie out of the ordinary track of ships, and are dangerous only in the event of this channel being mistaken in thick weather for the entrance of Rhio. Vessels should give these islands a berth of 2 miles in passing, and not bring Terobi Island eastward of E. $\frac{3}{4}$ N., until South-west Hill is well open of Talang.

SIOLON, or MANTANG ISLAND, 7 miles long, E. by N. and W. by S., and $2\frac{1}{2}$ miles broad, but divided by a narrow channel, lies to the north-westward of Talang, and is separated from it by a channel about $1\frac{1}{4}$ miles wide. On its S.W. end is South-west hill, 267 ft. high, which, when seen from the southward, appears as a double-peaked hill, terminating to the westward in a point, which forms the S.W. extreme of the island; but when viewed from the northward it makes with a peaked top. Four miles eastward of South-west Hill is *Siolon Hill*, 507 ft. high, being the highest hill on Siolon. At a distance of 12 miles to the southward both Siolon and South-west Hills appear as islands, owing to the land between them being low.

The South shore of Siolon Island, between South-west and Siolon Hills, forms a bay about a mile deep, and is fronted by a fringe of reef and a shoal bank, extending out in places nearly three-quarters of a mile. Upon this bank lie two or three detached patches of reef. *Thomas Shoal*, a patch 4 cables in extent, with 2 to 3 fathoms water over it, lies W.S.W. from Segai Islet, distant nearly a mile. There is anchorage under the southern shore of Siolon, between South-west Hill and *Thomas Shoal*, $3\frac{3}{4}$ miles eastward of it, in from 10 to 6 fathoms, with shelter from northerly winds.

There are channels on either side of Siolon which will lead out into the China Sea, northward of Pulo Gin; but as they are quite out of the ordi-

nary track of vessels, they should not be attempted by any one not locally acquainted. The tides in the channels run with great strength, and there are numerous overfalls.

Alligator Island, $1\frac{1}{2}$ mile W.N.W. from the western end of Siolon; seen from the westward, shows as three round lumps, but when approached from the northward, it appears to slope gradually from its northern end, which is 101 ft. high. There is no passage between Alligator Island and Siolon.

Alligator Reef, lying nearly a mile North of Alligator Island, is a quarter of a mile in extent. It is marked by a *white* buoy with *black* ring on its N.W. edge, in 4 fathoms, with West point of Alligator Island bearing S. $\frac{1}{2}$ E.; Topie Island, South point, W. by S. $\frac{1}{2}$ S.; and Blading Island N. by E.

Blading Island, lying $1\frac{1}{4}$ mile to the northward of Alligator Reef, is small and surrounded by a reef which extends in a southerly direction more than a quarter of a mile. Eastward of Alligator Reef and Blading Island are several other reefs and islands, lying off the northern shore of Siolon.

Prins Reef, about a third of a mile in extent, $1\frac{1}{2}$ mile N. by W. from Blading, lies on the outer edge of the shoal bank which fronts Batu Babie Point.

The Topies are a cluster of small round islets and rocks lying about 2 miles westward of Alligator Reef. Topie in the Malay language signifies hat, and when approached from the southward these islets, as they rise above the horizon, certainly present very much the appearance of the round, inverted, basin-shaped topies, or hats, in use among the Malays. The northern and eastern islands are the largest of the group; the former is 134 feet, and the latter 118 feet high. When approaching the eastern island from the northward, it appears of a crown shape, and in clear weather may be seen 10 miles off.

A *rock* lies close off the N.E. end of the eastern island; and a *bank* half a mile long, with $2\frac{3}{4}$ fathoms water over it, lies with its outer edge bearing S.E. by S., distant three-quarters of a mile from the same island.

Rotterdam Reef is a rocky patch, with only $1\frac{1}{2}$ fathom water over it, lying W.S.W. a little more than half a mile from the northern of the Topies group. It is marked by a *white* buoy with *black* ring, in $2\frac{3}{4}$ fathoms, on its West side, with South point of Pankel bearing N.W. by W. $\frac{1}{4}$ W., and Topie Island centre E. by N. $\frac{1}{4}$ N.

There is another reef, with but little water over it, lying N. by W. $\frac{1}{2}$ W., nearly half a mile from the Western Topie; its northern end is marked by a *beacon*. Near these dangers are 6 and 4 fathoms.

Dutch Shoal, a quarter of a mile in extent, with 3 fathoms water over it, and 6 or 7 fathoms close to the western side of it, lies with Little Garras lighthouse bearing S. $\frac{3}{4}$ W., $3\frac{1}{4}$ miles; the northern island of the Topies group E. by S. $\frac{3}{4}$ S., $3\frac{1}{2}$ miles; and the S.W. extreme of Pankel N.W. $\frac{1}{4}$ W.,

1½ mile. The northern Topie bearing E. by S. ½ S., and the S.W. extreme of Pankel N.W. ½ N., will lead a quarter of a mile S.W. of this danger.

This shoal is on the western edge of a bank, with 3 to 5 fathoms water on it, which lies about a mile off the S.E. end of Pankel, and extends 3½ miles farther in that direction from the island. A good mark to keep clear of the entire western edge is the apex of Loban Island in line with the western extreme of Pankel. Between the bank and Pankel the depths are 6 to 10 fathoms.

PANKEL ISLAND, 2 miles long North and South, and half a mile broad, bounds the eastern side of the main channel of Rhio Strait, abreast of Great Garras and the Moeboet Islands; it is belted by a reef which extends from a quarter to half a mile from it. Outside the shore reef at the N.W. part of the island, a bank with less than 3 fathoms water over it, projects to a distance of three-quarters of a mile from the shore. Eastward of this bank, and half a mile northward of the North point of the island, lies Pankel Reef, a patch of rocks about a quarter of a mile in diameter. Pankel, at a distance, makes as two distinct round hills; on a nearer approach a sandy beach will be seen at its South end, from which rocks and fishing stakes extend nearly three-quarters of a mile.

Rupels Reef, about a mile to the eastward of Pankel, has a *black* buoy with *white* ring on its East side, in 5 fathoms, with East point of Soré bearing N. by E.; Pankel, N.W. point, N.W. ½ W.; and Pankel, S.E. point, S.W. by W.

Sore Island, lying E. by N. ¾ N. nearly 1½ mile from the North end of Pankel, is a small, round island, covered with cocoa-nut trees, and surrounded by a reef. A shoal bank, with less than 3 fathoms water on it, extends three-quarters of a mile to the south-eastward, the tail, with 3¼ to 5 fathoms water, stretching nearly a mile farther in the same direction. N.N.W. from the island the shore reef extends more than half a mile, and half a mile farther in the same direction lies a detached reef, nearly a third of a mile in diameter; in the channel between are 5 to 8 fathoms. Nearly a mile from this last, in a N.W. ¾ N. direction, lies the S.E. end of the largest of the Soré Reefs; it is a narrow strip of sand and coral, a little more than 1½ mile long N.W. ½ W. and S.E. ½ E., and marked by a *white* buoy with *black* ring on its N.W. end in 2½ fathoms, with Pitjingit bearing E. by N. ½ N., and Terkolei light N. by W. ¾ W.

The channel, limited on one side by Rupels Reef, Pankel Island and Pankel Reef, and on the other by Soré Island and the reefs and banks adjacent to it, is perfectly free from danger, with depths of 9 to 14 fathoms.

Dompa is an irregularly shaped island; its western extreme, named Dompa Point, bears N.E. by E. 2 miles from Soré, and N. by W. 6 miles from the northern island of the Topies. Two small islands, surrounded by

reefs, lie off the South shore of Dompá. On the outer edge of the reef extending from Dompá Point is a *white* buoy with *black* ring, in 3 fathoms, with Dompá Point bearing N.N.E. $\frac{1}{2}$ E., West end of Basing Island S.E. $\frac{1}{4}$ E., and the end of Soré Island W.S.W.

The channel between the edge of the bank extending from the S.W. side of Dompá, and Soré Island and Reefs, is about 1 mile wide, and is generally used by vessels bound to Rhio from the southward; the depths in it vary from 8 to 19 fathoms.

RHIO ISLAND is about $4\frac{1}{2}$ miles in length East and West, and $2\frac{1}{4}$ miles wide, and, being separated from the manland of Bintang by a very narrow channel, appears to form part of it. The town, which stands on the N.W. point of the island, was formerly a port of much trade; and although its importance has for many years declined, it is still a place of considerable traffic for small vessels. There is a well-built fort on a hill commanding the town.

Tanjong Pinang, N.E. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles from Tanjong Dompá, is distinguished by a *beacon*, consisting of a white square pyramid, 16 ft. high, N. by W. $2\frac{1}{2}$ cables from it.

The usual anchorage is in 3 or 4 fathoms, about 2 miles northward of the West end of Dompá, sheltered from the northward by the island of Pitjingit. The soundings decrease gradually to 4 and $3\frac{1}{2}$ fathoms, but shoal suddenly under a depth of 3 fathoms. It is high water, full and change, at 9^h 50^m; springs rise 7 ft., neaps 5 ft.

Pakko is a small islet lying about half a mile off the western shore of Rhio Island, and N.W. by W. $\frac{1}{2}$ W. three-quarters of a mile from Pinang beacon, in the middle of a rocky bank about half a mile in extent. There is a narrow channel between the bank and the western shore of Rhio, having $1\frac{1}{2}$ to 2 fathoms water in it, and which is marked on the western, or rocky bank side, by three beacons.

Pitjingit, or Mars Island, lies half a mile westward of the N.W. point of Rhio, opposite the town. The island is about a mile long East and West, a third of a mile broad, is surrounded by a reef, which projects from its southern and western sides about a quarter of a mile. *Sengarang Island* projects some 3 miles to the north-westward of Rhio, forming a roadstead or anchorage between it and Pitjingit. Vessels usually enter by the narrow channel between the Pakko Reef and the West shore of Rhio. *Loz, or Loos*, is a small island lying close to the West end of Sengarang, inside the margin of the reef which extends from that island.

Terkolei Island and Lighthouse.—Terkolei Island, lying W.N.W. 4 miles from Pitjingit, is a low, flat island, about half a mile in extent, with a clump of trees on its East end; it is surrounded by a reef, which extends nearly half a mile eastward and a quarter of a mile westward and southward from it. A lighthouse is erected upon its West end, painted white, and exhibit-

ing. from an elevation of 31 feet, a *fixed bright light*, which is visible 6 miles.

Terkolei Island is situated near the middle of a *dangerous shoal bank*, composed of hard sand and mud, $7\frac{1}{2}$ miles long, E.S.E. and W.N.W. nearly, the eastern part of which extends to within half a mile of the reef surrounding Pitjingit. Half a mile South of the island a *black buoy with white ring* is moored on the edge of the shoal, in $2\frac{1}{2}$ fathoms, with Pitjingit bearing E. by S., and Terkolei North. The reef is here steep-to, and S.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile from the island is a *beacon*, on the southern edge of a 2-fathom shoal; the 3 fathoms edge of the bank is nearly half a mile southward of this beacon. Pitjingit bearing East clears the S.E. tail, and the apex of Loban bearing N.W. by W. $\frac{3}{4}$ W. will lead clear to the southward of Terkolei and the western part of the bank.

ISABELLA SHOAL lies three-quarters of a mile southward of Loban; it is nearly three-quarters of a mile long East and West, 2 cables broad, and has from 1 to $2\frac{3}{4}$ fathoms water over it. A tail, with $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms on it, stretches from its eastern extreme nearly a mile in an E.S.E. direction. The 1-fathom patch is near the centre of the shoal. A *white buoy with black ring* is moored in 3 fathoms on the western extreme of the shoal, with the East point of Pulo Loban bearing N.N.E. $\frac{1}{2}$ E., Terkolei light East, and South point of Little Loban N.W.; and a *black buoy with white ring* in 3 fathoms, on the eastern extremity, 3 cables E. $\frac{3}{4}$ S. from the West buoy.

The depths at a short distance from the South side of this danger are 6 to 10 fathoms, but its western edge is very steep, there being 14 fathoms close to it. Terkolei lighthouse, bearing E. $\frac{1}{2}$ N. clears the shoal to the southward, and Sau lighthouse, in one with the West end of Little Loban, leads well clear to the westward.

LOBAN ISLANDS, lying about half a mile off the S.W. part of Bintang, form a group of four or five small islands, separated by channels so narrow that they appear as one island. They may be recognized by the gradual rise the largest island takes from its North end, to a round hummock in the centre, which with Little Loban (the islet off its West end) present to vessels approaching them from the westward, the appearance of three distinct hills. A *reef*, about a quarter of a mile broad, surrounds the group. A small detached patch lies a third of a mile South of the S.W. point of Great Loban. The depths close to the reef fronting the western side of the Loban group are 11 to 20 fathoms. A *2-fathom patch* lies outside the shore reef on the N.W. part of Loban, the western edge of which bears N.N.E. $\frac{1}{4}$ E., three-quarters of a mile from the small islet off the West end of Little Loban.

Dessa is a small islet, conspicuous from having only one tree upon it, bearing N. $\frac{1}{2}$ W. about $1\frac{3}{4}$ mile from the West end of Little Loban, and S. by W. $\frac{1}{2}$ W. about half a mile from Batu Point, the nearest point of Bintang; it is on the southern point of a small shoal three-quarters of a mile in extent. Two patches of reef, together nearly a mile long E.S.E. and

W.N.W., lie with their western extreme about a third of a mile southward of Dessa, and between these and the 2-fathom patch off Loban is a channel not quite half a mile broad, with $3\frac{1}{2}$ to 9 fathoms in it. A *rocky patch* lies off the N.W. side of Dessa, the outer part being distant a third of a mile from it. Little Loban bearing S.S.E. leads westward of all these shoals, as will also West point, Bintang, if not brought westward of N. $\frac{1}{4}$ W. Close to these dangers the soundings are deep, 12 to 23 fathoms.

BATU POINT is $2\frac{1}{4}$ miles northward of Little Loban, the pitch of the point being about half a mile N.E. of the reef lying off the N.W. side of Dessa. At Batu Point the land recedes abruptly to the eastward.

Dua Island, about three-quarters of a mile long N.N.W. and S.S.E., fronts the bay between Batu and West points; a round lump which rises in its centre is lower than the adjacent land. There is a remarkable white rock near its West side. The island is bordered by a reef, and a small detached patch lies nearly a quarter of a mile south-westward of its South point, and a rock awash about the same distance to the south-eastward. This last, narrows the channel between the island and shore to $1\frac{1}{2}$ cable, but the water in it is deep, 7 to 12 fathoms; behind the island the depths are various, $4\frac{1}{2}$ to 11 fathoms, and 3 cables northward of the reef fringing the North part of Dua, and 2 cables from the Bintang shore, is a 3-fathom patch, leaving a patch more than a quarter of a mile broad, with $1\frac{1}{2}$ fathom water in it.

WEST POINT, bearing N. by W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from Batu Point, is bold-to on the South and West parts, but on the North part a reef begins to extend from the shore, and trends away from the point in a northerly direction, passing outside by Senggera Islet. West Point is moderately elevated land, presenting a round shelving appearance, and from it the coast line trends to the north-eastward, forming the eastern side of the North entrance of Rhio Strait.

The *Senggera* are a ledge of flat rocks, lying about a quarter of a mile off shore, $1\frac{1}{4}$ mile N. $\frac{1}{2}$ E. from West Point. Detached rocks on the shore reef will be seen nearly as far as West Point.

Malang Yarong is a small islet, covered with trees, lying half a mile North from Senggera Rocks, on the edge of the reef fronting the shore, which here extends more than a third of a mile off.

Pulo Kera, or *Skerrie*, is a small island lying N.E. $\frac{1}{4}$ N. 2 miles from Malang Yarong, and close off Kalumpung Point; it is of an oblong form, about 80 feet high, and will be recognized by the coast near it receding to the E.N.E., in the direction of the Subong River. The reef which fronts the coast from West Point follows the trendings of the coast, and passes a quarter of a mile outside Kera, and then trends to the eastward, fronting the southern coast of the large bight between Kera and Subong Point.

A *shoal bank*, with less than a fathom water over it in one place, and $1\frac{1}{2}$ to 3 fathoms elsewhere, fronts the shore reef above mentioned; the 3-fathom

line which marks its edge takes from Malong Yarong Island a N.N.E. direction for about a mile, where it trends a point more to the eastward and passes about half a mile outside Pulo Kera; from thence it trends away with an irregular outline to Tanjong Subong, passing just outside the Pap and a group of rocks E.N.E. from it. This bank between Malang Yarong and Kera is steep-to under a depth of 8 fathoms, and must be carefully avoided.

Netscher Shoal, the outer part of which lies half a mile outside the shoal bank just described, is very dangerous, for there is less than a fathom water on its N.W. extreme, and less than 3 fathoms everywhere else. It is a somewhat circular shaped shoal, about half a mile in extent, composed of hard sand and coral, and from the outer edge Pulo Kera bears S. by W., distant $1\frac{1}{2}$ mile, and the extreme of Tanjong Subong N.E. by E. $\frac{1}{2}$ E., $4\frac{1}{4}$ miles. Close to the western side of this danger are 10 and 6 fathoms, and the lead cannot be depended upon to give warning in time to avoid it.

SUBONG BAY, the deep bight between Pulo Kera and Subong Point, is nearly filled up with reefs, and is best understood from the chart.

Crocodile Shoal is a small patch of hard sand with 3 fathoms water over it, and is the outermost of the dangers off this part of Bintang. It lies N.E. $\frac{1}{4}$ N. $2\frac{1}{2}$ miles from Netscher Shoal; N.N.E. $\frac{3}{4}$ E. $3\frac{3}{4}$ miles from Pulo Kera; and W. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from Subong Point. Close to the West and N.W. sides of this shoal are 6 to 8 fathoms, and $4\frac{1}{2}$ fathoms a quarter of a mile from it on the N.E. side. Kera Island bearing S.S.W., leads nearly half a mile westward of the Crocodile; and Pulo Nongsa bearing West, or the islet off Subong E. $\frac{1}{2}$ S., leads half a mile to the northward. Barbukit Hill, N. by W. $\frac{1}{4}$ W., will also lead to the westward.

Sau Lighthouse bearing S.S.W. $\frac{1}{2}$ W., clears the shoal bank N.N.E. of Malang Yarong, as also the Netscher and Crocodile Shoals; it is a good guide for strangers when working near this rather dangerous coast.

SUBONG POINT is the N.W. extreme of Bintang and the north-eastern limit of Rhio Strait. It bears from Kera Island N.E. $\frac{1}{2}$ E. $5\frac{1}{4}$ miles, the coast between forming a deep bight, at the head of which is the entrance of the Subong River. A small islet lies off the pitch of the point, and S.W. by W. a third of a mile from the islet is a sunken rock. Some islets also lie close to the coast S.S.E. from the point.

Tides.—The flood tidal wave in the China Sea comes from the northward, and, being divided by the island of Bintang, sweeps round its shores, and flows into Rhio Strait at both ends, the stream from Singapore Strait meeting that from the southward in the space between Tiemara Island and Rhio. The main body of the southern stream takes a general westerly direction for Dumpo Strait, much of it diverging to the southward through the channels dividing the several groups of islands lying between Missana and Dumpo, and a portion turning off to the N.W., in the direction of Garras;

this last is joined by the streams flowing through the Siolon and adjacent channels, which gradually trend away to the north-westward after they enter the strait.

The monsoons and currents of the China Sea very much affect the regularity of the tides, which are strong, and at the springs rush with great velocity through the channels among the islands, forming numerous eddies, and stirring up the mud. In the narrow part of the strait, about West point, this is particularly the case, the tide running from 3 to 4 knots, and sometimes even $4\frac{1}{2}$ and 5 knots.

DIRECTIONS *through Rhio Strait to Singapore.*—Directions to proceed from Banka Strait outside Linga Island are given at page 54. A vessel intending to proceed through Rhio Strait, and having brought Tanjong Eung (the eastern extreme of Linga Island) to bear S.S.W. $\frac{1}{2}$ W., and Great Domino West, should steer about N.W. $\frac{1}{3}$ N., which, if care be taken to guard against the effects of the tide, will take her to the fairway at the entrance of Rhio Strait, with Pulo Gin—which will be first seen on the starboard hand—bearing about N.E. $\frac{1}{2}$ E., and Rodong Peak about S.S.W. $\frac{3}{4}$ W. In this track, if the course is preserved, the vessel will pass 7 or 8 miles outside Crocodile Rock, and 5 or 6 outside the Fly and Pollux Shoals.

Rondo, the small round island on the West side of the strait, and the peak of Rodong (page 314), the only hill of this feature in the vicinity, with South-west Hill on Siolon (page 319), Talang Island, and the extreme land to the eastward (Pulo Gin, with a flat peak near its centre) will, at a distance of 14 miles, readily show the approach to the narrow part of the strait, while nearer the Topies, Alligator, and other islands, cannot fail to point out the main channel.

Having brought the South end of Pulo Gin abeam, a N.W. $\frac{1}{2}$ W. course will lead to the entrance of the narrow part of the strait, and Table Hill, which is flat on the summit, and stands on the southern part of Galang Island, should be seen a little on the port bow. In entering, borrow towards the islets near Galang, to preserve the deepest water and to avoid the Topies, which latter have shoals extending 1 or 2 miles to the S.S.E., and 1 mile from their western sides.

Having arrived abreast of Little Garras, distant about a mile, a N.W. $\frac{1}{2}$ N. course will lead through the fairway of the channel till the Loban Islands are abeam, a distance of 16 miles. With Little Loban bearing East, distant a mile, a N. by W. course for 7 miles will take the vessel past West Point Bintang, which will bear about S.E.; a N. by E. or N. by E. $\frac{1}{2}$ E. course will then lead midway between the Pan Reef and the dangers off the N.W. coast of Bintang into Singapore Strait.

The mark for passing eastward of the Pan Reef is to bring Barbukit Hill N. $\frac{1}{4}$ W. or North, but not to the eastward of North, and to steer that course until Johore Hill bears N.N.W. $\frac{1}{2}$ W., which will lead north-eastward of both

Pan Reefs. A vessel will be clear of the Little Pan when Pulo Nongsa opens of Nongsa Point, and when the passage between the islands and the point comes open, she may steer N.W. and W.N.W. as necessary for Singapore Road. If the tide is setting to the westward, a sailing ship should be careful, especially in light or contrary winds, to get well over on the northern side of Singapore Strait, otherwise she may be carried by the strong current to the westward of St. Johns, and unable either to fetch into Singapore Road, or, from the great depth of water, to anchor.

The soundings do not give sufficient warning to keep a vessel clear of the Crocodile Rock, but in the event of meeting with baffling or contrary winds or tides, and getting over towards this danger, Domino Hill (the island lying between the Great Domino and Tanjong Eung) should not be brought to the southward of S. $\frac{1}{2}$ W., until the islet off the N.W. end of Great Domino bears S.W. $\frac{1}{2}$ W. The Fly Bank and the Pollux Rock must not be approached to a less depth than 13 or 12 fathoms.

At night, or in thick weather, a vessel, after having brought Tanjong Eung to bear S.S.W. $\frac{1}{2}$ W., and Domino Hill East, should make a N.N.W. $\frac{1}{2}$ W. course for about 23 miles, and then N.W. $\frac{1}{2}$ W. about 28 miles, which courses, if proper allowance has been made for the tide, will keep her 10 or 11 miles eastward of the Fly and Pollux Shoals, and place her in the fairway at the entrance of Rhio Strait, with Pulo Gin on the starboard beam.

Formerly difficulty was often experienced by strangers in making out the entrance to Rhio Strait, from the imperfect manner in which the islands between Missana and Dumpo were laid down on the charts; since, however, these have been correctly delineated, seamen making the strait for the first time will readily recognise any of the islands. The high conical peak of Rodong, the most conspicuous object in approaching the strait, should be made out as soon as possible.

Now that the channel between the two Pan Reefs is known to be clear (the survey of the *Rifleman* having proved that the reputed Riondo Shoal does not exist), no difficulty will be experienced in passing between them, as they are well marked by the beacon and buoy on the Great Pan, and a buoy on the Little Pan; it is only necessary to pass at a reasonable distance from these marks.

To work through Rhio Strait from the Southward.—It seldom happens that a vessel will have to work along near the islands from Missana to Dumpo. It is generally found advantageous to stand to the northward in case of meeting with a north-westerly wind, but it may occasionally happen that a vessel will derive advantage by standing towards them; in which case, when nearing the North side of Missana, in order to avoid the dangers which extend about three-quarters of a mile from that shore, the apex of Binan must not be brought northward of W. by N. To avoid the Rifleman Shoal, which lies about $1\frac{1}{2}$ mile eastward of the N.E.

point of Binan, the eastern extreme of Missana must not be brought East of S.E. $\frac{1}{2}$ E., or the northern extreme of Katang Linga North of W. by N. $\frac{1}{2}$ N. This last also clears the $3\frac{1}{2}$ -fathom patch off the North part of Binan. The East side of Katang Linga may be approached to the distance of half a mile, and the northern part of the island to within a quarter of a mile. The Selangs Islands and Oedik may be approached to within a moderate distance, but care must be taken not to stand within a line drawn from the North extreme of Katang Linga to the North Selanga, or within another drawn from the last-named island to Oedik, for reasons stated in the description of those localities.

In standing to the westward towards the South end of Galang Island, a vessel may approach the Great Bank (page 315) to 9 or 8 fathoms; but between the Great Bank and East Bank should tack at the first cast under 10 fathoms, as a 3-fathom bank projects far out from the island between Selatan and Dempo, and the soundings decrease suddenly towards it. To avoid this bank and also East Bank, the S.E. extreme of Selatan Island should not be brought South of W. by S., until Dempoe Point, the eastern extreme of the group, is West of N.W. by W. Rondo Island bearing S.W. $\frac{1}{2}$ S. also leads outside of East Bank and all other dangers between that island and Dempo Point, and is a safe turning mark.

Between Dempo Point and Little Garras a vessel may stand into 8 or 7 fathoms; but, to avoid Ditloff's Reef, the eastern point of Galang (which projects into the bay) must not be brought South of W. $\frac{1}{2}$ S. until Little Garras lighthouse bears westward of N.W. Little Garras should not be approached nearer than a quarter of a mile, nor Great Garras than half a mile, to avoid their reefs. The soundings near the former are deep, 11 to 22 fathoms, but 8 or 9 fathoms will be found half a mile from the reef of Great Garras.

Between Great Garras and East Moeboet Island a vessel may stand into 8 or 7 fathoms, but a good tacking mark appears to be to keep Little Garras well open of Great Garras; and, if this be attended to, it will keep the vessel clear to the eastward of the banks which extend about $1\frac{1}{2}$ mile southward from Moeboet.

After passing Moeboet, its eastern extreme must not be brought eastward of S. by E., until the southern extreme of Sembolang Point bears W. by S. $\frac{1}{2}$ S., when the vessel will be clear of the bank which extends N.W. of Moeboet; from thence to Sembolang Point she may stand into 8 or 7 fathoms. E. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ mile from Sembolang Point is a patch of coral, with $5\frac{1}{2}$ fathoms water over it, and 6 to 8 fathoms near it; but half a mile nearer the point there is a run of deeper water, 11 or 12 fathoms, and close to the reef fronting Sembolang Point are 7 and 9 fathoms.

Sembolang Point is fronted by a reef, but the pitch of the point may be passed at a quarter of a mile. The bay between that point and the Tiemara

Bank is free from danger, and a vessel may stand into it as convenient, but be careful not to bring the S.W. extreme of Tiemara Island West of W. $\frac{1}{2}$ N., nor the N.E. extreme of Little Tiemara North of N.W., in order to avoid the Tiemara Bank, over which there is as little as $1\frac{1}{4}$ fathom water.

Little Tiemara should not be approached nearer than half a mile, on account of dangers which extend nearly that distance from it, and close to which are 12 to 21 fathoms, so that the lead cannot be relied upon to give warning in sufficient time. After passing this island, its N.E. extreme kept to the southward of S.S.E. $\frac{1}{4}$ E., will serve as a good tacking mark as far as the buoy on the Innang Shoal, leading outside the Johannes Bank, and clear of all danger.

To avoid the dangerous reef which extends nearly half a mile from Innang Island, the N.E. point of Little Innang must be opened of the eastern extreme of Sau Island (with the lighthouse upon it) after passing the Innang Shoal buoy; and, if this be attended to, a vessel will keep outside all danger as far as the eastern extreme of Sau, which latter should not be approached nearer than half a mile on account of the small reef off it.

After passing Little Innang, in standing to the westward, do not shut in the eastern extreme of Sau Island behind Little Innang; this will lead safely along that side of the channel as far as the buoy on the Malang Orang Shoal, in about 10 to 15 fathoms water. If this buoy should have disappeared, the eastern extreme of Little Innang, if not brought East of S. by E., will lead clear of that danger.

Sau Point, if not brought South of S.W. $\frac{1}{2}$ W., will lead clear of the south-eastern edge of the Pan Shoal; and when passing to the eastward of that danger, care must be observed not to bring Barbukit Hill to the eastward of North, until Johore Hill bears N.N.W. $\frac{1}{2}$ W.; and then not to bring the last-named hill to the northward of N.N.W. $\frac{1}{2}$ W. until Pulo Nongsa is open of Nongsa Point.

In working between the Pan Reefs, after having passed the buoy on the Malang Orang, care must still be taken not to bring the eastern extreme of Little Innang East of S. by E., or to stand inside a line drawn from Malang Orang buoy to the buoy of the Little Pan, in order to avoid the dangerous shore reef which extends from Battam nearly three-quarters of a mile.

In standing to the eastward towards Talang Island, at the southern entrance of Rhio Strait, be careful to give the south-eastern shore of that island a berth of 2 miles, and to keep South-west Hill, on Siolon Island, well open to the westward of Talang, to avoid the Hendrik Jan Rock, which is awash at low water. The S.W. point of Siolon and Alligator Island may be approached to half a mile. When nearing the Topies, South-west Hill kept well open of the southern point of Alligator Island, will lead southward of all danger on that side of the group; and, in order to keep to the westward of Rotter-

dam Reef, the south-western extreme of Pankel must not be brought to the westward of N.W. $\frac{1}{2}$ W.

To clear the shoal water, 4 to 5 fathoms, which extends nearly $2\frac{1}{2}$ miles southward of the Topies, Siolon Hill must be kept open of South-west Hill, which will lead South of it, and the apex of Loban open of the West extreme of Pankel clears it to the westward, as also the Dutch Shoal and shoal bank of soundings south-eastward of Pankel.

It is not advisable to stand over between the Topies and Pankel, on account of the Rotterdam Reef; the reef which lies N. by W. $\frac{1}{2}$ W. nearly half a mile from the northern island of the Topies Group; and the Dutch Shoal of 3 fathoms lying S.E. $\frac{1}{4}$ E. nearly $1\frac{1}{2}$ mile from Pulo Pankel.

The Dutch Shoal, S.E. of Pankel, will be avoided by keeping the S.W. extreme of Pankel to the northward of N.W. $\frac{1}{2}$ N.; and the northern Topie Island, if not brought South of E. by S. $\frac{1}{2}$ S., will lead to the southward.

The S.W. end of Pankel should not be approached nearer than half a mile on account of the shore reef, close to which are 13 fathoms water; the West side may be neared to 7 or 8 fathoms, but the northern end should not be approached within a mile on account of the shoal water extending N.N.W. from it; this shoal water may be avoided by keeping Little Garras lighthouse open of the S.W. extreme of Pankel.

Between Pankel and the Isabella Bank, a vessel may stand well over in depths of 8 or 9 fathoms; but not to bring the North end of Pankel to the southward of S.S.E. $\frac{1}{4}$ E., or Turkolei lighthouse to the westward of N. by W., to avoid the Soré Reefs. Turkolei lighthouse bearing E. $\frac{1}{2}$ N. clears the Isabella Shoal to the southward; and Sau lighthouse in line with the West end of Little Loban leads well clear to the westward.

Little Loban should not be approached nearer than half a mile; and, after passing it, the western extreme should not be brought South of S. by E. $\frac{3}{4}$ E., until Batu Point bears East, which will avoid the dangers near Dessa Island. Batu Point is bold close-to; and both it and Dua Island may be approached to a quarter of a mile, but not nearer the latter, on account of the reef which fronts it, and near to which are 8 and 10 fathoms. West Point of Bintang is bold, and may be approached to a quarter of a mile, but a reef begins at this point which, extending outside Malang Orang and Kera Islands, fronts the whole of the N.W. coast of Bintang. Malang Yarong may be approached to a quarter of a mile, but Kera Island not nearer than three-quarters of a mile. Very close to the edge of the bank which fronts this part of the coast are 7 and 8 fathoms.

After passing Malang Yarong great care must be taken when standing in for the Bintang shore to avoid the dangerous bank which curves away from that island and extends half a mile outside Pulo Kera, and very close to which are 12 or 13 fathoms water; Sau lighthouse bearing S.S.W. $\frac{1}{2}$ W. will lead well clear of this bank, as also of the Netscher and Crocodile Shoals,

If Sau lighthouse cannot be made out after Pulo Kera bears southward of East, Malang Jarong Island—which will be seen well clear of the extreme of the land as Netscher Shoal is neared—must not be brought West of S. by W. $\frac{3}{4}$ W. until the screw pile beacon on the North end of the Pan Reef bears W. $\frac{1}{2}$ N. ; a vessel will then be to the northward of Netscher Shoal, and Pulo Kera may be brought S.S.W. but nothing to the westward, until Subong Point bears S.E. by E., by which means a vessel will avoid all the dangers off the N.W. coast of Bintang, including the Crocodile Shoal.

Through Rhio Strait from Singapore.—The ebb tide from Singapore meets the flood setting through Rhio Strait in the vicinity of the Pan Reefs; vessels, therefore, weighing at high water from Singapore will carry a fair tide through both straits.

The flagstaff on Fort Canning, Singapore, bearing West, leads 2 miles southward of the Johore Shoals; and when Johore Hill bears North, a vessel will be eastward of the shoals. Entering Rhio Strait, pass between the Little Pan buoy and the screw pile beacon on Great Pan; or, pass eastward of the Pan Reefs, and, in doing so, be careful not to bring Johore Hill to the northward of N.N.W. $\frac{1}{2}$ W. until Barbukit Hill bears North.

After passing the Pan Reefs, a course from S. $\frac{1}{2}$ W. to S. by W. $\frac{1}{2}$ W. will lead down the fairway of the strait until the vessel has arrived nearly abreast of the West point of Bintang, when S. by E. is the mid-channel course as far as the Loban Island. From thence a course about S.E. $\frac{1}{2}$ S., making allowance for tide, will lead midway between Pankel and Moeboet, also between the Garras Islands and the Topies, and out of the strait.

To work through Rhio Strait from the Northward.—In working between the Pan Reefs, the screw pile beacon on the North and the buoy at the South end of the Great Pan will point out the situation of that danger; but when standing towards the Battam shore, in order to avoid the dangerous reef extending three-quarters of a mile from the land, care must be taken not to stand inside a line drawn from Malang Orang buoy to the buoy of the Little Pan, nor to bring the eastern extreme of Little Innang East of S. by E. If proceeding by the eastern channel, in rounding the Pan Reefs, take care not to shut Pulo Nongsa behind Nongsa Point, until Johore Hill bears N.N.W. $\frac{1}{2}$ W., and then not to bring Johore Hill to the northward of that bearing until Barbukit Hill bears N. $\frac{1}{4}$ W. or North. The last-named hill must not be brought at all to the eastward of North when on the East side of Great Pan Reefs.

Standing towards the N.W. coast of Bintang, to avoid the Crocodile Shoal, Barbukit Hill should not be brought West of N. by W. $\frac{1}{4}$ W., or in case Barbukit cannot be seen, Kera Island must not be brought West of S.S.W.; or a vessel should tack in 10 or 9 fathoms. When the screw pile beacon on the Great Pan bears North of West, a vessel will be nearing Netscher Shoal, and must avoid bringing the small islet of Malang Yarong (which will be

seen well clear of the extreme of the land) West of S. by W. $\frac{3}{4}$ W., or Sau lighthouse West of S.S.W. $\frac{1}{2}$ W.; this last precaution will also clear the dangerous bank between Kera Island and Malang Yarong. The soundings decrease so suddenly about this part of the coast that they must not be relied on to give warning in time to avoid the dangers.

Kera Island must not be approached within three-quarters of a mile, but Malang Yarong may be to a quarter of a mile. A reef rounds away from Malang Yarong to West Point, having depths of 8 or 7 fathoms close-to, and it must be given a berth from three-quarters to half a mile until up with West point, which is rather bold. Dua Island must not be neared within a quarter of a mile, on account of the reef which fronts it; and all danger between Dua and Little Loban will be avoided by keeping the West end of the latter island East of S. by E. $\frac{3}{4}$ E., or by not bringing West Point West of N. $\frac{1}{4}$ W.

Standing to the westward, when near the South side of Great Pan Reef, Sau Point should not be brought South of S.W. $\frac{1}{2}$ W., which will clear the Great Pan, and also the Malang Orang Reef, in case the buoys upon these dangers should have disappeared. From Malang Orang beacon to Sau Island, keep the East point of Sau open of Little Innang, to avoid the dangers which lie north-westward of Sau.

The eastern point of Sau is bold on its northern side, but on its southern side is a small reef, distant from it a quarter of a mile, which should be given a wide berth; after passing it, be careful to keep the eastern extreme of Little Innang open of the eastern extreme of Sau, to clear the long spit which projects from the latter island, and also to avoid the reef extending from Innang, in case the beacon which marks it should be gone. Close to the reef are 8 or 7 fathoms, and 14 or 15 fathoms about half a mile off.

The same objects in line will serve to guide the vessel past the Innang Shoal buoy, towards which, if desirable, she may stand a little closer, after which, keep the East extreme of Little Tiemara South of S.S.E. $\frac{1}{4}$ E., to avoid the Johannes Shoal. Little Tiemara is fronted by a reef, and should be given a berth of at least half a mile. After passing this island, Tiemara Bank will be avoided by not bringing the N.E. extreme of that island to the North of N.W., until the S.W. extreme of Tiemara is North of W. by N., when she may stand into the bay towards Sembolang Point, as convenient, tacking in 8 or 7 fathoms.

Sembolang Point may be approached to a quarter of a mile in 10 or 9 fathoms. After passing it, do not bring its South extreme to the West of W. by S. until the eastern extreme of East Moeboet bears S.S.E., to avoid a bank which extends N.N.W. of that island. Between East Moeboet and Great Garras a vessel may stand into 8 or 7 fathoms, but a good mark for tacking is to keep Little Garras well open of the East extreme of Great

Garras, and this will also keep the vessel clear of the bank, which lies about $1\frac{1}{4}$ mile to the southward of Moeboet.

Little Garras Island may be approached to a quarter of a mile, but Great Garras not nearer than a mile. After passing Little Garras, the lighthouse must not be brought to the westward of N.W. until the East point of Galang (which projects into the middle of the bay to the southward) bears W. $\frac{1}{2}$ S., in order to clear Ditloffs Reef. Tjassens Shoal, which fills up a great portion of this bay, may then be approached to 9 or 8 fathoms.

Come no nearer than half a mile to Dempoe Point; and, after passing it, do not bring it North of N.W. by W. until the S.E. extreme of Selatan is West of W. by S., which will keep the vessel clear of East Bank and the shoal bank filling up Selatan Bay. Rondo or Dumpo Island bearing S.W. $\frac{1}{2}$ S. also leads outside of East Bank and all other dangers between that island and Dempoe Point, and is a safe tacking mark.

Between Rondo Island and Katang Linga a vessel may stand well over towards Oedik and Selanga Islands, but must avoid standing within a line drawn from the northward of the last-named islands to the N.W. extreme of Katang Linga. The East side of Katang Linga should not be approached nearer than half a mile, and in order to avoid the Rifleman Shoal (which lies about $1\frac{1}{2}$ mile eastward of the N.E. point of Binan), the northern extreme of Katang Linga must not be brought North of W. by N. $\frac{1}{2}$ N. (this also clears the $3\frac{1}{2}$ -fathom patch off the North part of Binan), nor the eastern extreme of Missana East of S.E. $\frac{1}{2}$ E.

Having passed the Rifleman Shoal, if the apex of Binan is not brought to the northward of W. by N., the dangers which extend about three-quarters of a mile from the North side of the Missana will be avoided.

Standing to the eastward, Little Loban should not be approached nearer than half a mile; and, after passing it, Sau lighthouse in line with its West extreme will clear the West side of Isabella Bank. The southern part of the bank will be avoided by not bringing Terkolei lighthouse East of E. $\frac{1}{2}$ N. Between the Isabella Shoal and Pankel, a vessel may stand well over into depths of 8 or 9 fathoms; but, in order to avoid the Soré Reefs, do not bring Terkolei lighthouse to the westward of N. by W., or the North end of Pankel to the southward of S.S.E. $\frac{1}{4}$ E. Little Garras lighthouse open of the S.W. extreme of Pankel will lead clear of the shoal water extending N.N.W. from the North part of that island; its West side may be approached to 8 or 7 fathoms; shoal water extends from the S.W. extreme, close to which are 13 fathoms water; it should not be closed nearer than half a mile. The apex of Loban open of the West extreme of Pankel, will lead clear of the Dutch Shoal, and of the shoal bank of soundings south-eastward of Pankel; this mark will also lead to the westward of the shoal water (4 to 5 fathoms), which extends nearly $2\frac{1}{2}$ miles southward of the Topies, and which will be cleared to the southward by keeping Siolon Hill open of S.W. Hill. The

shoal bank, just mentioned, is not dangerous to small vessels which may stand nearer to the Topies; but in order to avoid Rotterdam Reef, the S.W. extreme of Pankel must be kept North of N.W. $\frac{1}{2}$ W.

To the southward of the Topies, Alligator Island may be approached to half a mile, and a vessel may stand on well into the channel between Siolon and Talang, but must not bring S.W. Hill to the West of W. $\frac{3}{4}$ N., on account of Thomas Shoal. There are many shoal patches between Talang and Pulo Gin, but they all (except the Hendrik Jan Rock, awash at low water), lie out of the track of ships. The S.E. side of Talang should be given a berth of at least 2 miles in passing, keeping South-west Hill well open of Talang, until Pulo Terobi bears E. by N.

3.—VARELLA AND DURIAN STRAITS, ETC.

In the height of the N.E. monsoon, in December and January, when strong northerly winds prevail, it blows much more freely in the open portion of the China Sea, to the eastward of Linga and Bintang, than it does in the straits they form with the coast of Sumatra. Mr. Stanton, therefore, recommends the Varella and Durian Straits for a sailing ship going northwards at this season, as by avoiding the heavy sea, and southerly current, which sometimes runs at the rate of 3 knots an hour, they will save much time, and have smooth water, good anchorage, and will also be greatly assisted by the squalls from the Sumatra coast.

The straits have not been completely surveyed. Lieutenant Melvill Van Carnbee drew up a chart in 1843, to which Mr. Stanton, R.N., made considerable additions in 1860—1, and further corrections have since been made, but still the chart and directions must not be considered as perfect, and the mariner is therefore cautioned not to place too much reliance on them.

The **COAST of SUMATRA** from Batakarang Point (the N.W. limit of the Strait of Banka, described on page 198), trends about N.N.W. towards Jaboeng Point, sometimes known as Cape Bon, in about lat. $0^{\circ} 58' S$. The entire coast, which is very low, covered with wood, and entirely unknown, is fronted by a mud-bank, that may be approached to 6 or 5 fathoms water, except off Jaboeng Point, close to which there are in some places 9 fathoms, but all vessels should keep 3 miles from it. A bank of 4 fathoms was found by H.M. surveying vessel *Saracen*, in 1861, with Jaboeng Point bearing N.W. by W., distant 9 miles; a depth of 6 fathoms also nearer the shore. This is probably a projecting horn or spit extending from the mud flat, and as shoaler soundings may be found, vessels bound to Varella Strait should keep 5 miles off shore until Jaboeng Point bears West.

TANJONG JABOENG, or **Cape Bon**, in lat. $0^{\circ} 58' S$, long. $104^{\circ} 22' E$,

is the south-eastern limit of the Inner Route. Like most other parts of the East coast of Sumatra, it is low land, and has a shoal-water bank extending more than a mile from it.

VARELLA, or **Brahalla**, is a small island, 450 ft. high, which gives its name to the strait, and has a hill on its western part, which may be seen 20 miles off. It lies in the middle of Varella Strait, and bears from Tanjong Jaboeng, N. by E. $\frac{1}{4}$ E., nearly $9\frac{1}{2}$ miles, and from Pulo Taya, W. by S. 30 miles.

There are some islets and rocks near Varella, the largest of which, *Anak Varella*, lies about a mile north-eastward of it; and a mile North from it lies a rock, with 17 fathoms close to it.

There is anchorage on the S.W. side of Varella, and water may be procured; but this only ought to be done in case of necessity, as the lurking piratical proas have been known to assault and massacre the crews of boats sent on shore to procure water at this island. The ship *Hercules* was attacked by seventeen large proas near this place, and narrowly escaped being taken by them.*

Kunst Shoal.—Capt. G. Kunst, of the Dutch barque *Louisa Kroon Prinses of Sweden*, reports having seen a shoal, with but 12 ft. water over it, from which Varella Island bore W.N.W., distant 3 miles.

Middle Rocks lie $4\frac{1}{2}$ miles N.E. by N. from Varella, or nearly midway between the latter and the islets which front the South end of Sinkep Island. Rocks extend halfway across from Varella to the Middle Rocks.

Pollux Rock, with only 4 ft. water over it, lies nearly 2 miles N.E. of the Middle Rocks, and from it the nearest of the islets southward of Sinkep bears N. by W. $3\frac{1}{2}$ miles, and Anak Varella Islet S.W. $\frac{1}{2}$ S., nearly $5\frac{1}{2}$ miles.

The channel southward of Varella Island is wider and more free from danger than the channel northward of it, and is consequently much more frequented. The shoal bank fronting Tanjong Jaboeng projects about 8 or 9 miles north-westward from it, forming a sort of elbow, to avoid which it will be necessary to keep Tanjong Jaboeng to the South of S.E. $\frac{1}{2}$ S., until Varella Island is East of E.N.E. The channel to the northward, between

* Although piracy has very much decreased in these seas since Horsburgh's time, and, as a general rule, but little danger need now be apprehended from piratical fleets, yet Llanun pirate proas have been known to pass through Banka Strait within the last few years. It is still, in fact, very necessary indeed for merchant vessels which have occasion to fill up water in out of the way places to be on their guard against surprise. Natives, not ordinarily pirates, frequently become such if a good opportunity present itself, and merchant vessels offer such rich prizes, that the natives of almost any part of the Eastern Seas would very likely be tempted to attack them, if they saw a favourable opportunity for doing so successfully, when many of the crew were away from the ship watering.—J. W. Reed, Master R.N., 1864.

Varella and the small islands contiguous to the S.E. end of Sinkep is encumbered with the dangers just mentioned.

SINKEP, the easternmost of the three islands forming the North side of Varella Strait, is about 17 or 18 miles in extent, and of very irregular shape, projecting to a point on its East side, another on its S.E. side, and a third on its South side. Between these points are rather large bays, the most southern one, *Baru Bay*, being 3 miles deep. On the eastern side of the island is a range of hills, with a peak 1,440 ft. high near the centre of the range. There is a hill over Boekoe, or Buku Point, and 4 miles to the northward of it, on the West coast of the island, is a sharp peak of moderate elevation. From Boekoe Point the coast line takes a north-westerly direction for 14 miles to *Saboyoro Strait*, which separates Sinkep from the island next westward of it. Rocks above and below water front the whole S.W. coast of Sinkep, to the distance of a mile.

Rawa is the outer of two islands westward of Sinkep, their S.W. coast line following the same N.W. direction as that of Sinkep, the whole distance from Boekoe Point to the N.W. extreme of Rawa being 23 miles. The islands are separated by a channel so narrow that they appear as one. Shoal water extends 2 miles from the S.E. point of the eastern island.

Sinkep Laut is the outermost of four or five small islets lying about $2\frac{1}{2}$ miles off the S.E. point of Sinkep.

Seera, or *Reef Island*, is small, 160 ft. high, and lies E. $\frac{3}{4}$ N. $6\frac{1}{2}$ miles from Boekoe Point, and N.W. $\frac{1}{4}$ N. 14 miles from Varella Island. It is a flat, low island, sometimes mistaken for Varella when coming from the northward. A reef surrounds the island, and extends more than a mile from its East end, and more than 2 miles from its N.W. end. At 4 miles W. by N. $\frac{1}{2}$ N. from Seera is a patch, having 4 fathoms least water over it. *Anak Seera* are rocky islets, lying about $2\frac{3}{4}$ miles N. by E. from Seera, with a safe channel between them and the latter island, and also (with the exception of the $4\frac{1}{2}$ -fathom patch 2 miles eastward of them) between them and the coast of Sinkep. A bank with 2 to 3 fathoms water over it extends from them about 2 miles in a north-westerly direction.

Speke Rock, on which a ship of this name struck, lies W. by N. $\frac{1}{4}$ N., 9 miles from Seera Island, and S.E. $5\frac{1}{2}$ miles from the southern Alang-Tiga Island. It is of small size, and a portion of it uncovers at two-thirds ebb, showing as a small black rock about the size of a boat. Close-to are 10 fathoms water. Boekoe Point kept open to the southward of Seera Island, E. $\frac{1}{4}$ S., leads to the southward, and the southern Alang-Tiga Island bearing N.W. by N. leads to the westward.

Atkin Rock, on which the brigantine *Bob Tail Nag*, Capt. Atkin, struck in May, 1863, is a pinnacle which uncovers at two-thirds ebb. The marks for the rock are, the West extreme of the North Alang-Tiga Island, just shut in

by the East extreme of the Middle Island, and the South extreme of the Southern Island, bearing N.W. by W. $\frac{3}{4}$ W., distant three-quarters of a mile.

Alang-Tiga Islands, bearing N.W. $\frac{1}{2}$ W. 29 miles from Varella, are a group of five small islets, and some rocks above water. The three principal islands are high, and may be seen 24 or 25 miles, and the others 13 or 14 miles from the vessel's deck.

Silensing, or *Green Island*, is an islet 119 ft. high, lying $2\frac{3}{4}$ miles north-westward of Rawa Island, being separated from it by a safe channel, with depths of 10 to 19 fathoms. *Wright Island*, or *Boenta*, is a small islet lying $1\frac{1}{2}$ mile northward of Silensing. Some rocks appear to extend about a quarter of a mile from it.

JAMBI or JAMBIE RIVER.—From Tanjong Jaboeng (page 334), the coast of Sumatra trends in a westerly direction to Jambie Point, from whence it falls back to the south-westward, to the principal entrance of the Jambi River, also named the *River Nioer*, or *Kwala-nur*. There are, however, between this entrance and Tanjong Jaboeng, several other entrances, off the mouths of the two easternmost of which lies an island named Berba. The river is barred, and has a depth of $1\frac{1}{2}$ fathom over the bar, and 4 to 8 fathoms inside. It is one of the principal rivers on this side of Sumatra, and a Dutch expedition under Lieut. Schouw Sautvoort was started in 1876 to explore in its neighbourhood. There are several towns and villages on the banks of the river, the principal of which is *Simpang*, about 20 miles, and *Jambie*, about 50 miles from the entrance. This part of Sumatra is under the Dutch, who have a station and fort at *Moeara Kompeh*, a town 5 miles above *Simpang*. For 30 miles inland the country is a wooded marsh.

Coal.—A fine seam of coal was (in 1860) discovered near the Sultan's house at Jambie. It is said to be 12 ft. thick, close to the river, and at some distance below the surface, quite equal to English Newcastle coal.

BASSO, or Bakauw Point, in lat. $0^{\circ} 20' S.$, long. $103^{\circ} 47\frac{1}{2}' E.$, is the S.E. extreme of Basso Island, which projects in the form of a peninsula from the main coast of Sumatra in an E.N.E. direction about 13 or 14 miles, its breadth being about 5 or 6 miles. It bears N.W., and is distant about $52\frac{1}{2}$ miles from Tanjong Jaboeng, the coast line between falling back into a large bight, 33 or 34 miles deep, the main entrance to the Jambie River, just described, being situated at its head. The eastern face of Basso Island should not be approached nearer than about 2 miles, as a shoal, steep-to, projects nearly a mile from it.

AMPHITRITE BAY and INDRAGIRIE RIVER.—Amphitrite Bay is a large bight about 16 miles deep, formed between the N.E. extreme of Basso Island and Baroe, or Dato Point, 15 miles to the northward. The bay is nearly filled by a shoal, which extends several miles from either shore. It projects in a N. by W. direction (Horsburg says N. by E.) for 5 or 6 miles

from the South point of entrance, but it curves away more gradually from the North point, and between these projections is the deep-water portion of the bay, about 3 or 4 miles broad.

The large River Indragirie discharges itself through several channels into Amphitrite Bay, and also into the bay between Tanjong Jaboeng and Basso Island.

Caution.—The outer edge of the shoal extending from the points of entrance to Amphitrite Bay, especially from the southern, is steep-to, having 10 or 11 fathoms within half a mile of it in some places, then quickly 5 or 4 fathoms, to $1\frac{1}{2}$ or 1 fathom upon it, which requires great attention to the lead when approaching this part of the coast in the night.

All this part of the coast of Sumatra is flat low land, thickly wooded with trees about 120 ft. high.

From the low headland of Dato Point, the coast runs N. by W. and N.N.W. toward the Strait of Durian, and is fronted by a shoal bank from 2 to 6 miles off shore, which may be approached by the lead, as from 10 fathoms upon its edge the soundings gradually decrease to 6, 5, 4, and 3 fathoms.

CHANNELS between SINKEP and LINGA ISLANDS.—*Ponoebo Island*, 5 or 6 miles long, East and West, 2 miles broad, and having a hill 955 ft. high near its centre, lies between Sinkep and Linga, dividing the passage between those islands into two channels, named Lima and Ponoebo Straits.

Lima Strait, between Ponoebo and Linga, is narrow, much encumbered with islets and dangers, and does not, upon the chart, appear to be a very convenient channel for navigators unacquainted with it. Capt. McKenzie, however, says that it is safe and quickly passed through with the tide; and that on its western side, just beyond the narrows, there is a small bay on the Linga shore, with good anchorage, wood, and water.

Ponoebo Strait, between Sinkep and Ponoebo Islands, is, like *Lima Strait*, very narrow and encumbered with islets and dangers. It is said that a vessel of moderate draught may pass through it with safety.

PULO SETJAWA lies close to the N.W. extreme of Linga, from which it is separated by a channel about half a mile broad. Upon the chart it is shown as a long narrow island, 14 or 15 miles long, and 3 miles broad, with hillocks on it from 200 to 300 ft. high; but this island, together with many others near it, are very imperfectly known, not having been even roughly surveyed.

Tiampa Island, separated from the western side of Setjawa by a channel about $1\frac{1}{2}$ mile wide, is about 5 miles long N.W. and S.E., and about $1\frac{1}{2}$ mile broad. *Boeova Island* lies nearly 3 miles westward of the N.W. point of *Tiampa*, and in the channel separating them is a group of islets and rocks. *Boeova* is only 2 miles in extent, but it is a remarkable island, rising to a peak 888 ft. high.

Dian is the easternmost, and *Lobam* the westernmost of a chain of islets fronting the South and S.W. sides of Boeova. The *Leda Rock* is the outermost of a ridge of rocks which extend about $1\frac{1}{2}$ mile in a N.W. by W. direction from *Lobam*.

TEMIANG, RODONG, and DUMPO STRAITS.—To the northward of Boeva Island, the eastern side of the Inner Route is bounded by numerous islands, with deep channels between them. In order to avoid the difficulty and delay sometimes experienced in getting from the northern part of Durian Strait to Singapore Road, many sailing vessels have preferred to pass from the Inner Route by Abang Strait or Dumpo Strait into Rhio Strait. It seems probable that the best passages might be made in this way, for the great depth of water in the western part of Singapore Strait is often embarrassing in light winds.

Temiang Island, which limits the Temiang Group to the north-eastward, is 7 miles long, 3 miles broad, and much the largest of the islands. The island is mostly composed of high hills, and near the West end is some table land elevated 800 ft.

Close off the N.W. end of Temiang is *Pintoe*, an island about $1\frac{1}{2}$ mile long; and off the N.W. end of *Pintoe* is an island named *Kebab*. All the islands are fringed with reefs.

Pompon Island lies S.W. by W., a little over 2 miles from *Kebab*; it is rather more than half a mile in diameter, rising to a hill in the centre 433 ft. high. A rock, awash at high water, lies close off its N.W. point. Some detached rocks lie N.E. by E. three-quarters of a mile from *Pompon*, and N.W. $\frac{1}{2}$ N., the same distance from the N.W. islet of the *Babie Group*, which lie between *Pitoe* and *Pompon* Islands.

Pompon Shoal, N. $\frac{3}{4}$ E., $2\frac{1}{4}$ miles from *Pompon* Island, consists of three or four rocks several feet above water. A detached rock awash lies a quarter of a mile to the westward.

Irene Rock, said to lie W. by N. $\frac{1}{2}$ N., about 7 miles from *Pompon* Island, could not be found by the *Rifleman*, in 1869, in the course of a few hours' search; but the examination was insufficient to disprove its existence.

Allor, a small round island, 139 ft. high, is surrounded by a reef and some islets.

PANGALLAP ISLAND, 3 miles long N. by W. $\frac{1}{4}$ W. and S. by E. $\frac{1}{4}$ E., is moderately elevated and fringed by a reef. The channel between *Pangallap* and the reef extending from *Allor* is 3 cables broad, and from 7 to 23 fathoms deep.

Dedap lies to the westward of *Pangallap*. Off the S.E. end of *Dedap* are three small islets and a rock, the latter being distant a little over half a mile. A mile from the island, in the same direction, are two rocks awash;

from the outer one of these the South end of Pangallap bears N.E. $\frac{3}{4}$ E., and the South extreme of Allor E.S.E. The channel eastward of these, and between Dedap and Pangallap, appears to be free from danger, with the exception of a rock awash a short distance outside the edge of the reef fringing the latter island, and which bears E. by N. $\frac{1}{2}$ N. from the North end of Dedap.

A small islet lies close to the N.W. point of Dedap, and half a mile off in that direction lie two small islets, encircled at a short distance by a reef. These islets form the southern limit of Abang Strait (described farther on).

Rodong Group (see page 314) lies to the westward of Niamok and Misana. The three eastern islands, which form a sub-group, are known as the Desie Islands; the two western ones, lying close together, as the Madang Islands. The channel between Missana and the Rodong group is encumbered with many dangers, and should not be used.

The **Dua Islands**, two rather low islands, lie W.N.W. $2\frac{1}{2}$ miles from the Madangs. Two reefs lie $1\frac{1}{2}$ mile north-westward of the Dua Islands. On the South end of the southern one is an islet, and on the N.E. extreme of the other is *Tree Rock*, a rock about 10 ft. above high water, with a tree upon it. A *coral patch*, with 3 fathoms water over it, and 11 to 14 fathoms around it, lies N.W. by W. $\frac{1}{4}$ W. nearly a mile from Tree Rock, the channel between them is safe.

Tetampan Group, occupying a circular space about 4 miles in diameter, lies north-westward of the Rodong group; it comprises numerous islands, islets and rocks, divided from each other by narrow, intricate channels, encumbered with many reefs and dangers. Tetampan, elevated 390 ft., the highest and most conspicuous of the islands, is situated near the S.W. part of the group; Binan and Katarg Linga form its eastern and northern limits, and the Nopong Islands, with the adjacent islets and reefs, its north-western ones.

TEMIANG STRAIT, leading from the China Sea to the Durian and the other straits adjacent, is about 14 miles long and 2 broad, its direction being N.W. by W. $\frac{1}{4}$ W. and S.E. by E. $\frac{1}{4}$ E.; it is bounded to the southward by the northern islands of the Sebangka group, and by Temiang, Pintoe, and Kemat, and to the northward by Niamok, the Rodong group, Dua Islands, and Tree Rock Reefs.

A *dangerous pinnacle rock awash*, very difficult to make out, lies at the southern entrance of this strait, nearly 1 mile N.E. from a group of small islands south-eastward of Temiang. This danger may be passed on either side, the channel to the southward being three-quarters of a mile wide, but the best plan is to pass to the northward; in doing so, however, be careful to avoid the shore reef, which projects half a mile to the southward of the East point of Desie, and also a rock awash, which lies more than 2 cables from the South point of the Madang Islands.

RODONG STRAIT, between the Rodong and Tetampan groups, is also navigable, but a *rock awash*, which lies N.N.E. $\frac{1}{4}$ E. more than 6 cables off the North point of Rodong, must be carefully avoided; there are also *two patches of reef*, one lying a quarter of a mile south-eastward, and the other about double the distance south-westward, of the southern island of the Tetampan group. Besides avoiding the first-mentioned danger, vessels, when working, should not stand within a line joining the northern extremes of Rodong and Missana Islands.

The channel between the Tetampan group and Dua Island and Tree Rock Reefs is safe, taking care not to stand too close to the S.W. islands of the group between Tetampan and Little Nopong.

PANGALLAP STRAIT is limited on the East by the Tetampan group and the Selanga Islands, and on the West by Allor, Pangallap, and Oedek (page 314). A bank, with from 5 to 10 fathoms water on it, lies in the fairway of this strait, having on the northern end a *rock awash*, from which North Selanga Island bears E. $\frac{1}{2}$ S. $1\frac{3}{4}$ mile, and the apex of Allor Island S.W. by S. $2\frac{1}{2}$ miles; near its opposite extreme is a $2\frac{1}{4}$ -fathom patch of hard sand, with the N.E. extreme of Pangallap bearing N.W. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles, and the apex of Allor Island S.W. $\frac{3}{4}$ S. $1\frac{1}{2}$ mile. Vessels may pass between or on either side of these dangers, but it is better to pass to the eastward of both of them. South of the N.E. point of Pangallap a *hard mud bank*, with 5 to 10 fathoms water over it, extends nearly a mile to the eastward, and the same distance to the southward; and a bank of sand, nearly half as large, with about the same depth of water over it, extends to the eastward from Oedik; elsewhere the soundings are very irregular, 13 to 28 fathoms.

The strong tides near the springs, owing to the uneven nature of the bottom, cause violent whirls and overfalls, which are alarming to strangers; but it seems only necessary to avoid the above described dangers to pass safely through the strait, as none besides those could be discovered, though carefully searched for.

ABANG STRAIT.—Little Abang, about a mile in extent, lies 2 miles N.W. by N. from Dedap, with the Nio Islands, a group of islets and rocks surrounded by reefs, lying nearly a mile from its eastern side. Between Dedap and Little Abang is Abang Strait, narrowed to the breadth of a mile by two islets, which lie half a mile off the N.W. end of Dedap, and by the Sapientoe islets and rocks, the outer edge of which is three-quarters of a mile from the S.E. end of Little Abang. A short distance westward of the fairway of the strait is a deep hole of 25 fathoms, with 15 fathoms round its edge. The depths near the islets are 7 fathoms, with 12 in mid-channel, increasing to 20 or 23 fathoms between the North point of Pangallap and the Nio Islets.

Great Abang, twice the size of Little Abang, lies N.N.W. of it, and between them is a channel with 3 to 9 fathoms, but it is narrow, being con-

tracted by an island near Great Abang and the reefs extending from both islands. A *rock*, with but 3 ft. water over it, lies W. $\frac{3}{4}$ S. nearly a mile from the S.W. point of Little Abang, and S.E. $\frac{1}{2}$ E. the same distance from the South point of Great Abang; near it the depths are 4 to 9 fathoms. Close to the West side of Great Abang is *Tortel Islet*, and W. $\frac{3}{4}$ S. $1\frac{1}{4}$ mile from this islet is *Hippomenes Rock*, a rock awash, with 7 to 13 fathoms around it.

Cameleon Rock was examined in the *Rifleman*; it is a small rock about a foot above high water, with 11 fathoms close to its West side, and some patches of $2\frac{1}{2}$ and 3 fathoms from a quarter to half a mile northward and north-eastward of it. From the rock the apex of Potong bears N.N.W., distant nearly $6\frac{1}{2}$ miles, and the South point of Little Abang E. $\frac{3}{4}$ N., distant about 7 miles. Potong, if not brought to the westward of North, will lead well clear to the westward of both the Irene and Cameleon Rocks.

Potong Island, lying 5 miles W.N.W. from Great Abang, has several hills upon it, one of which is 462 ft. high. The island is surrounded by numerous islets and rocks, which, off its S.E. side, extend three-quarters of a mile. Off the N.E. side the soundings are very irregular and somewhat shoal, $3\frac{1}{4}$ fathoms being found at two-thirds, and $2\frac{1}{4}$ fathoms at one-third of a mile from the shore.

DUMPO STRAIT, 7 miles long N.W. and S.E., and 3 miles broad, is bounded on the southward by Oedik Island and the eastern sides of the Abang group, and to the northward by Dumpo, the S.W. part of Gallang, and the islands Penjaboeng and Somoet, which lie off the West coast of Gallang. Shore reefs, not extending far from most of them, front the whole of these islands, but from the S.W. part of Gallang the reef projects a third, and from Somoet not quite a quarter of a mile.

This strait affords easy and safe navigation, the fairway being perfectly free from danger, and the following rocks lie so near the shore that they may be easily avoided. *Haai Shoal*, a patch of 2 fathoms, lies a quarter of a mile S.S.E. from Dumpo; a 6-foot *rock* E.S.E. half a mile from the S.W. point of Gallang; a *rock above water*, E. by S., a third of a mile from the North point of Great Abang; and *Penjaboeng Rock*, S.W. $\frac{1}{4}$ S., 4 cables from the North point of the island of that name. This last is the most dangerous, and will be avoided if the S.W. point of Gallang be kept open of the S.W. point of Penjaboeng, and the apex of Tafelberg, a table hill on Gallang Island, open of the N.W. end of Somoet. The soundings in the straits are very variable.

We now commence the description of Durian Strait.

THREE BROTHERS.—The South Brother, in lat. $0^{\circ} 33' 20''$ N., long. $103^{\circ} 46'$ E., is the largest and highest of the three islands lying at the South entrance of Durian Strait. It is about a mile in length North and South, and not quite half a mile in breadth; the highest hill near the centre

of the island is 257 ft. high, and may be seen 17 or 18 miles. There is a white cliff or rock on the N.E. side, which makes this island remarkable. The *Middle Brother*, only 135 ft. high, lies about $1\frac{1}{4}$ mile northward from the North point of the South Brother. Between the South and Middle Brother there is a safe passage, about two-thirds of a mile wide, with soundings from 9 to 13 fathoms. The *North Brother*, sometimes called the Round Brother, is smaller and lower than the others, being but 87 ft. high. It lies N. by W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from the Middle Brother, and between them there is a safe passage, with 11 to 17 fathoms water, now frequently used.

The **Eastern Bank**, which bounds the channel to the eastward of the Brothers, is composed of hard sand, having irregular depths on it from 1 to 6 fathoms, with 10 and 12 fathoms close to its western edge. A number of low mangrove islands extend from about $2\frac{1}{2}$ miles northward of the Sumatra coast, to a distance of 8 or 9 miles in that direction from it. The south-easternmost of the group is a very small islet, known as South Island, 90 ft. high, and surrounded by rocks. The north-easternmost one, named Long Island, which lies about 6 miles westward of the South and Middle Brothers, is $1\frac{1}{2}$ mile long, North and South; and $1\frac{1}{4}$ mile north-westward of it is a higher island, named Saddle.

A *patch*, having only 2 fathoms water over it, lies with the northern extreme of Long Island, bearing W. $\frac{1}{2}$ S., Saddle Island W. $\frac{3}{4}$ N., and the peak of False Durian N.N.W. $\frac{1}{4}$ W. About a mile north-eastward of the 2-fathom patch is another shoal, with 3 fathoms water over it, and 4 or 5 fathoms around it, discovered in 1861 by Mr. Stanton, commanding H.M.S. *Saracen*. It is about a third of a mile in extent, composed of sand and shells, and lies three-quarters of a mile South from Rocky Islet, off the eastern extreme of False Durian.

All these dangers will be avoided by keeping South Passage Island, or the West end of Little Durian, open eastward of the rocky islet lying off the eastern extreme of False Durian; or by not bringing the latter to the northward of N.N.W. until nearly abreast of it, when it may be approached to 2 cables' lengths.

FALSE DURIAN, or *Pulo Duri*, is a very irregular shaped island, about $2\frac{1}{2}$ miles in extent, and with the contiguous islands, forms the south-western limit of Durian Strait. Near its N.W. end is a peak 604 feet high, which bears West distant 5 miles from the North Brother.

Three or four small islands lie close to the S.E. point of False Durian, the outermost one of which, named Rocky Islet, is very small. A group of islets and rocks, called Rocky Islands, lie off the N.W. point.

As the islands hereabout have a similar appearance, strangers when coming from the southward ought to be careful not to mistake one for the other, for some ships have not been able to discern the proper passage. The

peak of Great Durian being higher than the peak of False Durian, or indeed of any other land, is first discerned in coming from the southward.

Richardson Shoal.—This dangerous coral rock, on which the ship *Hurry Puddemsey*, Capt. Richardson, struck in May, 1863, has lately been examined by H.M. surveying vessel *Rifleman*. It is about 200 yards in extent, has $2\frac{3}{4}$ fathoms on it, and 7 to 10 fathoms around it, and between it and the East side of False Durian Island, at low-water springs. From the rock the peak of False Durian bears W. by N., distant $2\frac{1}{2}$ miles; Rocky Islet S. $\frac{3}{4}$ E. three-quarters of a mile; North Brother, E. $\frac{3}{4}$ N., $2\frac{3}{4}$ miles; and Middle Brother S.E. by E., 4 miles. To avoid this rock, do not bring Rocky Islet South of S. by W., until the peak of False Durian bears West.

GREAT DURIAN, or Pulo Sanglar, about 4 miles N.N.W. of the North Brother, is a larger island than False Durian, being $3\frac{3}{4}$ miles in extent, with a peak near its centre 965 feet high. This peak, as remarked above, is the highest land hereabouts, and is consequently visible at the greatest distance.

The **Tombs** is the name given to some islets and reefs, extending about three-quarters of a mile from the southern part of Great Durian. A small reef of coral lies about half a mile south-westward of the Tombs, and about a mile S.E. by S. from the S.W. point of Great Durian.

Little Durian, 590 ft. high, and about half the size of Great Durian, lies off the N.W. extreme of the latter island, from which it is separated by a channel, only a quarter of a mile wide. *South Passage Island*, 204 ft. high, and about half a mile in extent, North and South, lies three-quarters of a mile from the S.W. coast of Little Durian. It is surrounded by rocks lying close to the shore. *North Passage Island*, 156 ft. high, is about half the size of South Passage Island, from which it bears N.N.W. $\frac{3}{4}$ W. $2\frac{1}{2}$ miles.

PRINCES ISLAND, lying W. by S. $\frac{3}{4}$ S. $2\frac{3}{4}$ miles from North Passage Island, on the western side of Durian Strait, is a coral formation not much above high water. It is covered with trees, and their height being about 100 ft., the island has a round and conspicuous appearance.

SOUTHERN ENTRANCES of DURIAN STRAIT.—Durian Strait may be entered on either side of the Three Brothers. When the peak of Great Durian is seen bearing N. by W., a ship will be in the fair track for entering the strait by either channel, and should steer for the South Brother, which, in one with Great Durian peak, bears N.N.W., nearly.

The channel eastward of the Three Brothers, between them and the Eastern Bank, and between the North Brother and the South shore of Great Durian, is about 4 miles wide, having various depths, from 15 to 10 fathoms.

The channel westward of the Brothers, between them and False Durian, is 3 miles wide, and has from 8 to 14 fathoms water, but near the North Brother 24 fathoms. Both channels are equally safe.

The Strait of Sanglar, to the northward of Great and Little Durian, may also be considered one of the southern entrances to Durian Strait, although it is but imperfectly surveyed, and does not offer any advantages to induce a vessel to proceed through it, but on the contrary is very inferior to either of the other channels.

Monkey Islands, three in number, lie from $1\frac{1}{4}$ to $1\frac{1}{2}$ mile northward of Little Durian. Two *rocks*, or patches of reef, lie off the N.W. point of the westernmost Monkey Island, and a 4-fathom patch midway between the West end of Little Durian and the western Monkey Island.

MURO ISLAND is long, narrow, but high, and forms the eastern side of the middle part of Durian Strait. It extends from about $1\frac{1}{2}$ mile northward of Great Durian in a N.W. by N. direction for $5\frac{1}{2}$ miles. On its East side, between it and Suji Island, is the *Strait of Muro*. The West side of Muro is but imperfectly known.

Dolphin Island, 153 ft. high, lies about a third of a mile off the N.W. end of Muro Island. A *rock* lies a third of a mile N.N.W. from the North extreme of Dolphin Island. A *reef*, of an oval form, 2 cables in extent, steep-to all around, and dry at low-water springs, lies a mile westward of the southern part of Dolphin Island.

Bolombo Island is high, about 3 miles long, N.W. by N. and S.E. by S., and half a mile broad. Its southern end is about a mile E. $\frac{1}{2}$ N. from the North end of Muro, and its North end is about three-quarters of a mile from the Twins. Its North end is fronted by a reef to a distance of nearly half a mile, having a white rock within its margin, off the N.W. point of the island. *Red Island*, or *Pulo Goomeata*, lying nearly 2 miles N.W. of Dolphin Island, is of triangular shape, about half a mile in extent, and covered with trees. Its height is 256 ft., and it may be seen 15 miles off.

The passage between Red Island and Dolphin Island ought not to be attempted, for nearly in mid-channel lie *two dangerous rocks*, one *awash* at low water spring tides, and the soundings near being irregular, afford no guide.

A *rocky patch*, dry at low water, lies rather more than half a mile W. by S. from the S.W. end of Red Island, with deep water all round, and between it and the island. Nearly half a mile northward of Red Island is a *small rocky islet* with a tree on it, surrounded by rocks, dry at low water.

The Twins, or *Pulo Mentegas* are two small round islands, lying a little more than a mile north-eastward of Red Island. They bear N.N.W. and S.S.E. of each other, and are 152 ft. high. Distant three-quarters of a mile north-westward of the North Twin is the North end of a *dangerous* and extensive *coral reef*, dry at low-water spring tides, having from 10 to 17 fathoms all round.

The Western Shore of Durian Strait, from False Durian to the Carimons,

is formed of numerous low islands, covered with trees, the principal of which is Sabon. This land is generally known as the Sabon shore, for the islands forming it are separated from Sabon and from each other only by very narrow channels, and therefore appear as one continuous island.

Pulo Panjang, a large, low, flat island, lies northward of Saddle, and westward of False Durian; off its North coast is a small islet named *Round Island*. *Pulo Torreatep*, the next island named on the chart, is the largest and easternmost of a group of several islands, and bears N.W. by W. $\frac{3}{4}$ W., 5 miles from the N.W. point of False Durian; about a third of a mile from its East side is a patch with 4 fathoms water on it. Two miles N.N.W. $\frac{1}{3}$ W. from Terreatep, is what appears to be rather a conspicuous island. The channel between this island and Princes Island has not been sounded.

SABON ISLAND, or *Pulo Pappan*, is the largest island on the western shore of Durian Strait. Its North point reaches to within 3 miles of the southern part of the Great Carimon, and off its N.E. coast lie the islands of Buru, Paril, and Pandan.

Deep-water Point, the most eastern point of Sabon, lies $2\frac{3}{4}$ miles N.W. from Princes Island. There is another point $2\frac{1}{2}$ miles westward of Princes Island, the coast between forming a bay, fronting which is a reef with some trees upon it, from the outer part of which Deep-water point bears N.N.W. $\frac{1}{2}$ W., distant three-quarters of a mile. To avoid this danger, be careful to keep the peak of False Durian open eastward of Princes Island.

From Deep-water Point the Sabon coast trends N.W. by W., and lying close off it are four islands, the north-westernmost of which is the largest.

Middleburgh Shoal, lying nearly midway between Red Island and the bank extending from Sabon Island, is a reef of coral rocks, 300 yards in extent, of circular form, partly dry, about 1 foot above the sea at low-water spring tides, its sides being almost perpendicular, with 7 and 9 fathoms close to the rocks, and 17 to 20 fathoms about 200 yards off. When on the centre of the shoal, the Passage Islands were in one, their East extremes bearing S.E. by S.; the rocky islet, with a tree on it, off the North end of Red Island, nearly on with the North brow of the North Twin; the Twins open to the northward of Red Island; the South end of Red Island, E. by N. $\frac{1}{4}$ N.; Sabon Hill, W. by N. $\frac{1}{3}$ N.; Clay Island, W. $\frac{1}{3}$ N.; peak of Great Durian, S.E. $\frac{1}{4}$ E., and the peak of False Durian, S.S.E. $\frac{1}{2}$ E.

Passage eastward of Middleburgh Shoal.—The passage between Middleburgh Shoal and the bank extending from the Sabon shore is about $1\frac{3}{4}$ mile wide, with soundings deepening from 6 or 7 fathoms near the bank to 14 and 16 and 20 fathoms near the shoal.

PULO BURU is a low island, $4\frac{1}{2}$ miles in length N.N.W. and S.S.E., crowned with high trees, and having a few inhabitants, who collect great quantities of mangosteins, durians, and other fruits, which flourish here in a wild and luxuriant state. It is the next largest island to Sabon, and its

S.E. part bears N.N.W. nearly 5 miles from Deep-water Point. Off its South end is a small islet, named Clay Island, covered with straggling trees and surrounded by rocks.

The eastern shore of Pulo Buru is fronted by a shoal-water bank to a distance of from 1 to $1\frac{1}{2}$ mile, and rocks partly dry at half tide nearly to the same distance, with Sabon Hill, or Gunong Pappan bearing from W. $\frac{1}{2}$ N. to West. These dangers may be avoided by keeping Deep-water Point South of S. $\frac{3}{4}$ E.

Sabon Hill cannot be easily mistaken, being the only hill on the western side of the channel to the southward of Great Carimon, which island has on it *two* high peaks or hills, and the Little Carimon *one*, as seen from the southward, but has really two high peaks on it also.

Pulo Pandan, the southern of two small islands lying about a mile northward of Pulo Buru, is low, and covered with trees about 100 ft. high. *Pulo Paril* is a much larger island than Pandan, lying to the westward of it, and close to the northern part of Sabon.

Close to the eastward of Deep-water Point the depth is 9 fathoms, and 5 fathoms close to the northern extreme of the point; but from thence a shallow bank extends, with a slight curve into the bight between Deep-water Point and Pulo Buru, as far as Pulo Pandan. Deep-water Point bearing S. $\frac{3}{4}$ E. will lead a mile clear of the edge of this bank.

GREAT CARIMON ISLAND, which divides the Straits of Malacca, Durian, and Singapore, has been described on page 136, *ante*. It is 10 or 11 miles in length in a N.N.W. direction, and near its North end are two high and conspicuous peaked hills, the northern one 1,376 feet, and the southern one 1,474 ft. high; the rest of the island consists of low level land. Its southern part is separated from Sabon Island by the *Strait of Clam*, $2\frac{1}{2}$ miles wide.

LITTLE CARIMON (see p. 136) is a high, bold island, $2\frac{1}{2}$ miles in length N.W. and S.E., and rising to two peaks, covered with trees, the northern one being 1,067 ft., and the southern one 1,026 ft. high.

Sand Banks.—A patch of 5 fathoms lies E. $\frac{1}{2}$ S. $1\frac{3}{4}$ mile from Pulo Pandan; and there are two other patches of 4 fathoms off the same island, one bearing E. by N. nearly 2 miles, and the other about N.E. $\frac{1}{2}$ N. the same distance from it. These patches seem to be the tail of a bank of sand lying about 2 miles off the S.E. coast of Great Carimon, and which nearly joins another bank extending S.E. from the Little Carimon. Pulo Pandan bearing South will lead to the eastward of the $2\frac{3}{4}$ -fathom patch on the southern bank; and the peaks of Little Carimon in line about N.W. will lead close to the edge of the northern bank in 5 or $4\frac{3}{4}$ fathoms. A white Herbert's *buoy* is said to lie off the reef extending from the S.W. point of Carimon Island.

Tides.—Throughout Varella and Durian Straits the tides are very irregular, rendering it difficult to ascertain either their direction or velocity. In

August and September the rise and fall was found generally to be between 10 and 11 ft., sometimes running from 3 to 4 knots per hour during the springs, at other times not more than $2\frac{1}{2}$ knots at the same period. This irregularity appears to be produced by the prevailing winds in the North or South entrance of the straits, forcing the tides through in one direction for 12 or 18 hours at a time, although the rise and fall on the shore was regular. But sometimes the tides run with regularity.

At Red Island, in the northern part of Durian Strait, it is high water, full and change, at 10^h, and the tide rises 10 or 11 ft.

The *rippings* might be alarming to a stranger; they appear to be caused by the uneven bottom, and the resistance the tides meet with from the steep reefs and numerous small islands.

PHILLIP CHANNEL, or the north-eastern entrance to Durian Strait, is formed between the numerous islands fronting Battam and Boelang Islands to the south-eastward, and Long and Round Islands to the north-westward. It appears to be free from danger, with good anchorage, and is a short route for vessels proceeding to or from Singapore.

SUJI, JOMBOL, BOELANG, and **BATTAM**, are four islands lying to the north-eastward of Muro and Bolombo Islands. The two former are about 10 miles long in a N.W. and opposite direction; the two latter are much larger, Boelang being about 15 miles long, in the same direction, and 7 miles broad, and Battam 15 or 16 miles in an East and West direction, and 13 or 14 miles North and South. The northern parts of Boelang and Battam form part of the southern side of Singapore Strait.

Numerous small islands, islets, and rocks lie off the shores of and in the channels between the above-named large islands, the whole of which are known under the general name of the Boelang Archipelago, but in the present state of our knowledge, no vessel should venture among them, and it is therefore only the outermost islands and dangers which concern the ordinary navigator, and those will be next described, after the following brief observations on the channels between the large islands. Muro, Suji, Jombol, and Batu Hadji Straits are the names of the channels separating these large islands.

Muro Strait is bounded on the West by Great Durian, Muro, and Bolombo Islands, and on the East by the eastern bank and Suji Island. There are many islands and rocks in it, and it has been but imperfectly surveyed. It is, however, navigable with proper care; and in 1860 an electric telegraph cable between Singapore and Batavia was laid through it from a large steamer piloted by a Dutch steam frigate.

Suji Strait, between Suji and Jombol, is very imperfectly known, but it is certainly encumbered at both ends with many dangers.

Jombol Strait, between Jombol and Boelang, is also encumbered with many dangers, although apparently not to so great an extent as Suji; it is

but imperfectly known; and at present, like the rest of the straits, is not available for general navigation.

Batu Hadji Strait, between Boelang and Battam, is very narrow, in some places not a quarter of a mile broad. A running survey was made of this strait several years ago by Mr. L. C. Bailey, Master R.N., and it is said to be available for vessels, but we cannot give any directions for it. A short time since it was urged upon the attention of nautical men at Singapore as being a route by which vessels could be speedily towed from Singapore Roads to sea in the N.E. monsoons; but it will have to be properly surveyed before it can be used for such a purpose.

PULO DONCAN, lying N.E. $\frac{3}{4}$ N., distant $6\frac{1}{2}$ miles from the Twins (page 345), is the larger of two low wooded islands, fronting the North entrance of the Strait of Jombol, which is formed by a group of beautiful islands, some of which are inhabited. Pulo Doncan is surrounded by reefs to a distance of a mile, and between E.N.E. and E.S.E. to 2 miles off.

Cap Island, so named from its appearance, bearing N. $\frac{1}{4}$ W. 4 miles from Pulo Doncan, is a rock about 40 ft. in height, with a flat top and perpendicular sides, surrounded by a reef to the distance of about 300 yards.

It would be imprudent to pass to the eastward of Cap Island, between it and Steep Cape, as a reef of rocks lies 1 mile off Steep Cape, and it is quite possible that others may exist, for the chart has very few soundings in this locality.

Round Island, or *Takong Ketchil*, is a small but elevated islet, lying $3\frac{3}{4}$ miles northward of Cap Island, $2\frac{3}{8}$ miles W. by S. $\frac{3}{4}$ S. from Helen Mars Reef, and $3\frac{1}{2}$ miles S.S.W., southerly, from Raffles lighthouse. It is the south-easternmost of a chain of islands and reefs which extend from it in a north-westerly direction for about $5\frac{1}{2}$ miles.

Long Island, or *Takong Besar*, 115 ft. high, and lying nearly half a mile N.N.W. of Round Island, is similarly surrounded by reefs, and a small islet lies close to its North shore. Long Island and Round Island are also known as the Brothers: both are covered with trees.

Red Island, or *Pulo Patampong*, is a mere islet or rock, 20 ft. high, covered with trees, with a beach of red sand, lying two-thirds of a mile to the N.W. of Long Island.

Three detached reefs lie in a south-westerly direction from Red Island, the outer and largest one being distant nearly $1\frac{1}{2}$ mile from it. Raffles lighthouse on Coney Island, in line with the N.W. extreme of Long Island, leads to the eastward of them; Round Island bearing E. by N. leads to the southward; and the northern Tree Island, open westward of the southern one, bearing N.N.W., leads to the westward.

Tree Islands, or *Pulo Angup*, two small islets, or rather clumps of trees, are the outermost of the islands and dangers which extend north-westward from Round Island, and limit the southern side of the western entrance of

Singapore Strait. In passing northward of Tree Island, the Raffles lighthouse (or light) should not be brought to the northward of East, nor the reef neared under a depth of 14 fathoms, which will keep a vessel half a mile northward of its northern edge.

Kent Rocks lie between Red Island and Tree Island Reef, N.W. $\frac{3}{4}$ N. and S.E. $\frac{3}{4}$ S. from each other, and not quite half a mile apart. From the southern rock, which is the larger of the two, and has $1\frac{1}{2}$ fathom over it at low water springs, the North end of Long Island is on with the centre of Red Island, S.E. by E., and Raffles lighthouse bears E. by N. $\frac{3}{4}$ N. From the northern rock, which is about 30 or 40 ft. in circuit, with not more than 3 ft. water on it, the southern Tree Island bears W. $\frac{3}{4}$ S. (or W. $\frac{3}{4}$ N.), distant a mile, and Raffles lighthouse E. by N. $\frac{1}{4}$ N., 4 miles.

HELEN MARS REEF is the outermost of some dangerous reefs, which, together with several small islets, lie off the N.W. point of Boelang. From this reef Round Island bears W. by S. $\frac{3}{4}$ S., distant $3\frac{2}{3}$ miles, and Raffles lighthouse is just inside the left extreme of Barn and Alligator Islands N.W. $\frac{1}{4}$ W., nearly. A short distance from it are 14 and 15 fathoms.

The North peak of Great Carimon in line with Red Island, leads close to the northward of this dangerous shoal; Red Island, bearing W. $\frac{3}{4}$ S., will lead well clear to the northward; and Steep Cape, the bold headland inside Cap Island, if kept to the southward of S. $\frac{1}{2}$ W., will lead to the westward.

The Helen Mars Reef lies at the point where Phillip Channel joins the main channel of Singapore Strait, which at this part is bounded on the North side by Coney Island, on which stands Raffles lighthouse, and the islands adjacent to it; and on the South side by the Helen Mars and adjacent reefs and islands, Long Island, Red Island, Kent Rocks, and Tree Islands, with its surrounding reef.

The description of the Rabbit and Coney, with Raffles lighthouse, and the western part of Singapore Strait, is given hereafter.

Directions Northward.—*Departing from Banka Strait*, and being abreast of Batakarang Point in 7 fathoms, if bound to Varella Strait, a N.N.W. course will lead towards Varella or Brahalla Island, distant about 78 miles. The bank along the Sumatra coast in this space being very flat, the soundings are usually the best guide, and the rule is to keep in from $5\frac{1}{2}$ to 7 fathoms. Recollect, however, that at 9 miles S.E. by E. from Tanjong Jaboeng the bank projects a sort of spit or horn, having only 4 fathoms water over it, and 6 fathoms between its northern part and the shore.

The tides near the shore are generally strong; in the offing they are irregular, and currents sometimes prevail.

In passing through the South channel, between Varella Island and Tanjong Jaboeng, keep in 10 or 12 fathoms towards Varella to give a berth to the bank of hard ground projecting from Tanjong Jaboeng; from thence, working along the coast to the westward.

Standing towards Varella, remember the shoal with only 2 fathoms water over it, reported to lie E.S.E., 3 miles from that island (page 335). Being through the narrow part of the passage between Tanjong Jaboeng and Varella, which is about $6\frac{1}{2}$ miles wide, a N.W. by W. course should be steered towards the Alang Tiga Islands, keeping along the coast in soundings of 9 to 12 fathoms, and carefully avoid the Speke Rock (page 336). In this track attention to the tides is *indispensable*, for they are often irregular, sometimes setting out of the Jambie River to the north-eastward $2\frac{1}{2}$ or 3 miles per hour.

Having passed the Alang Tiga at about 2 miles, a course about N. by W. should be steered for the southernmost of the Three Brothers, bearing from the Alang Tiga N. by W. $\frac{1}{2}$ W., distant 63 miles. In working, be careful not to stand nearer to Basso Island or Dato Point than 2 miles, and also avoid being tempted to stretch into Amphitrite Bay, for the banks off the former, and the shoals in the latter, are steep-to, and the lead cannot be depended upon to give warning in sufficient time.

To enter Durian Strait by the eastern channel, a berth of 1 or 2 miles may be given to the South and Middle Brothers, by passing them in 10 or 12 fathoms; and on nearing the North Brother, give a prudent berth to the reef that projects from it to the south-eastward, taking care also not to stand too far over towards the eastern bank. When the southern point of Great Durian is approached, the three islets near it, called the Tombs, will be discerned, and Sabon Hill, bearing about W. by N. $\frac{3}{4}$ N., making like two islands, which may be mistaken for the Carimons. Having passed the North Brother, at $1\frac{1}{2}$ or 2 miles distance, haul to the westward, giving a berth of about $1\frac{1}{2}$ mile to the southern part of Durian, to avoid the sunken rocks rather more than half a mile south-westward of the Tombs.

To enter Durian Strait by the western channel, when near the South Brother, steer to the westward of it at $1\frac{1}{2}$ mile distance, and proceed to the northward in 8 to 12 or 14 fathoms, about mid-channel between the other Brothers and the eastern part of False Durian, to avoid the foul ground surrounding the Brothers, and the shoal patches which lie to the southward of the rocky islet contiguous to the East end of False Durian (see page 343).

Take care, however, when standing towards False Durian, not to bring rocky islet to the southward of S. by W. until the peak of False Durian bears West, to avoid Richardson Rock.

Having cleared the Brothers by either of the channels, the Passage Islands will be seen to the north-westward on the East side of the channel; and on the West side, opposite North Paasage Island, is a flat island called Princes. There is a channel between the Passage Islands and Little Durian, but it is not frequented, as it is not so convenient as the former; but in a case of necessity a ship may sail between any of these islands, giving them a berth of 1 mile, as off their points there is generally rocky and foul ground.

After leaving the Brothers, steer for the Passage Islands; in mid-channel the depths will be generally from 17 to 26 fathoms. When they are approached, Red Island, about 6 miles N. $\frac{1}{2}$ W. from North Passage Island, will be discerned; it may be known by two islets to the north-eastward of it, called the Twins. With care, the passage is safe in daylight, between Middleburgh Shoal and Red Island; but as a reef, dry at low water, lies W. by S. more than half a mile from the latter, and the depths being from 17 to 26 fathoms, with some overfalls, the channel to the westward is preferable.

There is also a passage close to the eastward of Red Island; but as its eastern side is bounded by the rocks lying about a mile N.W. of the Twins, and by others about three-quarters of a mile E.S.E. of Red Island, it ought not to be attempted by a stranger.

The channel eastward of Middleburgh Shoal, between it and the reef lying W. by S. from Red Island, requires care; the best track is about mid-channel in 19 to 16 fathoms, mud. The peak of Great Durian bearing S.E. a little southerly, or East point of North Passage Island in line with the peak of False Durian, bearing S.S.E., will lead mid-channel between the patch off Red Island and Middleburgh Shoal. In working, do not bring the peak of False Durian above a ship's length open westward of North Passage Island, nor stand nearer, to the reef off Red Island, than to bring that peak nearly on with South Passage Island. The tides are very strong between Middleburgh Shoal and Red Island, the flood setting to the southward, and the ebb to the northward, from 3 to 4 knots on the springs.

The Channel westward of the Middleburgh Shoal is preferable, being about $2\frac{1}{4}$ miles wide, with mostly regular soundings from 16 and 17 fathoms close to the shoal. When clear of North Passage Island, haul to the westward for the Sabon shore, then steer about N.N.W. along it, in 7 fathoms, which will lead in the fair track between that shore and Middleburgh Shoal. When Red Island bears East, or E. by S., edge out a little, about N. by W. or North, and deepen to 10 or 12 fathoms; continuing to keep in these depths, steer to the northward, taking care to give a good berth to the South end of Great Carimon, to avoid the bank of $2\frac{3}{4}$, 3, and $3\frac{1}{2}$ fathoms, sand and mud, which projects 3 miles from the South point of that island. When abreast of this point, the distance of 4 or 5 miles should be preserved from the East side of Great Carimon, and the Little Carimon may be rounded at any convenient distance, if bound to the northward.

In working, do not deepen towards Middleburgh Shoal to above $8\frac{1}{2}$ fathoms, as there are 9 fathoms very near its eastern edge; but the Sabon shore may be approached to $5\frac{1}{2}$, or to 5, or $4\frac{1}{2}$ fathoms, in a small ship.

To pass through Phillip Channel.—If bound to Singapore, having passed between Middleburgh Shoal and the Sabon shore, and brought Red Island to bear East or E. by S., a course about N.E. by N. may be steered guard-

ing against tide, to pass through Phillip Channel to the westward of Doncan Island and between Cap Island and Round Island, neither of which should be approached nearer than three-quarters of a mile, on account of the reefs which project from them.

In this route take care that the vessel is not set too near the dangers which lie at the entrances and near the points of the Straits of Muro, Suji, and Jombol, for the tide rushes through them with a velocity of 3 or 4 knots at springs. Having passed Cap Island, bring it to bear S. by W. $\frac{3}{4}$ W., or S.S.W. astern, which will lead through in mid-channel between Round and Long Islands to the West, and Helen Mars Reef to the East. The soundings in this track are very variable, 15 to 35 fathoms.

In working, if standing westward of the South end of Round Island, do not go farther in that direction than to bring Raffles Lighthouse on with the N.W. end of Long Island.

Standing towards the N.E. sides of Round and Long Islands, to avoid the reefs which extend from them, the Cap should not be brought South of S. $\frac{1}{2}$ W., or Raffles Lighthouse East of N. by E. The Cap, if not brought West of S.S.W. $\frac{3}{4}$ W., or Steep Cape, the bold headland inside Cap Island, kept to the South of S. $\frac{1}{2}$ W., will keep the vessel clear of the Helen Mars Reef; and when the northeru peak of Great Carimon is well open northward of Red Island, a vessel will be northward of that danger, and may proceed to the north-eastward into the fairway of the main channel of Singapore Strait. To proceed from thence to Singapore Road, see hereafter.

Directions Southward.—*Leaving Singapore Strait*, and having proceeded as far as Raffles Lighthouse, and brought it to bear W.N.W., or N.W. by W., distant about $1\frac{1}{2}$ mile, Cap Island will be seen bearing about S. by W. $\frac{3}{4}$ W., or S.S.W., and kept upon either of those bearings it will lead about mid-channel between Helen Mars Reef and Round Island. In working, Cap Island must not be brought West of S.S.W. $\frac{3}{4}$ W., or Steep Cape West of S. $\frac{1}{2}$ W., to avoid Helen Mars Reef. The dangers extending from Round Island and Long Island will be avoided by not bringing Cap Island South of S. $\frac{1}{2}$ W.

Having passed westward of the Cap, which must not be approached nearer than half a mile, a course about S.W. or S.W. by S. may be steered towards the Sabon shore; but, as before noticed, be particularly careful to guard against the effects of the tide in this locality.

With a commanding breeze, the passage eastward of the Middleburgh Shoal may be taken by keeping the East point of North Passage Island in line with the N.W. peak of False Durian, which will lead midway between the shoal and the rocky patch; the water deepens towards the Middleburgh Shoal, it being steep-to all round. To prevent being set upon it in light

winds, caution is requisite, as the tides run here from 3 to 4 miles an hour at times.

A vessel being abreast of Little Carimon, with its northern end bearing West from 2 to $2\frac{1}{2}$ miles, a S.S.E. $\frac{1}{2}$ E. course will carry her clear of the mud-banks fronting the low land of Great Carimon, in soundings from 7 to 8 fathoms, until the North end of Pandan Island is on with the North end of Sabon, when the strait between Great Carimon and Sabon will be open. With a working wind from Little Carimon the soundings are the best guide in standing towards the mud-banks fronting Great Carimon, which ought not to be approached under 6 fathoms, remembering that the peaks of Little Carimon in line, bearing about N.W., lead close to the edges of the shoal banks; the depths in the offing are from 14 to 16 fathoms, mud. The peaks of Little Carimon in line will lead outside the dangers off Great Carimon, as will also Pandan bearing South.

When the strait between Great Carimon and Sabon is open, the soundings become irregular; and here caution is requisite with a working wind, as the tides set strong through this straight to the westward at times. When the North end of Pandan is on with the North end of Sabon, and the vessel is distant from the former 2 miles, in 7 fathoms, a S. by E. course will lead clear of the mud-bank that fronts Buru, and midway between it and Middleburgh Shoal, till the North end of Red Island is on with the South end of the South Twin, and the soundings will be irregular, from 5 to 9 fathoms.

In working, a vessel may stand to the eastward to a moderate distance at discretion, but she must not approach the shore of Buru nearer than $1\frac{1}{2}$ mile in 5 to 6 fathoms. When the South end of Buru bears West, the soundings will decrease regularly on the edge of the mud-bank which extends southward as far as Deep-water Point, and the mud-bank may be borrowed on at discretion. Standing eastward towards Middleburgh Shoal, do not approach it nearer than to bring the West end of North Passage Island to touch the East end of South Passage Island; the North end of Red Island, on with the bluff headland to the eastward, will lead northward of the shoal, and the North end of Red Island, on with the South end of the Twins, will lead southward; the latter transit-line also just clears to the northward, the rocky patch lying to the westward of Red Island.

When clear of Middleburgh Shoal, and of the shoal to the westward of Dolphin Island, as the strait to the southward is free from danger, a direct course may be steered for the East end of False Durian; the Passage Islands may be approached to any convenient distance. Princes Island must not be neared much under a mile, as dangers extend a considerable distance from it. The soundings throughout are very irregular, decreasing towards the western shore, where there is good anchorage. At $1\frac{1}{4}$ mile from the north-western and largest of the two rocky islets off the N.W. end of False Durian,

and it being on with the peak of the latter, there is a bank of hard sand and stones three-quarters of a mile in extent, having $4\frac{1}{2}$ fathoms least water, and from 10 to 6 fathoms close-to; when on it, the East side of South Passage Island is on with the North end of Little Durian.

Standing towards the South end of Great Durian, come no nearer the Tombs than 1 mile, when South Passage Island will bear N.W. by W. $\frac{1}{4}$ W., to avoid the small reef of coral rock lying half a mile from the South Tomb, and near to which are 20 to 29 fathoms. The best anchorage in this part of the strait will be found about three-quarters of a mile from the eastern shore of False Durian, in 12 to 14 fathoms. With a working wind, keep near False Durian, where the tides are much stronger than in mid-channel; but take care to bring Rocky Islet to the West of S. by W. before the peak of False Durian bears West, to keep clear of Richardson Shoal.

To pass westward of the Brothers, between them and False Durian, steer through in mid-channel; but with a working wind, either side of the channel may be borrowed on, when to the southward of Richardson Shoal.

After passing Rocky Islet, off the S.E. end of False Durian, keep it West of N.N.W. until to the southward of the 3-fathom bank, lying nearly a mile South of it.

To pass eastward of the Brothers, after passing the Tombs, steer E. by S., keeping about 2 miles from the North and East sides of the North Brother, where the water will shoal to 12 or 13 fathoms; then steer about S. by E., attending to the set of the tide, to pass the Middle and South Brother at the same distance, not borrowing nearer them than 10 or 12 fathoms. With a working wind, do not stand too far over towards the Eastern bank, but tack immediately, if irregular soundings are got on the overfalls near it, nor so far out as to sink the beach of the Middle Brother from the deck of an ordinary ship. The depths in this channel will be mostly from 10 to 12 fathoms near the Brothers, to 16 or 18 fathoms near the overfalls on the edge of the Eastern bank.

Being abreast of the South Brother, at about 2 miles distance, steer South or S. by W. until it bears N.N.W.; and whether the vessel has passed eastward or westward of the Brothers, after having brought the South Brother to bear N.N.W., steer about S. by E. $\frac{1}{2}$ E. towards the Alang Tiga Islands, and endeavour to keep in from 14 to 16 fathoms. With a working wind the best track is to stand to the eastward until in 17 fathoms, about mid-channel, and into 12 fathoms towards the Sumatra shore, but not under this depth in passing Dato and Basso Points, as the shoal fronting the latter is steep-to, with 8 to 14 fathoms near its edge. After passing Basso Point, the coast may be approached occasionally to 6 or 7 fathoms; but the best track with a fair wind is about mid-channel between it and the Alang Tiga, or pass about 2 or $2\frac{1}{2}$ miles westward of these islands at discretion.

Having passed the Alang Tiga, keep the southernmost island to the North

of N. W. by N., until Seera Island bears East or E. $\frac{1}{2}$ S., to avoid the Speke Rock; the proper track from the Alang Tiga to Varella is to keep along the Sumatra coast in 9 to 12 fathoms, borrowing to 6 or 7 fathoms towards the coast, with a working wind.

Caution is, however, necessary if running here in thick weather or in the night, on account of strong tides setting into or out of the rivers, or you may get set on the extensive sand and mud bank fronting the coast to the westward of Tanjong Jaboeng, opposite the mouth of the Jambie River.

Varella Island may be passed at about 2 miles distance in 10 or 12 fathoms; but the spit surrounding Tanjong Jaboeng is steep from 5 fathoms, and should be approached only with great caution under a depth of 10 fathoms in working.

From a position about 8 miles East from Tanjong Jaboeng to abreast Batakarang Point, at the entrance of Banka Strait, the course is about S.S.E., and the distance 66 miles, and the whole of the bank fronting the coast is in this space very flat, with regular soundings upon it, except the horn or spit with only 4 fathoms on it, lying 9 miles south-eastward of Tanjong Jaboeng. The best guide, therefore, after leaving Varella, is to keep along the coast in from $5\frac{1}{2}$ to 7 fathoms, until Batakarang Point is approached, and $6\frac{1}{2}$ or 7 fathoms are the proper depths to preserve, when passing this point and entering Banka Strait, to avoid the Frederick Hendrik Rocks, on the East side of the channel; with a working wind, the point may be approached to $5\frac{1}{2}$ or 5 fathoms.

CHAPTER IX.

THE STRAIT OF SINGAPORE.

THIS great thoroughfare between India and China is about 50 miles in length from the junction of the Straits of Malacca and Rhio, previously described, to the Horsburgh Lighthouse at its eastern end. The great Malay Peninsula is, as it were, continued in extensive ranges of islands, separated by intricate channels, of difficult navigation, but within a few years the beautiful lighthouses at either end of the main ship channel have rendered the passage easy, with common attention, either by day or night.

Formerly the ships of less draught and smaller tonnage passed through the Old Strait to the northward of Singapore Island, but this is now never used by the larger vessels of modern times—a fact due, in some degree, to the western entrance of this channel, having become much shoaler.

In the earliest days of European navigation, the route followed was around the South side of Singapore island, by the Salat Sambulan and the almost newly-discovered New Harbour. It is exactly described by John Hughen Van Linschoten, in his “Discourse of Voyages of the Portingales into the East Indies,” probably written in the early part of the sixteenth century, and which certainly shows that these early Portuguese pilots were as well acquainted with the channels as we are even now, and their instructions are the best to pursue in the present day. They used Pedra Branca as a leading mark, and went through the middle channel, as now recommended.

The strait was generally, though not minutely, surveyed by J. T. Thompson, Esq., F.R.G.S., the Government surveyor at Singapore, and the engineer to the excellent Horsburgh and Raffles Lighthouses, which form its portals; and the directions which follow are taken from the China Sea Directory, and are based on this survey, as added to by Messrs. Richards, Reed, and Stanton, R.N., in 1858—1862. We have re-arranged the matter

so as to commence at the western end, where it connects with the straits previously described.

The Winds and Seasons are described on pages 6—13, *ante*.

The Currents and Tides are noticed generally on pages 26, 27.

Passages to and from Singapore are discussed on pages 50—67.

The NORTH SIDE of the STRAIT is formed by the southern extremity of the Malay Peninsula, and the southern shores of the Island of Singapore.

TANJONG BOLUS, the N.W. limit of the strait, and the termination of the Strait of Malacca, has been alluded to on page 136, the Carimon Islands on the opposite side being the other boundary. They are also described on page 136.

The Bank, which surrounds Tanjong Bolus, extends across the entrance of the old Strait of Singapore, and is very shallow, having only from 6 to 12 ft. water on most parts. Its outer edge trends about E. by N. for about 9 miles to *Tanjong Gul*, the S.W. point of Singapore Island. The *Old Strait of Singapore*, or *Salat Tambroh*, in early times the great highway, is not now used by large vessels. Its western entrance has shoaled up very considerably.

To the south-eastward of Tanjong Gul is a cluster of islands, of which we have no particular account, which bounds the inner channel, called *Salat Sambulan*. This is navigable, but the strait South of the islands is much preferable, as it is more direct, and its dangers are marked by beacons.

The Coast of Singapore Island, to the eastward of the Salat Sambulan, trends in a straight line S.E. and N.W., and at its South end is the *New Harbour*, a strait presently described, which separates it from Blakan Mati Islands, beyond which, in the same direction, are the St. John's Islands, which form the northern side of the narrowest part of the strait. To the north-eastward of these islands is the roadstead and harbour of Singapore. They will be described together hereafter.

SINKI CHANNEL, or Salat Sinki, by which Singapore New Harbour is approached from the westward, is bounded on either side by reefs, the edges of which are marked by beacons. Its length is 4 miles, and its breadth, at the eastern part, where it is narrowest, is but three-quarters of a mile. The depths in it are very irregular, generally from 9 to 15 fathoms, but in places there are over 20 fathoms. The eastern extreme of the channel is about 3 miles to the westward of New Harbour, and the western extreme about the same distance from the Sultan Shoal, described presently.

North Side.—The first of the reefs, westward from New Harbour, are named the *Cyrene Shoals*, and their S.E. extreme bears from Lots Wife W. by S., distant $2\frac{2}{3}$ miles. They consist of two patches, which dry at three-quarters ebb, extending nearly $1\frac{1}{4}$ mile East and West, and about half a mile North and South. The eastern patch is twice as large as the western one, from which it is separated by a narrow channel. A *beacon* is placed upon the South extreme of each of the patches.

The next patch lies 3 miles to the westward of the western beacon of the Cyrene Shoals; it is very small, and has a *white beacon* on its North side.

Half a mile North of this patch is a small island named *Pulo Laut*, having a smaller island close to the eastward of it. These two islands are the southernmost of an extensive group of islands lying close together, and to the northward of which, between them and the Singapore shore, is the navigable channel named Salat Sambulan.

The outermost reef on the North side of the Sinki Channel, and which may be considered to form its north-western limit, is a small patch lying W. $\frac{3}{4}$ N. $1\frac{1}{2}$ mile from the beacon on the small patch last mentioned; W.S.W. 1 mile from the West end of Pulo Laut, and N.E. by E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles from the Sultan Shoal; this patch is not marked by a beacon.

South Side.—The South side of the channel is marked by four *red beacons*, the whole of them being nearly in line on a W. by S. and E. by N. bearing, and almost equidistant from each other. The easternmost beacon, bearing S. by E. $\frac{3}{4}$ E., about three-quarters of a mile from the eastern beacon on the Cyrene Shoals, is placed on the northern edge of the reef which surrounds *Freshwater Island*, or *Pulo Bookum* and *Pulo Oelar*. The next beacon, almost a mile distant, is on the edge of the reef which extends from Pulo Bosing. Westward of this last are two reefs, which dry at three-quarters ebb, and their northern edges are each marked by a beacon.

Pulo Salook, a small islet, 90 ft. high, may be considered as the south-western limit of the Sinki Channel. It is surrounded by a reef, which projects nearly a quarter of a mile from it, and other patches of reef lie in a S.S.W. direction, and extend more than half a mile from it. Pulo Salook bears S. $\frac{3}{4}$ E. nearly $2\frac{1}{4}$ miles from the beacon on the reef South of Pulo Laut, S.E. by E. $2\frac{3}{4}$ miles from the reef which forms the north-western limit of the strait, and E. by S. $\frac{3}{4}$ S. $3\frac{3}{4}$ miles from the tripod beacon on the Sultan Shoal.

Directions.—Coming from the westward, and intending to proceed through the Sinki Channel, a course may be steered to sight the tripod beacon on the Sultan Shoal, which may be passed at a prudent distance on either side. But to provide against the chance of the beacon having disappeared, or in the event of thick weather, the safer plan will be to steer for Pulo Salook—which, being a small round islet 90 ft. high, can be readily distinguished—on an East, or E. $\frac{1}{2}$ S. bearing. When the tripod beacon is made out,* and is brought to bear from N.N.W. to N.W., steer from E. by N. to E.N.E., giving Pulo Salook a berth of $1\frac{1}{4}$ mile; after it is passed keep a good look-

* If the tripod beacon upon the Sultan Shoal cannot be seen, a vessel should not proceed until she is quite certain of her position, and assured that some accident must have happened to the beacon. As the mail steamers, both to and from Europe, now pass through the Sinki Channel, great attention is paid to the beacons which mark it.

out for the outer beacons on either side of the channel, when it will be only necessary to steer mid-channel between them.

The same course, E. by N.—always remembering to guard against the effects of tide—will lead to the entrance of New Harbour, which should also be entered in mid-channel, taking care not to get too close over towards Berlayer Point, and to keep the conspicuous red bluff, which will be seen on the South side of the harbour, well open of the P. and O. Company's jetties, to clear the Berlayer Rock. It is very necessary, however, when taking care to avoid this rock, not to get too close over on the opposite side, as has sometimes happened. The best plan is to keep as nearly as possible in mid-channel.

The Tides are very irregular in the passages among the islands, running sometimes 4 miles per hour at springs.

ST. JOHNS ISLANDS, which limit Singapore roads to the south-westward and form the eastern limit of the North side of this part of Singapore Strait, will be described presently.

The **SISTERS** are two small islets, not quite a mile to the westward of West St. Johns Island; the South Sister, named *Pulo Soobur*, is 89 ft. high. They are surrounded by reefs, which in places extend to the distance of a cable's length, and close to their edges are irregular soundings of 5 to 9 fathoms. South from the South Sister the soundings soon deepen to 10, 12, 16, and 18 or 19 fathoms. The channel between them and West St. Johns is free from danger, with depths of 14 to 24 fathoms; but about one-third of a mile West-southerly from the South Sister is the eastern end of a patch, with 18 ft. water over it, which thence extends one-third of a mile to the W.N.W.

MIDDLE ISLAND, or *Pulo Sabaroot*, 78 ft. high, bears W. by S. $3\frac{1}{2}$ miles from West St. Johns, and N.E.-easterly $4\frac{1}{2}$ miles from Raffles lighthouse. It is a green island, with other islands to the north-westward of it. It is surrounded by a reef, which, from its S.E. point, projects nearly a third of a mile.

A **Dangerous Reef** of rocks lies S.E. by E. three-quarters of a mile from the S.E. point of Middle Island. The reef is small, and always covered, except at very low tides, some points of the rocks being then just discernible. From it the South extreme of West St. Johns Island bears E.N.E. 3 miles, Raffles lighthouse S.W. by W. $\frac{1}{4}$ W. $4\frac{2}{3}$ miles, and Buffalo Rock S. by E. $\frac{1}{4}$ E. The chart shows no soundings on the South side of this reef, but there is said to be deep water close to; on the North side it is said to be a steep coral wall, and the chart shows 8 fathoms close to this side.

Pulo Jong, a small round islet 75 ft. high, lying half a mile N.W. of Middle Island, open eastward of Middle Island, leads N.E. of the reef, and the South point of West St. Johns N.E. by E. $\frac{1}{2}$ E., or Raffles lighthouse S.W. by W. $\frac{1}{2}$ W., leads to the southward. The South peak of Carimon

Island, in line with the North part of Barn Island, W. by S. $\frac{1}{4}$ S., also leads to the southward of it.

The North side of the channel between Barn Island and Middle Island is bounded mostly by shoals and coral reefs, partly dry at low water. Nearly $2\frac{1}{4}$ miles S.W. by W. from Middle Island is a reef, the middle part of which is dry.

The **RABBIT** and **CONEY** are two small islets, on the North side of the western entrance to the main channel, nearly connected with the S.E. end of Barn Island, to the North of it, by a reef of rocks partly dry at low water. The Coney, or southernmost, is the smallest, and distant from the point of Barn Island rather less than one-third of a mile. The Rabbit is on with the centre of Barn Island bearing N.W. $\frac{3}{4}$ W.; the Coney is on with it, N.W. $\frac{3}{4}$ N., nearly; and these islets are in one with each other, bearing N. by E. $\frac{1}{2}$ E. A rocky spit, covered at high tide, projects nearly a cable's length to the southward from the Coney; consequently the islet should be given a berth of 2 cables.

RAFFLES LIGHTHOUSE, on Coney Island, was named after Sir Stamford Raffles, the founder of Singapore. It is in lat. $1^{\circ} 9' 51''$ N., long. $103^{\circ} 44' 51''$ E., and exhibits, at an elevation of 105 ft. above high water, a *fixed bright light*, which is visible from a ship's deck at the distance of 12 miles, between the bearings E.S.E. (being obscured over the St. Johns Islands and Middle Island, and its off-lying reef) and N.W. by W., which latter bearing leads 1 mile S.W. of Sultan Shoal. It bears S.W. by W. $\frac{1}{2}$ W. $7\frac{1}{2}$ miles from the South end of West St. John's Island; E. $\frac{1}{3}$ N. nearly $5\frac{1}{2}$ miles from the North end of Tree Island Reef; S.E. $\frac{1}{2}$ E. nearly $7\frac{1}{2}$ miles from the Sultan Shoal; N.W., westerly, 3 miles from Helen Mars Reef; and West, northerly, $4\frac{1}{2}$ miles from Buffalo Rock.

BARN ISLAND, or *Pulo Sennang*, about a mile in extent and 133 ft. high, lies close to the N.W. of the Rabbit and Coney, and E. by N. $\frac{1}{2}$ N. 5 miles from Tree Island. It is of a square, level aspect, covered with trees, and visible at the distance of 15 miles. Its South and West sides are fronted by a reef extending 2 or 3 cables from it, close to which are 9 or 11 fathoms, with 18 and 19 fathoms a short distance off.

ALLIGATOR ISLAND, or *Pulo Runcan*, nearly joins the N.W. end of Barn Island, the space between affording no passage for ships. It is about the same size, but 52 ft. higher than Barn Island, and of a sloping form, the highest part being at its South end. At a quarter of a mile from its South end are 14 and 16 fathoms, but off its West side not more than 6 to 9 fathoms will be obtained at half to two-thirds of a mile.

A mile to the northward of Alligator Island is a small island, *Pulo Soodong*, inside which, between *Middle* and *Freshwater Islands*, are several islands, with numerous coral reefs amongst them, the exact positions of which are

unknown; these islands and dangers lie quite out of the track of shipping. Pulo Salook, the north-westernmost of them, and also the S.W. limit of the Sinki Channel, is described at page 359.

SULTAN SHOAL (*Terumbo Careemon*), which forms the north-western limit of the western entrance to Singapore Strait, is of circular form, about two-thirds of a cable's length in diameter, and the rocks on its shoalest part are about 2 ft. above the sea at low-water spring tides. The ship of that name grounded on it in 1789. Its North side is marked by a tripod *beacon*, painted in red and white stripes, from which the N.W. extreme of Tree Island Reef bears S. $\frac{1}{4}$ E. 5 miles; Pulo Salook E. by S. $\frac{3}{4}$ S. $3\frac{3}{4}$ miles; and Raffles lighthouse, just open of the West extremes of Alligator and Barn Islands, S.E. $\frac{1}{2}$ E. $7\frac{1}{4}$ miles. Captain Ross examined this shoal in 1829, and reported it to be steep-to, 7 fathoms water within a boat's length of the rocks.

Ajax Shoal, on which the steam vessel of that name touched in 1877, lies 1 mile S.E. by E. $\frac{1}{2}$ E. from the Sultan Shoal beacon; this shoal, composed of coral with sharp pinnacles, is about half a cable in extent N.E. by N. and S.W. by S., and has on its S.W. extremity a depth of 19 ft., at low water, spring tides. A *nun buoy*, painted *red*, has been placed by the Master Attendant at Singapore, on the centre of Ajax Shoal; this buoy should be given a berth of 2 cables when passing it, on either side.

The following bearings were taken from the *Grouler* whilst at anchor in 5 fathoms, on the shoal:—viz., Sultan Shoal beacon, N.W. by W. $\frac{1}{2}$ W.; Raffles lighthouse, S.E. $\frac{1}{2}$ E.; and Tanjong Bolus, W. by N.

The line of islands and shoals which lie to the south-westward of these Round, Long, Red, and Tree Islands, &c. which form the N.E. limit of the strait of Durian, has been described on page 349 previously.

SOUTH SIDE of the STRAIT.—The strait between the rocky ledges north-westward of Little Sambo and St. John's Islands (described in p. 371), is $2\frac{1}{2}$ miles wide, with very irregular soundings, varying from 15 or 16 to 40 or 50 fathoms.

Caution.—Owing to the *strong tides* which rush through this part of the strait, and the rocky and uneven nature of the bottom, violent eddies and overfalls, very alarming to strangers, are usually to be met with, more especially on the South side of the channel, towards the Sambo Islands; for which reason, as also because of the dangers and great depths of water on that side, it is advisable to keep on the North side, near St. John's Islands, —a custom, always followed by those accustomed to the navigation of the strait.

The Coast.—That part of the southern side of Singapore Strait between the Sambo Islands and the north-western extreme of Boelang Island, a distance of $7\frac{1}{2}$ miles to the S.W. by W., is formed of numerous islands lying

on either side of the entrance of Batu Hadji Strait, which separates the large islands of Battum and Boelang.

Pulo Sennang, the outermost of the islands at the eastern side of entrance to Batu Hadji Strait, is only about a third of a mile in extent, and bears S.W. by W. $\frac{1}{2}$ W. about $1\frac{1}{2}$ mile from the N.W. extreme of Little Sambo, and S. by E. $\frac{3}{4}$ E. 3 miles from West St. Johns. Westward of this island there are many dangers.

Barren Island, the outer of the small islands on western side of entrance to Batu Hadji Strait, is a mere rock or islet, and bears S.W. by W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from Pulo Sennang; S. by W. $\frac{1}{4}$ W. $4\frac{1}{4}$ miles from West St. Johns; and S.E. by E. $\frac{1}{4}$ E. $1\frac{1}{4}$ mile from Buffalo Rock.

Near Pulo Sennang are depths of from 7 to 12 fathoms. Barren Island appears to be free from danger, with depths of 13 to 18 fathoms between it and Buffalo Rock; but, as previously remarked, vessels should avoid getting on this side of the strait.

Buffalo Rock, lying well out towards the fairway of the strait, is of a black colour, about the size of a long-boat, always above water, with 30 and 40 fathoms water near it to the southward, and irregular soundings of 13, 18, and 25 fathoms close to it on the N.W. side. It bears S.W. by S. 4 miles from the South extreme of West St. Johns; S.S.E. 3 miles from Middle Island, and East-northerly from Raffles lighthouse.

Between the Buffalo Rock and the reef off the S.E. end of Middle Island, the strait is $2\frac{1}{2}$ miles, the same breadth as between the rocky ledges and West St. Johns. It is prudent, in working here, to keep nearest the North side of the channel, making short tacks, and not to deepen above 30 or 34 fathoms towards the Buffalo Rock, and the South side of the strait.

Tides.—The flood from the straits of Malacca sets to the eastward, and the flood from the China Sea sets to the westward, meeting between Tanjong Bolus and Tree Island. It is high water at Rabbit Island at full and change at 11 a.m., but the tide does not set to the eastward till about 1 p.m., and it is then about half low water by the shore.

The tides set fairly through the channel about E.N.E. and W.S.W. between St. John's Islands and Raffles lighthouse, frequently very strong, with eddies on the springs. Their velocity, when strongest, is from 4 to $4\frac{1}{2}$ miles per hour, making it unpleasant to anchor here in large ships when the weather is unsettled in the night, particularly if unacquainted. From Raffles lighthouse to the western entrance of the strait the tides cannot be depended on to set as fairly through the channel as they do to the eastward of the lighthouse, but may be expected to draw more across the channel in a north-easterly or opposite direction. Outside the strait between Tree Island and Tanjong Bolus no dependence can be placed upon the set of the tides, for they sometimes run strong down towards the straits of Durian, and at other times to the northward towards the old strait of Singapore.

The flood has been observed in both monsoons to run to the westward 10 or 12 hours at a time, or even 18 hours, strong and weak alternately; at other times the flood sets only 6 hours to the westward, and the ebb the same length of time to the eastward; but the tides throughout Singapore Strait are seldom very regular.

During the strength of the N.E. monsoon at neap tides, the current sets to the westward at times for three or four days, although there is a regular rise and fall by the shore. Staff Commander Richards, R.N., commanding H.M.S. *Saracen*, found the rise and fall in New Harbour to be 10 feet at springs and $7\frac{1}{2}$ feet at neaps.

Temporary Anchorages.—Owing to the strong tides and currents in the western part of Singapore Strait, sailing vessels are frequently obliged to anchor, for which purpose the North side of the channel is much to be preferred. The most convenient spot for the purpose between St. Johns and Raffles lighthouse, are the banks which front the Sisters and Middle Islands. (See page 360.)

Abreast of the South end of St. Johns a ship ought not to anchor if it can be avoided, for the water is deep, and the tides run in eddies with greater strength than in any other part of the strait.

There appears to be fair anchorage, in 12 to 19 fathoms, a mile or two on either side of Buffalo Rock, or between it and Barren Island; also between it and Helen Mars Reef, as well as about a mile or so to the northward and westward of the latter danger; but this side of the strait is usually avoided as much as possible even by those locally acquainted.

To the westward of Raffles lighthouse there is convenient anchorage in 6 to 12 fathoms all along the North side of the strait, while to the southward the water is deep, and the bottom rocky; the South side of this part of the strait is, therefore, very unsuitable for anchoring purposes, especially when it is remembered that violent squalls are common hereabouts.

Caution.—Vessels at anchor, or coming to an anchor during the night, should be careful to ascertain their exact position as nearly as possible, and to have a *good bearing of Raffles light*; they should also keep a vigilant lookout that they do not drag their anchors, and drift into danger.

Directions.—To proceed from *Singapore Roads* or from the eastward, through the western part of Singapore Strait, steer to pass the South point of St. Johns Islands as close as the wind may permit, and then about S.W. by W. $\frac{1}{2}$ W. to round the Rabbit and Coney. It is best to keep nearest the North side of the channel in this track, to avoid the Buffalo Rock, and the deep water and rocky bottom towards the South shore; but remember the reef off the S.E. end of Middle Island. The South end of St. Johns kept N.E. by E. $\frac{1}{2}$ E., or Raffles lighthouse S.W. by W. $\frac{1}{2}$ W., leads clear of this

reef, and either of these are safe bearings to lead along the North side of the channel until Raffles lighthouse is approached, which may be rounded at the distance of 2 or 3 cables' lengths, if the wind is northerly.

After rounding the lighthouse, steer W.N.W. to pass between Tree Island and Sultan Shoal; the lighthouse kept between E. by S. and E.S.E. will lead in a good fairway course, but it must not be brought at all to the northward of East to avoid Tree Island, or to the southward of S.E. by E. to clear the Sultan Shoal; having passed between those dangers, a course West or W. by N., according to the set of the tide and other circumstances, will lead between Little Carimon and Tanjong Bolus.

At Night.—Raffles light (page 361) kept in sight clears all dangers on the North side of the channel, both to the eastward and westward of it.

To proceed from Little Carimon to the eastward through the western part of Singapore Strait.—When in mid-channel between Tanjong Bolus and Little Carimon, in 17 to 20 fathoms water, steer East or E.S.E. as the prevailing wind and tide require, observing to bring the North point of Little Carimon W. $\frac{1}{2}$ S., or draw gradually the North peak of Great Carimon in one with the South point of Little Carimon, bearing about W. by S. $\frac{1}{2}$ S., which will lead about 2 miles northward of Tree Island. If the wind is southerly, borrow towards Tree Island to 14 fathoms, about a mile distant, but no nearer, which will favour the vessel in rounding the Rabbit and Coney.

As before stated, Raffles lighthouse bearing between E. by S. and E.S.E., is the fair channel course between Tree Island and Sultan Shoal, not bringing the lighthouse to the northward of East to avoid Tree Island, nor to the southward of S.E. by E. to clear the Sultan Shoal. Having passed Tree Island, steer to round the lighthouse at from 2 cables' lengths to 1 or 1 $\frac{1}{2}$ mile distant; or if the wind and tides are adverse, or from other circumstances it be desirable to do so, anchor to the westward of Barn Island, out of the strength of the tide. Having rounded the lighthouse, steer to pass St. Johns Islands at a convenient distance—from 2 cables' lengths to a mile—not bringing the lighthouse to the southward of S.W. by W. $\frac{1}{2}$ W., or the South point of St. John's to the eastward of N.E. by E. $\frac{1}{2}$ E., to avoid the danger on the North side of the channel. After rounding St. Johns, and bound to Singapore Roads or through the eastern part of the strait, proceed as directed hereafter.

In working through between St. John Islands and Raffles lighthouse, it is usual to keep on the North side of the channel, making short tacks if necessary, as that part of the strait affords tolerably convenient anchorage along the greater portion of it, and vessels are extremely liable to meet with light baffling airs, which would render it necessary for them to anchor. It is especially requisite to attend to this when to the eastward of Buffalo Rock, for on that part of the South side of the strait the water is deep, and the

bottom rocky and unsafe for anchoring upon, the danger being much increased by rapid currents and tides, with violent eddies and overfalls.

All danger on the North side of this part of the channel will be avoided if the South extreme of St. Johns Islands be not brought eastward of N.E. by E. $\frac{1}{2}$ E., or Raffles Lighthouse southward of S.W. by W. $\frac{1}{2}$ W., but these bearings more particularly apply to the rock which lies S.E. by E. from Middle Island. Vessels may, with proper precaution, stand farther over between the Sisters and Middle Island, and bring the South end of St. Johns as far as E. by N. Take care, however, when nearing Middle Island, not to bring Pulo Jong on with the East extreme of Middle Island until the lighthouse bears S.W. by W. $\frac{1}{2}$ W., or the South end of St. Johns N.E. by E. $\frac{1}{2}$ E. When to the westward of the rock, which may be known by seeing Pulo Jong open of the West side of the island, a vessel may stand to the northward until the South end of St. Johns bears E.N.E., but nothing to the eastward of that bearing. At *night*, Raffles light kept in sight leads clear of all dangers on the North side of the strait, as before stated.

The narrowest part of the channel is when Buffalo Rock bears S. by E. to South, between it and the rock lying south-eastward of Middle Island; and to know in the night when the vessel is in this part of the channel, Middle Island will in general be perceived nearer, and more distinctly than the other islands on the North side of the channel. When approaching the meridian of Buffalo Rock, or when Middle Island bears about N.N.W., be careful to keep Raffles Lighthouse to the southward of W. $\frac{3}{4}$ S.; on no account must it be brought to the westward of W. $\frac{1}{2}$ S. when Middle Island bears N.N.W. When Middle Island bears N. by W., the vessel will be westward of Buffalo Rock, and in daylight may stand farther to the southward, if necessary; but it is much safer and better to keep over towards the Coney. If, however, a board should be made to the southward, take care to keep clear of Helen Mars Reef (page 350).

SINGAPORE.

SINGAPORE, properly Singhapura—*i.e.* Lion City, the great British emporium of the Indian Archipelago, was acquired by purchase in 1819; and in 1826 was formed into one government with Penang and Malacca. It now ranks as the fourth European city of India, being exceeded by Batavia, which the Dutch founded just two centuries previously, in 1619; a century before Calcutta was established, and 50 years before Bombay became a British settlement.

Singapore was the first experiment in free trade. Its success is measured by its progress. In 1819, the population of the island consisted of 150 miserable fishermen; seven years after it amounted to 13,000; in 1850 it

reached 60,000, and in 1865 it was 90,700, among whom were 58,000 Chinese, 13,500 Malays, and about 800 Europeans. In this population the disproportion of the sexes was most startling; to six men there was but one woman, taking the whole inhabitants of the island; but among the Chinese this difference was still greater, only one woman to eighteen men. In the census of 1871 the number of the population was returned as 88,032, but doubts exist as to the accuracy of the returns, and the number is probably much larger. Of the returned number, about one quarter were females; of Malays there were 19,250, and the sexes were about equal in number: Chinese, 54,098, of whom 7,467 were females; natives of India, 11,191, about one quarter of whom were females; Eurasians (half-castes) number 2,164, and the females outnumber the males; the white, European and American population, numbered 1,329. Altogether there are about fifteen nationalities among the people, who, preserving generally their own languages, make use of the liquid, easily acquired Malay, as a common medium of intercommunication. In 1863 its imports reached six and a half millions sterling, and its exports five and a half millions, together twelve millions sterling. In 1875 the imports had decreased to four and a quarter millions, and the exports to four millions sterling, which decrease is accounted for by the fact that goods are now shipped direct to China and other places, instead of being transhipped at Singapore. In 1875, 2,261 vessels arrived at the port, with an aggregate tonnage of 1,283,786 tons, or an average of 568 tons each.

The Island of Singapore is about 25 miles long, and 14 in its greatest breadth; area, 206 square miles, or one-fourth larger than the Isle of Wight. It is separated from the Malay main land by the Old Strait before mentioned, once the great thoroughfare, now abandoned for the more open and well beaconsed passage to the southward. Except on the shore of this strait, the British settlement extends 10 miles inland, while to the southward and with the islands, 75 in number, the whole area of the settlement comprises an area of 223 square miles. The island has the appearance of one continuous forest, with undulating surface, the highest hill being 519 ft. high, and nearly in the middle of the island.

It was ceded to Britain by the Sultan of Johore, on February 6th, 1819, and the city was then founded by Sir Stamford Raffles. He was succeeded by the late talented historian of the Indian Archipelago, Mr. John Crawfurd, F.R.G.S., in 1823, who established the present laud-tenure; he was succeeded, in 1827, by Mr. Murchison.

The following description of the town and harbour is taken, like the foregoing portion of the work, from the *China Sea Pilot*.

The Town of Singapore is built on each side of the Singapore River, a small stream, only navigable for boats, on the S.E. side of the island, about 4 miles northward of the South extremity of the St. John's Islands. The

commercial part of the town is on the South side of the river, the bank on that side being lined with quays and godowns for the landing and reception of merchandise. The river is usually crowded with cargo boats and many other descriptions of small craft on their way to and from the ships in the harbour, presenting a scene of extraordinary bustle and activity. Singapore is a free port; there are no harbour or tonnage dues.

Fort Fullerton, a small battery, stands on the southern part of the entrance to Singapore River. It is important from being the point to which it has been customary of late years to refer the meridian distances of this portion of the Archipelago. The latitude and longitude of Fort Fullerton now used is $1^{\circ} 17' 20''$ N., and $103^{\circ} 51' 18''$ E. A handsome line of godowns is erected to the southward of the fort, upon some land reclaimed from the sea for that purpose. These buildings are conspicuous when approached from the eastward; and in 1867 an extensive system of fortifications was in progress.

The principal landing place is at the Dalhousie Pier, a structure of stone and wood, on the northern side of the entrance to the river, projecting over the flat which extends from the shore some distance to seaward. An obelisk stands near the inner end of the pier, and around it are *four red* lights, which serve to point out the position of the landing place at night. A *white* light is shown on the outer end of the pier. Close to the left of the obelisk (as viewed from seaward) are two fine buildings; the one standing back is the court-house, and that nearer the sea the town hall. Farther to the left is the post-office, a very mean-looking building, and still farther to the left, on the bank of the river, is the office of the master-attendant.

On the right of the obelisk, the esplanade, a grass enclosure surrounded by a carriage drive, extends along the sea front for the distance of a quarter of a mile, and the drive round it is the fashionable resort of the European residents in the cool of the evening. Behind the esplanade are three large buildings, the two farthest to the left are used as hotels, and the third is the masonic hall. To the right of these buildings stands St. Andrews Church, one of the finest ecclesiastical structures in India, built after the model of Netley Abbey; the church has a fine tower, surmounted by a lofty spire, which is very conspicuous when viewed from seaward. To the right of the church is a very large building, the Raffles Institution; extending from which, in the same direction, are a number of handsome detached houses, standing in gardens. Beyond this line of houses is an extensive native town, the greater part of which is hidden by the sandy point, named Tanjong Rhoo.

The above is a brief description of the most prominent objects seen along the shore of Singapore Bay, when viewed from the anchorage.

SINGAPORE ROADS* are on the southern side of Singapore Island, their

* THE LIMITS OF THE PORT OF SINGAPORE ARE AS FOLLOW:—From an obelisk built on Tanjong Catong in a straight line to Peak Island; along the northern shore of that island

limit being defined by a line drawn from an obelisk on Tanjong Catong, $2\frac{1}{2}$ miles E. by N. from Fort Fullerton, to Peak Island. The usual anchorage, however, for ships taking in and discharging cargo, and which is generally known as Singapore Harbour, is restricted to that part of the roads comprised within the limits defined by a line drawn from Malay Point in an easterly direction, until it meets the line drawn between Tanjong Catong and Peak Island, and which includes a space about one-third of the extent of the entire roads.

TANJONG CATONG, or *Deep-water Point*, forming the north-eastern boundary of Singapore Roads, is $3\frac{2}{3}$ miles W.S.W. from the small Red Cliffs. An obelisk, which marks the harbour limit in this direction, stands about a cable's length to the westward of the round of the point.

Sand-Banks.—Lines of fishing-stakes run out from the coast about Tanjong Catong, over the shallow bank extending from the coast, and close to the ends of the stakes are 6 and 7 fathoms water, but these soundings are in a narrow run of deep water, behind the harbour bank, the 5-fathom line at the edge of which is about three-quarters of a mile distant from the point.

Between the deep water close to the point and the 5-fathom line outside of it, are several patches with but $2\frac{1}{2}$ and $2\frac{3}{4}$ fathoms water over them, and two patches with as little as 2 fathoms. One of the latter lies S.E. by E. $\frac{1}{2}$ E. from the obelisk, distant half a mile from the shore nearest to it; and the other S. by W. $\frac{1}{3}$ W. nearly three-quarters of a mile from the obelisk.

These shoals will be avoided by keeping Mount Serapong westward of S.W. by W. $\frac{1}{2}$ W. until the flagstaff on Fort Canning bears W. by N. $\frac{1}{2}$ N.; or by not shoaling under a depth of 6 fathoms towards them.

Tanjong Rhoo, or *Sandy Point*, is the extreme of the land extending $1\frac{3}{4}$ mile West from Tanjong Catong, and forming the northern shore of Singapore Bay. It bears N.E., a little over three-quarters of a mile from the entrance of Singapore River, and is separated from the western shore of the bay by a channel a quarter of a mile wide, in which there are but 3 to 7 ft. water at low spring tides.

to its north-westernmost point, thence in a straight line to its southernmost point of Blakang Mati, thence along the eastern and northern shores of that island to the north-westernmost point thereof, thence in a straight line to a mark placed at Batu Blaayer (Lot's Wife) on the island of Singapore, thence along the shores of the island of Singapore, to the obelisk at Tanjong Catong, including the mouth of the Singapore River as far as the second or Coleman's Bridge, also the mouths of the Rochore and Kallang Rivers as far as the first bridges crossing those streams, and including the public streets, roads, or high-ways, made or to be made along the banks of these rivers to the limits specified and including all public landing-places, stairs, piers, or jetties, made or to be made along the shores of the island of Singapore.

Inside Tanjong Rhoo is an extensive shallow lagoon, convenient for the anchorage of boats and native craft, and very many such are to be seen there at certain seasons. Some shipwrights' yards are now established at this point, and small vessels go there to be repaired.

FORT CANNING.—Rising abruptly behind, and overlooking the town of Singapore, is a hill, 156 ft. high, upon which formerly stood a large bungalow, the residence of the governor; now, however, the crest of the hill is covered by a large fort, which has been named *Fort Canning*, in honour of the late Viceroy of India. Near the middle of the fort is a flagstaff, crossed with two yards, which is used during the day to signal the arrival of ships.

Light.—A *fixed* white light is exhibited from the flagstaff on Fort Canning, at an elevation of 226 ft. above the level of the sea. It is a bad light, but in clear weather is said to be visible at 15 miles. It is only shown over an arc of 90°, or between St. John's Island and Johore Shoal.

A mud flat fronts the whole shore of Singapore Bay from abreast of Tanjong Catong to Malay Point. In front of the esplanade it extends rather more than a cable's length, in front of Fort Fullerton and the new godowns, not more than half a cable, but in the bay to the southward, towards Malay Point, its distance from the shore is nearly 2 cables.

MALAY or **Malang Point**, the south-western limit of Singapore Bay bears S.W. by W. $\frac{1}{4}$ W. nearly 3 miles from the obelisk on Tanjong Catong, and S. by W. $\frac{3}{4}$ W. nearly a mile from the entrance of Singapore River. A mud and sand flat, with several patches of rocks upon it, and which dries at two-thirds ebb, fronts the small bay between Malay Point and Pagar Point. That part of the bank which extends from Pagar Point, and on which the sea wall is built, is known as *Pagar Spit*, and that extending from Malay Point as *Malay* or *Malang Spit*. Shoal water, under 3 fathoms, extends some distance outside the flat, and its edge is marked by several lines of fishing stakes.

BLAKAN MATI ISLAND lies to the southward of the southern part of Singapore Island, from which it is separated by a channel, known as New Harbour. The island is 2 miles long W.N.W. and E.S.E., and a mile broad at its eastern extreme, but its western end terminates in a point. It is fringed by a reef, which from *Berala Point*, its north-eastern extreme, projects a quarter of a mile to the eastward; this part of the reef is known as *Berala Spit*, and from its outer part *Berala Point* bears W. $\frac{3}{4}$ S., and the hill over *Pagar Point* N. $\frac{1}{4}$ W.; from thence it trends about S. by W. for the eastern extreme of the island, from which it projects but a short distance. Off the South point of the island the shore reef extends about three-quarters of a cable's length, and about the same distance along its West side; but a small detached reef, named *Pelawan*, about $1\frac{1}{2}$ cable in extent, lies 2 cables' lengths off the West shore of the island, nearly midway between its southern and western extremes.

MOUNT SERAPONG, rising to the height of 302 ft. near the north-

eastern extreme of Blakan Mati, is conspicuous when approaching Singapore Roads from the eastward, and will assist a stranger in making out the land, St. Johns Islands being seen to the southward of it. There are several other hills of less height than Serapong upon Blakan Mati, but they are more observable in coming from the westward, when they will be seen under the higher land of Singapore Island.

Over *Rimau Point*, the West extreme of the island, is *Mount Siloso*, 170 ft. high, to the eastward of which, and South from *Berdaun Rock*, is *Mount Imbeah*, 202 ft. high. South-eastward from Imbeah is a hill, 168 ft. high, westward of which is another, 160 ft. high.

Buran Darat is the name of an extensive coral reef, which uncovers at two-thirds ebb, and fronts the eastern shore of Blakan Mati Island. It is about a mile long, N.E. by N. and S.W. by S., a quarter of a mile broad at the northern end, and terminates in a point at its southern extreme. There is a detached patch, with $1\frac{1}{2}$ fathom on it, lying about a cable's length to the northward of the North edge of the reef. The north-eastern extreme of *Buran Darat* is marked by a *white beacon*, from which *Berala Point* bears W. $\frac{1}{4}$ N., distant nearly two-thirds of a mile, and the hill over *Pagar Point* N.N.W., westerly.

ST. JOHN'S ISLANDS, three in number, form the south-western limit of Singapore Roads. They lie about N.E. by E. and S.W. by W. from each other, extending nearly a mile in those directions.

Peak Island, or *Pulo Tambakool*, the north-easternmost of the three, is a mere islet, rising to a peaked hill 101 ft. high. From its western part a low, narrow, sandy neck extends, on the extreme of which is a small mound, which at some little distance appears like a separate islet. The island is encompassed by a reef.

The Middle Island, known as *East St. John's Island*, is about half a mile long N.W. and S.E., a quarter of a mile broad, 189 ft. high, and sloping in form. It is also surrounded by a reef.

West St. John's Island is rather larger than *East St. John's*, but not quite so high. Its N.E. extreme is joined to the main body by a narrow neck of lower land, which at a little distance gives it the appearance of a separate islet. Between these islands are narrow channels about half a cable wide, with depths of 6 to 16 fathoms in them.

In the space between Blakan Mati and *St. John's Island* are a few small islands and several extensive reefs. Between the latter are channels of deep water, but they are so narrow and intricate as to be useless for the purposes of ordinary navigation.

Pulo Sikookur, about half a mile long N.W. by N. and S.E. by S., but very narrow, lies nearly mid-channel between *West St. John's* and *Blakan Mati* Islands. *Pulo Ringat* is the easternmost of two small islets which lie close to the north-eastward of *St. John's Islands*.

To avoid all the dangers between St. John's Islands and Malay Point, Peak Island must not be brought to the eastward of S. $\frac{1}{2}$ E., when Mount Serapong bears to the northward of W.N.W. When Mount Serapong is to the westward of W.N.W., a vessel may stand on until the western extreme of West St. John's Island bears S. by W. $\frac{1}{2}$ W., but no farther.

Outer Bank and Shoal.—A mud-bank, with general depths of 10 to 4 fathoms over it, extends across the outer roads of Singapore, from the St. John's Islands to abreast of Tanjong Catong, where it takes the direction of, and fronts, the coast some distance to the north-eastward.

The least water on this bank is about the middle of it, and it is this part which is generally known as the Outer shoal, which is $1\frac{1}{2}$ mile long N.E. and S.W., a cable broad at its northern, and nearly half a mile broad at its southern end, having depths of 4 to $4\frac{3}{4}$ fathoms over the greater part of it, but some patches of $3\frac{1}{2}$ and $3\frac{1}{2}$ fathoms near its southern extreme. *This bank is shoaling rapidly.* From the N.E. end of the shoal, in 5 fathoms, the obelisk on Tanjong Catong bears N. $\frac{3}{4}$ E., Fort Canning flagstaff is just to the northward of the obelisk on the Dalhousie Pier N.W. by W. nearly, and Peak Island bears S.S.W. $\frac{1}{2}$ W.; from its south-eastern extreme Fort Canning flagstaff bears N.N.W. $\frac{1}{4}$ W., and Peak Island S. by W. $\frac{1}{2}$ W.; and from its south-western extreme the same flagstaff bears N.N.W., and Peak Island S. $\frac{1}{4}$ W.

Fort Canning flagstaff open northward of Dalhousie Pier, bearing N.W. by W. $\frac{1}{4}$ W., will lead clear of the North end of the outer shoal; Peak Island S.W. by S. will lead eastward of it; and the southern extreme of Blakan Mati Island S.W. by W. $\frac{1}{2}$ W. will lead westward.

North-eastward of the Outer shoal the bank is not quite three-quarters of a mile broad, with depths of 6, 7, and 8 fathoms over it. South-westward of the Outer shoal the soundings on the bank are not so regular, and a hole of deep water, half a mile long, runs into the bank in a north-westerly direction about three-quarters of a mile from St. John's Islands.

A small patch, about 2 cables in extent, having 4 fathoms least water over it, lies about a third of a mile south-westward of the Outer shoal, and from its centre Fort Canning flagstaff bears N.N.W.-northerly, Peak Island S. $\frac{3}{4}$ W., and Mount Serapong W. by N. $\frac{1}{4}$ N. Mount Serapong bearing W. $\frac{3}{4}$ N. leads between this patch and the Outer shoal, and bearing W. by N. $\frac{3}{4}$ N. leads to the southward of it.

Peak Island bearing S.W. leads just outside the 10-fathom line at the edge of the bank in from 11 to 13 or 14 fathoms; the soundings quickly deepening to 17, 20, 25, and 30 fathoms south-eastward from the middle and southern part; and to 17 and 20 fathoms south-eastward from the northern part of the bank.

Inside the Outer Shoal are 10 to 12 fathoms, mud, decreasing gradually to 7 or 6 fathoms, but shoaling suddenly from a depth of 5 to 4 or 3 fathoms,

when Fort Canning flagstaff bears to the northward of N.W. by W. $\frac{1}{2}$ W., demanding caution in large ships anxious to get as close in as possible. With Fort Canning flagstaff to the westward of N.W. by W. $\frac{1}{2}$ W., the soundings decrease much more regularly. The 2-fathom line extends nearly half a mile south-eastward of Fort Fullerton, and nearly three-quarters of a mile from the depth of Singapore Bay. The extremity of the north-eastern line of fishing-stakes marks the 3-fathom edge of the shore bank, eastward of Malay Point.

Near the north-eastern extreme of the Duran Darat Reef is a run of deep water—12 to 23 fathoms—which terminates about half a mile E.S.E. from Malay Spit.

Anchorage.—The trade of Singapore is now so considerable that a large number of vessels are always to be found anchored in that part of the roads called the harbour, and small vessels may run in, guided by their soundings, and anchor where they can find a convenient berth.

Vessels of large draught must be more cautious, on account of the soundings decreasing suddenly from 5 to 4 and 3 fathoms. Good, safe anchorage, in from 7 to 10 fathoms water, will be found with the flagstaff on Fort Canning between the bearings of W. by N. $\frac{1}{2}$ N. and N.W. $\frac{1}{2}$ N., and with Mount Serapong bearing S.W. by W. $\frac{1}{2}$ W., or the left extreme of Blakan Mati S.W. $\frac{1}{2}$ W.; the latter bearing places a ship a little further in, and is useful when the flagstaff is to the westward of N.W. by W.

Directions.—Small vessels bound to Singapore Roads from the eastward will have no difficulty, as they have merely to proceed to a convenient anchorage. Those drawing between 12 and 16 ft. may pass inside the shoals off Tanjong Catong, by keeping in the run of deep water, pretty close to the end of the lines of fishing stakes which extend out from the point; but vessels of larger draught had better keep outside those shoals.

It is often advisable for vessels, and the usual custom for those belonging to the port, to keep the Singapore shore well aboard when proceeding to the anchorage from the eastward, especially when the wind is off the land and the tide setting to the westward. It will then, however, be very necessary to be guarded as Tanjong Catong is approached, and vessels of large draught must be very careful not to bring Mount Serapong (on Blakan Mati Island), to the southward of S.W. by W. $\frac{1}{2}$ W., until the flagstaff on Fort Canning bears W. by N. $\frac{1}{2}$ N., or to avoid getting under a depth of 6 fathoms towards the Tanjong Catong shoals.

A vessel of large draught will pass north-eastward of the Outer shoal, and not have less than 5 fathoms water, by keeping the flagstaff between the bearings of W. by N. $\frac{1}{2}$ N. and N.W. by W., and she should be prepared to anchor *directly* Mount Serapong bears S.W. by W. $\frac{1}{2}$ W., or the left extreme of Blakan Mati S.W. $\frac{1}{2}$ W., inside of which vessels of heavy draught should

not go; but those drawing not more than 18 or 20 ft. may go a cable's length or so farther in, and have 4 or 5 fathoms.

When bound to the roads from the westward, and having rounded Peak Island at the distance of about 2 cables' lengths, steer N. by E. or N.N.E., according to the tide, across the Outer shoal for the anchorage. A large ship, wishing to avoid the Outer shoal, may steer to the northward with Peak Island bearing between South and S. by E.,—but nothing to the eastward of the latter bearing,—until the left extreme of Blakan Mati bears S.W. by W. $\frac{1}{2}$ W., which bearing kept on will lead north-westward of the Outer shoal, and then steer as convenient for the anchorage.

In *working* towards the dangers between St. Johns Islands and Blakan Mati, care must be observed not to bring Peak Island East of S. $\frac{1}{2}$ E. while Mount Serapong is North of W.N.W.; but when Mount Serapong is West of W.N.W. a vessel may stand on until the western extreme of West St. Johns Island bears S. by W. $\frac{1}{2}$ W. The shoalest spots on the Outer shoal will be avoided by not bringing Peak Island West of South, after the South extreme of Blakan Mati bears W. by S. The fishing stakes will give warning when a vessel is standing towards the Pagar and Malay spits. The South extreme of Blakan Mati, if not brought West of S.W. by W. $\frac{1}{2}$ W., will lead clear of the inner side of the Outer shoal; and large ships, not wishing to stand over this shoal when outside of it, should not bring Peak Island South of S.W. by S.

SINGAPORE NEW HARBOUR.

NEW HARBOUR, between Singapore and Blakan Mati Islands, is about $2\frac{3}{4}$ miles long, in a general direction East and West, and not more than $1\frac{1}{2}$ cable broad in places. The eastern entrance is bounded on the North by the Malay and Pagar spits, and on the South by Buran Darat Reef, and the reefs surrounding the eastern sides of Blakan Mati and Ayer Brani Islands.

As an anchorage New Harbour is but a very indifferent one indeed, for the breadth of the navigable channel is but from 100 to 200 yards, the bottom is rocky and foul, and affords but bad holding ground, whilst the tides rush through it with great velocity; there is, from these circumstances, great risk of vessels dragging their anchors and going ashore, especially during the violent squalls which are common in this part of the world.

Notwithstanding these serious drawbacks, New Harbour has grown into a place of considerable importance, for it possesses facilities for running out jetties and making docks, which render it of the highest possible value to a large shipping port like Singapore, situate in the very centre of eastern commerce. The Peninsular and Oriental Company, together with other steam proprietors and merchants, have erected extensive coal stores, wharves, and jetties, the latter allowing of the largest steamers being lashed alongside in

perfect security. It is the place of arrival and departure of the mail steamers, and all other steamers, no matter how large, proceed here to coal. There are capacious dry docks, with workshops, and all needful appliances for repairing ships.

The whole of the above establishments are situated on the North or Singapore side of New Harbour, but the English and French Governments have coal wharves and jetties on Pulo Ayer Brani, an island lying in the middle of the eastern entrance to the harbour, and dividing it into two channels.

Both sides of the harbour are fringed with reefs which dry at low water, but close to their edges are depths of $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms, increasing quickly to 5 and 6 fathoms, and to this circumstance New Harbour owes its importance. The deep water at the edges of the reefs allowing the largest vessels to come alongside, it is but a simple matter to run out jetties to secure the vessel to. These jetties, of course, greatly facilitate the coaling of steamers and landing of cargo, which, at the anchorage in the roads, can only be done by means of boats.

The entrance to New Harbour between Pagar Spit and Ayer Brani Island is divided into three channels, by the Timbaga Rocks and Brani Shoals, which are marked by buoys and beacons, as hereafter described. The channel between Pagar Spit and Timbaga Rocks is named the *North Channel*; that between Timbaga Rocks and Brani Shoals the *Middle Channel*; and that between Brani Shoals and Ayer Brani Island the *South Channel*.

NORTH SIDE of NEW HARBOUR.—*Pagar Spit*, which forms the north-eastern limit of New Harbour, extends about S.S.E. $\frac{1}{2}$ E. a third of a mile from Pagar Point, and its extreme is marked by a *red* beacon, and there is another at a cable's length to the north-westward of it. Between these beacons is the head of the sea wall, which is built on Pagar Spit, and off it is moored a *red* nun hauling off *buoy*, in 4 fathoms water S. by E., 150 yards from the end of Pagar sea wall. From the first beacon the edge of the reef trends in a north-westerly direction for rather more than half a mile. The edge of this latter part of the reef is marked by two *fixed white* beacons, and close to it are depths of $3\frac{1}{2}$ to 5 fathoms. The edge then trends about S.W. by W., and for a distance of nearly a quarter of a mile is lined with a row of jetties, with coal stores and godowns behind them. At a cable's length farther to the S.W., on the other side of a shoal bight named Blangah Bay, is St. James's Hill, 70 ft. high, having a house and some trees on its summit, and which is a beautiful feature in the delightful scenery of this harbour. It juts out from the main—to which it is connected merely by a low, narrow neck—close to the edge of the reef, which is there marked by a *red beacon*. Mooring buoys, painted red, are placed off the jetties, to assist in securing the steamers when coaling.

From St. James's Hill the edge of the reef takes a westerly direction, and

at a cable's length from the hill, on the other side of a shoal bight, named Sibet Bay, commence the jetties of the Peninsular and Oriental Company, with extensive coal stores and godowns behind them. The whole of these buildings are on ground that was once a small island, but which is now connected to the main island of Singapore by a roadway. The entire frontage of the jetties is about $1\frac{1}{2}$ cable in extent. A *red beacon* marks the edge of reef between St. James Hill and the jetties, and at either end of the jetties is a dolphin to secure vessels to, with two mooring buoys off in the stream for the same purpose.

From the western end of these jetties, the edge of the reef takes a W. by N. direction for $3\frac{1}{2}$ cables' lengths, a *red beacon* marking it about halfway; it then turns sharply to the N.W., and at about the distance of $1\frac{1}{2}$ cable is the dry dock and works previously alluded to. From the dock the reef curves round to the westward, forming Chermin Bay; it then takes a S.W. direction for about $1\frac{1}{4}$ cable, when it again curves to the westward, and then to the southward, forming another small bay, and finally passes about a quarter of a cable's length round Lot's Wife, at the north-western limit of the harbour.

Hantu, the small round island lying in front of Chermin Bay, is nearly $1\frac{1}{2}$ cable in diameter, 96 ft. high, and covered with trees. Its southern side, being nearly in the same line as the Peninsular and Oriental jetties and Lot's Wife, forms part of the northern side of the main channel of the harbour. A reef surrounds the East, South, and West sides of the island, the edge of which, on the South side, is marked by a *white beacon*. The N.E. side, opposite the dry rock, is free from reefs, with 3 fathoms water close to. On the East side of the island is a ship-yard, with a patent slip for vessels under 200 tons.

BERLAYER POINT, the north-western limit of New Harbour, mentioned previously, is formed of cliffs of moderate elevation, and projects in a S.S.E. direction from the low mangrove behind it to a rather sharp point. From this point the coast trends in a north-westerly direction, and is fringed with a white beach named Pasir Panjang, or long beach, upon which, at a cable's length from Berlayer Point, stands a board, denoting the harbour limit in this direction.

Lot's Wife is a rock about 6 ft. above high water, lying immediately off the pitch of Berlayer Point, about a third of a cable's length inside the edge of the shore reef, which is here steep-to. This rock was formerly much higher, and had the appearance of a pillar, hence its name.

Berlayer Rock, with but $1\frac{1}{4}$ fathom water over it, lies S.W., rather more than half a cable's length from Berlayer Point. H.M.S. *Charybdis* touched upon this rock; it is now marked by a *beacon*.

A *Patch*, having but $3\frac{1}{4}$ fathoms water over it, lies West-southerly, a quarter of a mile from Berlayer Point. It is the shoalest part of a bank

over the greater part of which are 4 and 5 fathoms water, with 7 and 8 fathoms close to its outer edge, and 6 fathoms between it and the shore reef fronting Pasir Panjang beach.

To clear this patch, and also the Berlayer Rock, keep Tereh Point, a conspicuous red bluff on Ayer Brani Island, well open of the Peninsular and Oriental Company's jetties.

MOUNT FABER is the name of a conspicuous range of hills which rise bold up on the northern shore, about the middle part of New Harbour. The direction of the range is about N.W. and S.E., the highest point, 357 feet, being towards its N.W. end. Near the middle of the range is a flag-staff, which, like that upon Fort Canning Hill, is crossed by two yards, used for signalling the arrival of ships from the westward, and repeating the signals made from Fort Canning. The height of the range where the flag-staff stands is 303 ft., exactly the same height as Mount Serapong on the opposite side of New Harbour.

Eastward of Mount Faber, behind the wharves and jetties, are several small hills from 100 to 132 ft. high.

AYER BRANI ISLAND, commonly known as Pulo Brani, lies inside the eastern entrance to New Harbour. It is nearly two-thirds of a mile long, N.W. and S.E., and the same extent East and West; its greatest length is on its north-eastern side, facing Singapore roads, and upon this part are three hills, the middle one, which is the highest, being 168 ft. above the sea. Teregeh Point, the S.E. extreme, and Tereh Point, the North extreme of the island, are both formed by cliffs; those forming Tereh Point are of a red colour, and present a bold, red bluff, which is very conspicuous when viewed from either entrance of the harbour.

This island, like Blakan Mati, is encircled by a coral reef with occasional patches of sand upon it, which uncovers at two-thirds ebb. From Teregeh Point the reef projects about half a cable's length to the southward, and more than 2 cables' lengths eastward, the extreme of the latter part being known as Teregeh Spit, and marked by a white beacon. From this spit the reef curves round gradually, passing about a cable's length from Silingsing Point, the middle point of the island; it then closes the island until at Tereh Point it is distant only about 20 or 30 yards. From Tereh Point it curves slightly in towards Saga Bay, and then runs pretty straight about W.S.W., and forms a spit, the outer part of which is more than $1\frac{1}{2}$ cable's length westward of Risim Point, the West extreme of the island.

Buoys.—Two black nun buoys were placed to mark Brani Reef in 1876, one in 3 fathoms, on the S.E. end of the reef, with Teregeh Spit beacon bearing S.W. by W., distant $1\frac{1}{4}$ cable; and the other on the edge of the Brani Reef, off Brani Bay, in 5 fathoms, with the red beacon on the North shore bearing N. $\frac{3}{4}$ W. distant nearly 3 cables.

The N.W. side of Ayer Brani, between Tereh and Risim points, is the most important part of the island. Between these points is Saga Bay, dry at low water, which offers great facilities for the construction of dry docks. Some years ago a dry dock was commenced by a Mr. Clunis, who had early perceived the advantages possessed by this island for such enterprises. He had made considerable progress with his work when he was stopped by the Government, who took possession of the property, owing to Mr. Clunis having failed to possess himself of the proper legal grant of the land. The Government has since built a temporary jetty and coal stores close to the dock, at the north-eastern part of Saga Bay, but with the dock itself nothing has been done. These coal stores and jetty are at present in a dilapidated state, but they are about to be replaced by permanent structures. Just to the north-eastward of Risim Point the French Government has erected some good coal stores and run out a convenient jetty, off which mooring buoys are placed to secure the vessel to.

SINKI STRAIT is the channel between Ayer Brani and Blakan Mati. To render it navigable, beacons are placed on the edges of the reefs bounding it; even now it is hardly safe for sailing vessels, owing to the uncertainty of the direction of the gusts of wind caused by the adjacent high land.

SILUGU ISLAND lies at the western entrance of Sinki Strait, about a third of a mile West from the extreme of the spit projecting from Risim Point, and fronts a shallow bight, dry at low water, named Imbeah Bay. It is a remarkable little island, almost circular in shape, and moderately elevated, with a small bungalow on its summit. The shore reef projects from the coast a short distance outside this island; close to it are $3\frac{1}{2}$ to 5 fathoms.

On a projecting point of Blakan Mati, a short distance to the south-eastward of Silugu, is a jetty for heaving down ships.

BERDAUN ROCK is a small patch of reef above water, grown over by mangrove trees, distant about $1\frac{1}{2}$ cable westward of Silugu Island, and half a cable from the Blakan Mati shore. A reef, dry at low water, extends about two-thirds of a cable westward, and about a third of a cable northward and eastward from it.

RIMAU POINT, the N.W. extreme of Blakan Mati, and the S.W. limit of New Harbour, is formed of cliffs with patches of shelving rocks projecting from their bases. The shore reef extends only a short distance from the North and West sides of the point, and close to it are $3\frac{1}{2}$ and 4 fathoms, excepting in a W.N.W. direction from the West extreme of the point, where a sort of narrow tongue with but $1\frac{1}{2}$ fathom water projects to a distance of half a cable's length.

Brani Shoals lie at the eastern entrance of New Harbour, between Pagar Point and Ayer Brani Island. They extend, under a depth of 3 fathoms,

about half a mile N.W. by W. and S.E. by E., and from their S.E. extreme Teregeh Point bears S.W. by W., and Pagar Point N. $\frac{1}{2}$ W.; from their N.W. extreme the eastern part of Teregeh Point bears S. $\frac{3}{4}$ E., and Pagar Point N.E. by E. $\frac{1}{2}$ E. The least water upon these shoals is $1\frac{1}{2}$ fathom, this part being near their centre, and in length it is about 2 cables, and from a few yards to half a cable wide. The channel on their eastern side is marked by three *white* buoys, one near their S.E. extreme, one near their middle, and the other half a cable's length inside their N.W. end. A white buoy has also been placed on the S.W. edge of the shoal in 3 fathoms, with the end of Pagar sea wall bearing E.N.E., distant 4 cables.

The soundings decrease gradually towards the shoals, and if the lead be properly attended to, it will show when a vessel is nearing them. The channel between them and Blakan Mati is about a cable wide, with depths in it of 3 to 10 fathoms.

The **Timbaga Rocks**, dry at low water springs, lie between Pagar Point and the shoalest part of the Brani Shoals; they are about half a cable long N.W. by W. $\frac{1}{4}$ W. and S.E. by E. $\frac{1}{4}$ E., but only a few yards broad. Two *red* beacons mark these rocks, one on either extreme.

The **Timbaga Shoal**, about half a cable in extent, and with only $1\frac{1}{2}$ fathom least water over it, lies about a cable's length north-westward of the Timbaga Rocks, and its north-western end is marked by a *red* buoy.

Mæander Shoal, about a cable in extent, East and West, with 6 to 16 ft. water over it, lies on the South side of the main channel of New Harbour, about $1\frac{1}{2}$ cable South of the Peninsular and Oriental Company's works, and a cable to the N.W. of the extreme of the spit extending from Risim Point. The shoal is marked by *two red buoys*, one near its S.E., and the other near its N.W. end; around it, and in the channel between it, and Risim Spit, the depths are $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms.

A mooring buoy, for the use of the Peninsular and Oriental Company's steamers, is placed 110 yards to the northward of the eastern extreme of this shoal.

Keppel Rock, with 15 ft. water over it, lies W.S.W., a cable's length from the western extreme of the Peninsular and Oriental Company's works. Close around the rock are soundings of 5 and 6 fathoms, and a buoy is placed near its eastern side. The South extreme of Mount St. James on with the eastern extreme of the Peninsular and Oriental Company's jetties leads southward of the rock.

Anchorage.—The general depths in New Harbour are 6, 7, or 8 fathoms, but the bottom is foul and rocky, and very indifferent holding ground. Staff Commander Richards, R.N., who surveyed this harbour in H.M.S. *Saracen*, which vessel remained at anchor there for three months, remarks:—"The holding ground is bad, and great care is necessary to prevent fouling the

anchors; vessels remaining more than a day should moor." The best anchorage is considered to be off the French Naval Coal Stores.

Tides.—It is high water, full and change, at the Peninsular and Oriental Company's Wharf, at 9^h 45^m. Springs rise 10 ft., neaps 7½ ft. The ordinary rate of the tide at springs is 2¼ knots, but it is much influenced by the prevailing monsoon, and often runs 4 knots at the springs. During the N.E. monsoon the stream sets to the westward 18 hours in the 24 hours during spring tides, and almost continuously during neaps.

Directions.—Vessels proceeding from Singapore Roads into New Harbour should steer *about* S.W., according to their draught, not approaching Malang or Malay Point nearer than a mile, nor hauling to the westward until Mount Faber flagstaff is in line with the eastern extreme of the landing jetties, which clears the shoal spit off Malay and Pagar Points. In rounding these points, the fishing stakes furnish a ready guide to vessels, the outer ends of the longest lines of stakes having 3 fathoms water close to them, increasing at a short distance to 5 and 7 fathoms. Having rounded Malay and Pagar Points, steer to the westward until the two *red* beacons on the Timbaga Rocks are in line, bearing N.W. by W. ¼ W., and observing that Teregeh Point, the south-eastern extreme of Ayer Brani Island, must not be brought to the westward of W. ½ S., which clears Berala Spit and the northern part of the Buran Darat, and remembering that the north-eastern extreme of the latter is marked by a *white* beacon.*

To proceed through *North Channel*, north-eastward of the Timbaga Rocks, steer *about* N.W., and passing about half a cable's length westward of the outer or south-easternmost of the two *red* beacons which mark Pagar Spit, open the Timbaga Rock beacons on the port bow, and pass in mid-channel between those beacons and the inner or north-western beacon of Pagar Spit. Continue on a N.W. by W. course, according to circumstances, leaving the *red* buoy on the Timbaga Shoal about half a cable's length on the port hand, and edging to the westward as convenient when Pulo Silugu, a small round island, with a bungalow on its summit, is seen just open of the *red* cliffs of Tereh Point, which mark clears the N.W. extremes of the Timbaga and the Brani Shoals.

It should be remembered, when passing between the north-western extremes of the shoals just mentioned and the coral bank which extends 1½ cables' lengths from the shore of Singapore Island, and which uncovers at two-thirds ebb, that the edge of the latter is marked by two fixed *white* beacons, one North of the *red* buoy on the Timbaga Shoal, and the other

* Staff-Commander Richards observes, that owing to the strong tides and to the hard bottom, the floating beacons frequently break adrift, so that no dependence can be placed upon them; he recommends strangers to take a pilot.

about midway between the *white* beacon just mentioned and the extremes of jetties. Close to these beacons are 3 and 4 fathoms water.

To proceed by the *Middle Channel* to the south-westward of the Timbaga Rocks, after having rounded Malay and Pagar Points, and brought the beacons on the rocks in line, steer about N.W. by W., opening the beacons on the starboard bow, and pass about half a cable's length to the westward of both of them, and also of the *red* buoy on the Timbaga Shoal, about midway between the latter and the *white* buoy on the N.E. extreme of the Brani Shoals, in depths of 7 to $4\frac{1}{4}$ fathoms, deepening to 6 and 7 fathoms as Pulo Silugu comes open of the *red* cliffs of Tereh Point; when steer West and W.S.W., to pass mid-channel between the jetties and Tereh Point, leaving the *red* beacon and mooring buoys on the starboard hand.

The best anchorage is abreast of the French Naval Coal Stores; but if wishing to proceed farther to the westward, or through the harbour to the westward, a vessel may pass on either side of the eastern of the two mooring buoys off the Peninsular and Oriental Company's Wharf, but it is better to pass it on the South side, pretty close-to, giving a good berth to the buoys on the Mæander Shoal, which will then be on the port side. Keppel Rock will be avoided if the South extreme of St. James's Mount is not shut in behind the East extreme of the Peninsular and Oriental Company's jetties.

Having passed between the Mæander Shoal and Keppel Rock, a vessel may anchor where convenient, as nearly in mid-channel as possible. To proceed from thence through New Harbour to the westward, it will be merely necessary to steer about W. by S., and taking care not to get too close over towards the Berdaun Rock, keeping as nearly in mid-channel as possible, and so pass out of the harbour. The conspicuous red bluff forming Tereh Point, if kept well open of the Peninsular and Oriental Company's Works, will lead out clear of the reef extending from the South end of Hantu, on which there is a *red* beacon, and also of the Berlayer Rock and 19-ft. patch just outside the harbour.

SINGAPORE STRAIT; EASTERN PART.

The **SOUTH-EAST COAST** of **SINGAPORE ISLAND**, from *Tanjong Catong*, which forms the north-eastern limit of Singapore Roads or Harbour, to *Changhi Point*, takes a direction first to E.N.E. 5 miles, and then N.E. by N. $3\frac{1}{4}$ miles. A slight indentation in the coast line about 3 miles S.W. by S. from Changhi Point, is known as *Tulloh Mati Ikan* (Dead Fish Bay), just to the southward of which, where the shore begins to round away to the westward, are Tanjong and Tulloh Buddoh.

Red Cliffs.—The South and S.E. coasts of Singapore are level and woody.

The most conspicuous objects are the Large Red Cliff, or Tannah Merah Besar, about S.W. $\frac{1}{2}$ S. $1\frac{1}{2}$ mile from Changhi Point; and the Small Red Cliff, or Tannah Merah Ketchil, in a small bight in the land, just to the south-westward of Tulloh Buddoh.

A *Shoal Bank* fronts the whole of this part of the coast, extending to a distance of more than half a mile in places. The soundings decrease towards it with tolerable regularity, but large ships should not near it under a depth of 10 fathoms.

CHANGHI POINT, the N.E. extreme of Singapore Island, forms the S.E. limit of the Old Strait of Singapore. It is low land, with a white sandy beach, and bears about W. by N. nearly 6 miles from Johore Point. A shoal bank extends about a cable's length from the point, close to which are depths of 6 fathoms.

RED CLIFF BANK is an extensive flat of mud and sand, with some patches of rock and coral upon it, extending from the eastern part of Singapore Island, between Changhi Point and Tanjong Buddoh. The north-eastern edge of the bank projects about S.E. $\frac{1}{2}$ E. nearly 4 miles from Changhi Point, its extreme forming a sort of horn or spit. From Tanjong Buddoh the bank projects in an easterly direction towards the Johore Shoal, which may be considered the outer horn or spit of the bank. These two horns thus projecting from the main part of the bank form a sort of basin between them, in which are depths of 7 to 12 fathoms.

JOHORE SHOAL, or Allang Bau, fronts the entrance of the Old Strait of Singapore, and may be considered as the horn or spit of the outer part of the bank extending about 6 miles eastward from the Red Cliffs at the East end of Singapore Island. The shoal is about 2 miles long East and West, nearly a quarter of a mile broad, and is composed of hard sand, having $1\frac{1}{2}$ fathom on its shoalest part at low water, 3 and $3\frac{1}{2}$ fathoms on its South extreme, and 12 to 15 fathoms very near to it, on the South, East and S.W. sides.

South Romania Island open of South Point leads clear to the southward of this shoal; and when coming from the eastward it may also be avoided by not approaching the North shore under a depth of 17 fathoms after Johore Hill bears North, or Barbukit Hill N.E. $\frac{3}{4}$ E. Coming from the westward, St. John's Island should not be brought to the southward of W.S.W., after Little Johore Hill bears N. by E., or Johore Hill N.E. by N., nor the shoal neared under a depth of 17 fathoms until Johore Hill bears North.

OLD STRAIT of SINGAPORE, the channel between the northern shores of Singapore Island and the Malay Peninsula, was formerly the passage by which all vessels proceeded between India and China, when the strait at present in use was not known to be navigable. Its western entrance has very much filled up; formerly it had $3\frac{1}{2}$ fathoms in it at the least water, but

now a bar of sand, with but 2 fathoms water on it, stretches across from Tanjong Gul to Tanjong Bolus.

No vessels now proceed through this strait, but they occasionally enter by the eastern or Johore Channel to load granite at Pulo Ubin, or to load timber at a small town, about halfway through the strait, close to Tanjong Putri in Johore, and which the present Tumongong is striving to bring into importance, having erected some extensive saw mills there, for the purpose of cutting up the timber as it is brought from the adjacent forests. But these vessels invariably enter and leave by the eastern channel.

TIKONG BESAR and **TIKONG KETCHIL** are the two islands lying north-westward of Johore Point, at the entrance of the Johore River, dividing that stream into two branches. *Tikong Besar*, as its name implies, is the larger island of the two, being in extent $3\frac{1}{2}$ miles East and West, and $2\frac{1}{4}$ miles North and South. *Tikong Ketchil*, or Little Tikong, lying close to the West side of the larger island, is in shape nearly round, its diameter being about two-thirds of a mile. There is a small islet, named *Pulo Sijonkan*, lying close to the S.E. side of Tikong Besar; and another, named *Pulo Sijahat*, at three-quarters of a mile to the southward of Tikong Ketchil.

Kapala Rocks appear to be three rocky heads awash, the outer one lying S. by E. $\frac{3}{4}$ E. rather more than $1\frac{1}{2}$ mile from the South point of Tikong Ketchil, $1\frac{1}{3}$ mile W. by S. $\frac{1}{2}$ S. from the South point of Tikong Besar, and 4 miles W. by-N. $\frac{1}{2}$ N. from Johore Point.

Tikong Bank is the extensive shoal bank which surrounds both the Tikong Islands, and also projects outside the islets and rocks just mentioned. Its edge is distant from Pulo Sijonkan, in the direction of Johore Point, about $1\frac{1}{4}$ mile; and from thence takes a N.N.E. direction, passing about a quarter of a mile outside the East end of Tikong Besar. Southward of Pulo Sijonkan the bank extends farthest, its edge in this direction being distant nearly $1\frac{1}{2}$ mile from the islet.

The eastern side of this bank is rather steep, and must be approached with caution; on the South side the depths decrease more regularly, and it may be approached with proper attention in that direction by the lead.

JOHORE RIVER.—Kwala or Qualla Johore, or mouth of the Johore River, is bounded on the East side by the bank surrounding the South and West sides, and extending to the northward of Pulo Tikong; and on the West side by Red Cliff Bank, by the reef which projects eastward from Pulo Ubin, and by Tanjong Kopo and the coast to the northward of it.

The old town of Johore, once a place of considerably trade, now consists of some wretched huts, built with bamboo and mud, where good water may be procured, but nothing else. It stands about 10 miles up the river, which is navigable for ships the whole distance. It is not at all probable that European vessels will have to proceed to Johore for several years to come yet, although it is quite possible that the energy of the present Tumongong

(the sovereign of Johore), may, in the course of time, again develop some trade there.

JOHORE POINT is a bluff promontory, forming the eastern side of the entrance of Johore River and of the Old Strait of Singapore. The edge of the shore bank and the Malang Berdaun Rocks extend nearly three-quarters of a mile to the southward of Johore Point.

JOHORE HILL, or *Maru Bukit*, 660 ft. high, is of a regular, oblong, sloping form, and covered with trees. Standing but a very short distance inland from Johore Point, it is one of the most conspicuous objects in, and serves as a useful landmark for navigating, the Strait of Singapore.

Little Johore Hill, 749 ft. high, rises N. by W. $\frac{3}{4}$ W. $5\frac{1}{2}$ miles from Johore Hill. Although higher, this hill is not so extensive as Johore Hill, but it is also useful as a landmark.

CALDER HARBOUR is the name given to the entrance of one branch of the Johore River. It lies just round Johore Point, bounded on one side by the bank fronting the coast to the north-westward of Johore Hill, and on the other by the extensive bank which projects from Pulo Tikon Besar. The breadth of the harbour is three-quarters of a mile, with anchorage in $5\frac{1}{2}$ to 9 fathoms,

Tanjong Stapah, about S.E. by E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from Johore Point, is a good mark when kept in line with South Point, from which it bears West-northerly, distant $3\frac{3}{4}$ miles, to keep vessels well clear to the southward of all the dangers near the Romania Islands. This point appears to be pretty bold close-to; but vessels are recommended to give it a berth of at least half a mile.

A patch of *dry bank*, with 5 and 6 fathoms water close-to, lies about three-quarters of a mile W. by N. from Tanjong Stapah. It seems, however, to be but part of a shoal bank which fronts the coast to the distance of a mile, between Tanjong Stapah and Johore Point.

The *Malang Berdaun* are a rocky cluster, some above and others below water, the outer rocks of which lie South nearly three-quarters of a mile from Johore Point, and within the edge of the shore bank just described. These dangers are, however, quite out of the ordinary track of vessels as they lie inside the Johore Shoal.

Tanjong Teeram, about $1\frac{1}{2}$ mile eastward of Tanjong Stapah, and bearing W. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles from South Point, has rocks, both awash and below the water, lying off it, and there are also many between it and South Point; but they are all within the margin of the 3-fathom edge of the shore bank.

SOUTH POINT, or *Tanjong Tehimpang*, the most southern point of this part of the Malay Peninsula, bears W.S.W.-southerly 5 miles from Romania Point. The 3-fathom edge of the shore bank which fronts this part of the coast, is distant about a third of a mile from South Point; the soundings near it decrease rather suddenly from 10 or 9 fathoms.

ROMANIA POINT, or *Tanjong Penyusoh*, the S.E. extreme of the Malay Peninsula, and of Asia, with the circumjacent coast, is level land, covered with trees. The S.W. extreme of the point is nearly $1\frac{1}{2}$ mile S.W. by W. $\frac{2}{3}$ W. from the S.E. extreme, and, although it is rather conspicuous, no name has yet been given to it upon the chart. Between the extremes is a middle point, with a small bay on either side.

Many rocks lie off Romania Point, extending nearly half a mile from it in a southerly direction. A *rock awash* also lies a short distance off shore, between the middle point and the S.W. extreme.

A shoal bank fronts this shore and extends outside these rocks, its edge being distant nearly three-quarters of a mile in a S. by W. direction from Romania Point. Southward of the S.W. extreme of the point a tongue projects in an easterly direction from the shore bank, the outer part of which is three-quarters of a mile South of the point. Over this tongue are 3 fathoms water, but inside of it is a narrow gap of 4 and 5 fathoms.

BARBUKIT HILL, 645 ft. high, $4\frac{1}{2}$ miles W.N.W. from Romania Point, and bearing from Horsburgh Lighthouse W. by N. $\frac{2}{3}$ N. $12\frac{1}{2}$ miles, is a regular pyramid rising from the low land, and, being only about 5 miles inland, is a very useful object in making out the entrance of the strait.

FALSE BARBUKIT, 432 ft high, is a low, sloping hill near the sea, appearing like a top of trees a little more elevated than the adjacent coast, which is all rather low and woody to the northward of Barbukit Hill. It bears N.N.E. 6 miles from Barbukit Hill, and N.W. from Horsburgh Lighthouse, and, being discernible during hazy weather much sooner than Barbukit Hill, answers as a guide in coming from the northward towards the northern extremity of the outer shoals.

From the S.W. extreme of Romania Point, the South coast of the Malay Peninsula, trends to the north-westward for about $1\frac{1}{2}$ mile to the entrance of a small river, the *Songie Romynia*. From thence the land curves away to the south-westward for $2\frac{1}{4}$ miles to *Tanjong Romynia*, between which and South Point, which bears from it S.W. by W. $\frac{1}{2}$ W. nearly $1\frac{1}{2}$ mile, is a small bay, and the entrance of another small river, the *Songie Kalarang*.

WATER, or Watering Islands, is the name given to a small round island about a quarter of a mile in extent, with an islet off its West extreme connected to it by a reef, lying N.E. by E. $\frac{1}{2}$ E. from *Tanjong Romynia*, the outer side of the island being distant about three-quarters of a mile from it.

Close around the S.W. extreme of Romania Point is *Diana Cove*, where there is a stream of *fresh water*. The Romynia River, farther to the north-westward, has 2 or 3 ft. water at its narrow entrance at low tide, and is navigable by boats 2 or 3 miles inland.

The **ROMANIA ISLANDS**, fronting Romania Point, are six in number; the westernmost or larger one is composed of two islands very near each

other, joined by a reef; the northernmost and south-easternmost are two barren rocks; but the others are covered with trees. They extend about $2\frac{1}{2}$ miles N.E. and S.W., the largest being within a mile of the point, and the nearest to it. There is a rock, about 12 ft. above water, near the South point of South Island, and a reef of straggling rocks extending to the eastward, which are bold to approach on the South side.

DANGERS.—The following dangers lie contiguous to the Romania Islands:—

Congaltons Carr, a rocky patch, with $1\frac{1}{2}$ fathom water over it, and 8 to 12 fathoms close-to, is the easternmost of the dangers lying near the Romania Islands. From it the middle of the largest island is in line with Peak Rock, the latter distant a mile; North Rock, the northernmost island, bears N.W.-northerly nearly 2 miles, and Horsburgh Lighthouse E.S.E.-easterly $5\frac{1}{2}$ miles.

To avoid this danger, do not bring the southern extreme of the largest Romania Island to the westward of W. $\frac{1}{2}$ N., or the centre of that island in line with Peak Rock, until Tanjong Punji bears N.N.W. $\frac{1}{2}$ W.

Caution.—When the tide is running to the westward, vessels passing through the North channel must be very careful that they are not set too near this danger, of which the lead will not give timely warning.

Jones Reef, having only 1 fathom water over it, and 8 or 9 fathoms close-to, lies N.N.W. $\frac{2}{3}$ W. a little over half a mile from Congaltons Carr, with the Peak Rock bearing S.W. $\frac{1}{2}$ W., distant three-quarters of a mile, and North Rock N.W. $\frac{1}{5}$ W. $1\frac{1}{4}$ mile.

Whale Rock, or *Whales Crown Rock*, lying W. by S. nearly a third of a mile from Jones Reef, is a small ledge of rocks which is particularly dangerous, as it is only at about three-quarters ebb that a small round rock becomes visible, and indicates the existence of the danger. It is steep-to, and the depth in its vicinity is irregular, being from 15 to 8 or 9 fathoms. Peak Rock bears from it S.W. $\frac{1}{2}$ S., and North Rock N.W. $\frac{1}{2}$ N., distant a mile.

A *rock awash* lies a short distance E.N.E., and a 4-fathom patch about a quarter of a mile N.N.E. from Peak Rock. Another 4-fathom patch, with 12 fathoms near it, lies a short distance to the northward of Whale Rock.

A Reef, about half a mile in extent, and dry in places, lies between North Island and North Rock. Its eastern extreme bears North from Peak Rock, distant three-quarters of a mile; and its western extreme rather less than half a mile S.S.W. from North Rock. Upon its north-eastern extreme is the smallest of the Romania Islands—a mere rock; and there is a 5-fathom patch between it and North Island.

Stork Reef, lying S.W. by W. $\frac{1}{2}$ W. about three-quarters of a mile from Congaltons Carr, is about 3 cables in extent N.E. and S.W., and from its S.W. point Barbukit Hill is on with the North hump of the large Romania Island bearing W. by N. $\frac{3}{4}$ N.; Peak Rock N.W., distant a little more than

half a mile; the point of Watering Bay, the S.W. part of Romania Point, West; and Horsburgh Lighthouse E. by S. $\frac{1}{2}$ S. 6 miles.

A **Three-Fathom Patch** lies S.W. by W. two-thirds of a mile from Stork Reef. South Island bears from it N. by W. $\frac{3}{4}$ W. half a mile; the South end of the large Romania Island N.W. nearly a mile; and South Point W. by S. $6\frac{1}{4}$ miles.

A *rock awash* lies with South Island N.E. $\frac{1}{2}$ E., distant one-third of a mile, and the large Romania Island N. by W. $\frac{3}{4}$ W. about the same distance.

A **Four-Fathom Patch** lies nearly a mile W. by S. from the 3-fathom patch just mentioned; with South Island bearing N.E. nearly a mile; the large Romania Island N. by E. $\frac{1}{2}$ E., three-quarters of a mile; and the largest Water Island, West-southerly.

A Shoal with only $2\frac{3}{4}$ fathoms water over it, and which is the southernmost of the dangers near the Romania Islands, lies with the large Romania Island bearing N.N.E.-easterly, distant $1\frac{1}{2}$ mile; Horsburgh Lighthouse E. $\frac{1}{4}$ S. $7\frac{3}{4}$ miles; Romania Point North $1\frac{2}{3}$ mile; and South Point W. $\frac{1}{2}$ S., nearly $4\frac{3}{4}$ miles. There is a patch of $4\frac{1}{2}$ fathoms lying a third of a mile in a south-easterly direction from this shoal.

Clearing Mark.—There is deep water, 9 to 12 or 13 fathoms, very close to the above dangers. Tanjong Stapah, a point $3\frac{3}{4}$ miles to the eastward of South Point, in line with South Point bearing West, will lead clear to the southward of the last-mentioned patch of $2\frac{3}{4}$ fathoms, as also to the southward of all the dangers near the Romania Islands.

The **ROMANIA SHOALS** are a number of detached patches of sand and coral—various as to extent and depths of water over them—stretching in a south-westerly direction from the tail of the bank which extends to the southward of North Patch, towards the rocks and dangers which lie outside the Romania Islands. Between these patches are channels with depths of 8 to 10 fathoms water.

The limits of these shoals, to depths of 4 fathoms and under, lie between the bearings of N. by W. $\frac{1}{4}$ W. and N.W. $\frac{1}{2}$ W. from Horsburgh Lighthouse, the distance on the former bearing being 6 miles, and on the latter 5 miles. The least water shown upon the chart is $3\frac{1}{2}$ fathoms, and this shoal portion lies between the bearings N. by W. $\frac{3}{4}$ W. and N.N.W. $\frac{1}{2}$ W. from Horsburgh Lighthouse, and is about a mile in length, in a northerly direction. But it does not appear that $3\frac{1}{2}$ fathoms is the least water on these shoals, and great caution should be used.

Outside the N.E. limit of the shoal part of these reefs, the patches have depths generally of 6 to 8 or 9 fathoms over them, but there is one patch of 5 fathoms bearing N. $\frac{1}{2}$ W., and another of the same depth bearing N.W. by W. from the lighthouse.

South Island, the southernmost island of the Romania Group, just open of South Point, the southern extreme of the Malay Peninsula, leads to the south-

ward of the Romania Shoals; and Horsburgh Lighthouse kept to the southward of S. by E. $\frac{1}{4}$ E., will lead to the eastward of those patches which have less than 5 fathoms over them.

NORTH PATCH, lying $4\frac{1}{2}$ miles W. by S. from the Eastern Bank, is generally considered the outermost of the Romania Shoals, for the reason that the Eastern Bank, not having less than 7 or 8 fathoms water over it, is not only not dangerous to the mariner, but it is in fact useful to him, serving to determine his position; whereas the North Patch, having but 4 fathoms water over it, is not safe for a large ship to cross in a swell or a heavy sea. The patch is nearly $1\frac{1}{2}$ mile long, North and South, and half a mile broad, composed of mud and sand, and has but 4 fathoms water over the greater part of it. It lies near the North end, and is the shoalest part of a bank about 5 miles long and 2 miles broad, with depths of 6 to 10 fathoms over it, and a 5-fathom spot about a mile from its South end. From the North end of North Patch, False Barbukit Hill bears W. $\frac{1}{2}$ S. $12\frac{1}{2}$ miles; Barbukit Hill S.W. by W. $\frac{3}{4}$ W. 16 miles; and Horsburgh Lighthouse S. by W. $11\frac{1}{2}$ miles.

Bintang Little Hill open to the westward of Bintang Great Hill, leads half a mile eastward of the North Patch.

The **EASTERN BANK**, the outermost of the shoal patches off Romania Point, is nearly $1\frac{1}{2}$ mile in extent, with soundings of $7\frac{1}{2}$ to 10 fathoms over it, and 11 to 14 fathoms close around it. It lies about a mile inside the range of the Horsburgh light, and from its outer edge the light bears S.W. by S., distant 14 miles; Barbukit Hill W. by S. $\frac{3}{4}$ S.-southerly; and False Barbukit W. $\frac{1}{2}$ S.

Vessels getting soundings of 8 to 10 fathoms on this bank, during hazy weather, sometimes think they are on the northern patch of Romania outer reef, and then haul more to the eastward, which renders them liable to fall to leeward of the strait.

PEDRA BRANCA lies nearly in mid-channel of the eastern entrance to Singapore Strait, and as it advances beyond the mouth of the straits considerably into the China Sea, it has for ages served as the principal leading mark to vessels passing out of, or into, the straits. Its Portuguese name, "white rock," was significant of its appearance prior to the erection of the lighthouse, from its being so marked by the dung of the numerous sea birds which lived on it. It consists of a reef of light grey granitic rocks, about 450 ft. long N.E. and S.W., and 200 ft. broad. At high water it had the appearance of a mere heap of boulders loosely piled together, which only afforded two rocks large enough to build the lighthouse upon; the S.W. one was chosen.

The **HORSBURGH LIGHTHOUSE**, which stands on this rock, is a noble monument. It was determined on in 1847, after several years of delay and discussion. The funds were partially raised by liberal subscription in Singapore and China, and the structure was designed and executed by J. T.

Thompson, Esq., the government surveyor, who has given an elaborate and interesting account of the work. It is dedicated to the memory of James Horsburgh, F.R.S., the hydrographer of the East Indies. It is a fine column of dressed granite, the first building so constructed in these countries, is 92 feet 9 inches in height from base to the top of the funnel, with a white spherical dome, and the base of the rock being 16 feet 9 inches above the high-water level, it has a total height of 109 feet 6 inches.

It shows a *brilliant revolving light*, from nine holophotal metallic reflectors, the invention of Mr. Thomas Stevenson, three on each face of a triangular frame, which revolves in three minutes, consequently a bright flash of 15 seconds' duration is produced in every direction once in a minute. The light totally disappears at great distances. It is elevated 95 ft. above high-water mark, and so may be seen 15 miles off from the deck of an ordinary ship.

It is in lat. $1^{\circ} 19' 58''$ N., long. $104^{\circ} 24' 28''$ E., and from it the largest island off Romania Point bears W. by N. $\frac{1}{3}$ N. about $7\frac{1}{2}$ miles. It is the same distance from the shore of Bintang, and is in one with the centre of Bintang Great Hill, bearing S. by E. $\frac{1}{4}$ E.

DANGERS near PEDRA BRANCA.—With the exception of a patch of 4 fathoms, the North and N.W. sides of Pedra Branca are steep-to, there being 17 fathoms close to the rock, and 30 to 36 fathoms near it.

This 4-fathom patch lies about a quarter of a mile northward of the rock, and is the only shoal spot between it and the Romania Shoals, in which space the depths are very variable in mid-channel, 17 to 32 fathoms, but they become more regular, 17 to 14 fathoms, towards the Romania Shoals.

The East, South, and S.E. sides of Pedra Branca should not be approached nearer than a mile, for there are dangerous rocky patches to the distance of half a mile from the East side; and the South and S.E. sides are foul to three-quarters of a mile, at which distance South and S.S.E. $\frac{1}{4}$ E. from the lighthouse are two dangerous ledges, named Middle Rocks, which are but little above the surface at high water. Eastward at a short distance from the Middle Rocks is a patch of 4 fathoms, and North a quarter of a mile from this patch is a rock with only 3 ft. of water over it.

SOUTH LEDGE is very dangerous. It consists of three pointed rocks, very little detached from each other, with 8 and 9 fathoms close to, and 16 or 18 fathoms at a short distance from them in their stream. They are of small extent, not visible until the ebb has been made some time, and are nearly covered before the stream of flood begins to run. Horsburgh lighthouse bears from them N. by E. $\frac{2}{3}$ E., distant 2 miles; the large Romania Island N.W. by W. $\frac{1}{3}$ W. $7\frac{1}{2}$ miles: and the outer hill on Brakit Point E.S.E. $12\frac{1}{2}$ miles.

Between the South ledge and Middle Rocks the distance is about $1\frac{1}{2}$ mile, and the depths 15 to 20 fathoms; and between the South ledge and Diana Shoal the distance is $4\frac{1}{2}$ miles, and the depths vary from 12 to 18 fathoms,

decreasing under 11 fathoms within a mile of the Diana, and shoaling to 8 fathoms close to that danger.

The Tides about Pedra Branca are described on pages 26, 27.

EAST COAST of the MALAY PENINSULA.—The coast from Romania Point turns sharply to the northward, and at the distance of a little over half a mile is a point with some rocks off it, from whence the land falls back, forming a bay about a mile deep, the northern horn of which, named *Tanjong Punji*, bears N. $\frac{2}{3}$ E. $4\frac{1}{2}$ miles from Romania Point. About $4\frac{1}{2}$ miles N. by W. $\frac{1}{4}$ W. from Tanjong Punji, is another point, named *Tanjong Lompat*, which bears about West from the North patch, the outermost of the shoal patches which extend from the Romania Shoals.

A shoal bank fronts the whole of the coast from the point a mile northward of Romania Point to Tanjong Lompat. Abreast of Barbukit Hill it projects $1\frac{3}{4}$ mile from the shore, nearly as far as the meridian of North Rock, which bearing South leads close to its edge. Off Punji Point it extends about half a mile, and off Lompat Point three-quarters of a mile.

Water.—Excellent water can be procured from the river close round the rocky point, about 6 cables' lengths North of Romania Point.

The Inner Channel, between Romania Point and the islands, cannot be considered safe, and we refrain from giving any directions which might have the effect of tempting vessels to use it.

The North Channel is bounded on the East by the shoalest part of the Romania Shoals, and on the West by the dangers which lie to the eastward of the Romania Islands. The channel is about $3\frac{1}{2}$ miles wide; there is one patch of 4 to 5 fathoms and another of 5 fathoms lying in its fairway, but there does not appear to be any less water, and it is now frequently used by those locally acquainted.

Directions from the Northward.—Coming from the northward, and wishing to proceed into Singapore Strait by the North Channel, pass about midway between the North patch and the shore, and by the time False Barbukit Hill bears West, Barbukit Hill should bear S.W. by W., nearly, or in case Barbukit cannot be discerned, the South extreme of Tanjong Punji should bear about S.W. $\frac{1}{4}$ W.; a S. $\frac{3}{4}$ W. course will then lead through the channel by the middle track marked on the chart, which passes over the patch of 4 to 5 fathoms.

A vessel following this track will have soundings from 13 to 10 fathoms, until Barbukit Hill bears about W. by S. or W. $\frac{1}{2}$ S., when they will decrease to 8 and 7 fathoms, and when Barbukit Hill bears West to about 6 fathoms. She will then soon have 5 or $4\frac{1}{2}$ fathoms on the bank, except at low-water spring tides, when there may be as little as 4 fathoms. The depths will soon increase to 8, 9, or 10 fathoms, and then suddenly to 13, or perhaps 15 fathoms, when she will be in Singapore Strait. This 4-

fathom patch may be avoided and the banks crossed in not less than 6 fathoms water, by steering for Horsburgh lighthouse bearing S.E. $\frac{1}{4}$ S. to S.E. $\frac{1}{2}$ S.

Having crossed the banks, the S. $\frac{3}{4}$ W. course should be continued to avoid getting too near Congaltons Carr, over which there is but $1\frac{1}{2}$ fathom. The middle of the largest of the Romania Islands in line with Peak Rock is the mark for this dangerous patch, and vessels should be cautious—extremely so when the tide is making to the westward—not to bring the East extreme of Punji Point to the North of N.N.W. $\frac{1}{2}$ W., until Peak Rock is North of the middle part of the largest of the Romania Islands, or until the South end of the last-named island bears W. $\frac{1}{2}$ N. The vessel will then be to the southward of Congaltons Carr, and may steer S.W., but not more westerly, until Tanjong Stapah comes open South of South Point, when she will be to the southward of all the dangers near the Romania Islands, and may steer W.S.W. or W. by S., according to circumstances.

From the Southward.—In proceeding through the North channel from Singapore, take care, after passing South Point, not to lose sight of Stapah Point behind it, in order to avoid the $2\frac{3}{4}$ -fathom patch and other dangers near the Romania Islands. When the largest of those islands bears N.N.W., steer N.E., to pass about three-quarters of a mile outside Congaltons Carr; but if the tide is setting to the westward, a more easterly course must be steered to avoid that danger, which will be done if the South end of the largest of the Romania Islands be not brought westward of W. $\frac{1}{2}$ N., or Peak Rock in line with the centre of that island, until the right extreme of Punji Point bears N.N.W. $\frac{1}{2}$ W. With these marks on the vessel will be in about 13 or 15 fathoms water, and may steer N. $\frac{3}{4}$ E., through the North channel on the middle track.

In following this middle track, the soundings will vary from 12 to 15 fathoms for the distance of the first mile, when they will suddenly decrease to 9 or 8 fathoms, and shortly after to 5 or $4\frac{1}{2}$, and if at low-water spring tides, perhaps to 4 fathoms. Having crossed this shoal part of the bank—which is only about a third of a mile broad—the soundings will soon deepen to 6, 7, and 8 fathoms, and by the time Barbukit Hill bears W. $\frac{1}{2}$ S., to 10 and 11 fathoms; from thence to the northward they will continue to be 12 or 13 fathoms until past the North patch.

A vessel will avoid the 4-fathom patch and cross the banks in not less than 6 fathoms water, by keeping Horsburgh lighthouse S.E. $\frac{1}{4}$ S. to S.E. $\frac{1}{2}$ S., and steering the opposite course till the banks are crossed.

In working through the southern part of this channel, Horsburgh lighthouse should not be brought to the southward of S.E. $\frac{3}{4}$ S. when standing towards the Romania Shoals; nor to the eastward of S.E. by E. $\frac{1}{2}$ E. when standing towards Congaltons Carr or Jones Reef. The soundings are not at all to be depended upon to guide a vessel near these latter dangers, for there

are 12 fathoms in one direction and 6 in another very close to Congaltons Carr, and 9 or 8 fathoms close to Jones Reef.

SOUTH SIDE OF EASTERN PART OF THE STRAIT.

BINTANG is the largest island on the South side of Singapore Strait; Battam Island, on the West side of Rhio Strait, is also of considerable size, and from it a chain of islands, separated by narrow guts, extends westward, terminating nearly opposite the Rabbit and Coney.

The North side of Bintang is about 16 or 17 miles in length, nearly E. by N. and W. by S., the greater part being taken up by the large bay of Sumpat; several dangers lie off it, which will be described in detail farther on. Like most of the other land bounding the strait of Singapore, it is covered with trees, and, excepting the hills inland, is not much elevated.

Bintang Hills.—*Bintang Great Hill*, in lat. $1^{\circ} 4' 20''$ N., long. $104^{\circ} 29' E.$, bearing S. by E. $\frac{1}{4}$ E., about $16\frac{1}{2}$ miles from Horsburgh lighthouse, may be seen in clear weather 40 miles, being 1,230 ft. high, and is a good mark in approaching the entrance of the strait from the northward. When viewed from that direction it forms a saddle, and adjoining it on the North side, there is a small conical hill, called *False Bintang Hill*, or *Bintang Little Hill*, 762 ft. high, the summit of which is central with the saddle of the large hill bearing S. $8^{\circ} E.$ When the centre of the saddle bears South (*true*), the summit of the Little Hill is just open with the western shoulder of the large hill; and this mark or bearing of Bintang Hill is a safe guide to carry a vessel to the eastward of, but pretty near to the North patch, the outermost of the Romania Shoals.

TANJONG BRAKIT, the N.E. point of Bintang Island, has some hills on its East side 217 ft. high, and others a mile farther to the southward 267 feet high. Reefs and dangers extend $1\frac{1}{2}$ mile from this point, within the margin of which lie the following:—*Pulo Coco*, an island 40 ft. high, narrow, but three-quarters of a mile long, lies close to, and appears to form the eastern side of, Brakit Point; it may be approached to a distance of half a mile. *Pulo Brakit*, 30 ft. high, is an island about half the size of Coco, lying half a mile N.N.E. from the northern part of Brakit Point. It should not be approached nearer than three-quarters of a mile, for the shore reef projects nearly half a mile outside of it.

Black Rocks are a cluster of dark-coloured rocks lying off the North extreme of Brakit Point, the outermost rocks being distant nearly a mile from the shore; and a tongue of sand, with but 3 fathoms water over it, projects a third of a mile from their outer edge.

BRAKIT ROCK, discovered in 1861 by Mr. Stanton, commanding H.M.S. *Saracen*, is a cable in length, N.W. and S.E., and half a cable in breadth, with 2 fathoms over it at low water, and 10 to 12 fathoms close to all round.

It lies N.N.E. $\frac{3}{4}$ E. $2\frac{3}{4}$ miles from Tanjong Brakit, and from its southern and shoalest part the northern extreme of Pulo Sumpat appears in line with the apex of Little Bintang Hill S.W. $\frac{1}{4}$ S., and Horsburgh lighthouse bears W. by N. $\frac{1}{2}$ N. $12\frac{1}{2}$ miles. A conspicuous double tree on a long hill 4 miles from Tanjong Lokan appears just outside the point bearing S. $\frac{1}{2}$ W. This tree kept well open of Tanjong Lokan clears the eastern side; Pulo Panjang peak S.E. $\frac{1}{2}$ S. will clear both the eastern and northern sides. Barbukit Hill, about four times its own breadth open eastward of Horsburgh lighthouse, will also lead a vessel northward; and Little Bintang Hill well open northward of Pulo Sumpat will lead to the westward.

The channel between the Brakit Rock and the point is free from danger. It is not, however, advisable to use this channel except in cases of emergency.

Postillion Reef, composed of coral and sand, and having 2 fathoms water over it, lies nearly half a mile outside the shore reef extending from Brakit Point; between them are depths of 4 to 8 fathoms. Horsburgh lighthouse bears from this reef N.W. by W. $\frac{3}{4}$ W., nearly $10\frac{1}{2}$ miles.

A *shoal*, apparently about half a mile in extent, having $1\frac{1}{2}$ fathom water over it, is marked on the chart S.W. by W. $\frac{1}{2}$ W., $1\frac{1}{2}$ mile from Postillion Reef, W. by N. $\frac{1}{2}$ N., a little over $2\frac{1}{2}$ miles from Tanjong Brakit.

TULLOH SUMPAT or Sumpat Bay, is the extensive bight between the western extreme of Tanjong Brakit and Tanjong Batu Sow, which lie W. $\frac{3}{4}$ S. and E. $\frac{3}{4}$ N. of each other $9\frac{1}{2}$ miles apart. *Pulo Sumpat*, a small island 178 feet high, lying in the eastern part of Sumpat Bay, may be readily known by its saddle shape. It lies $2\frac{1}{2}$ miles South of the shoal last mentioned, and S.E. $\frac{1}{4}$ S. $1\frac{1}{2}$ mile from the western extreme of Brakit Point.

Two Reefs lie near the bottom of Sumpat Bay, the outer of which is nearly a mile distant from a rocky point on the shore, about 2 miles W. by S. $\frac{1}{2}$ S. from Pulo Sumpat, and $2\frac{1}{4}$ miles E. $\frac{3}{4}$ N. from Tanjong Batu Sow.

Diana Shoal, about half a mile in extent, has but $2\frac{3}{4}$ fathoms water over it, and 4 fathoms close around. From its outer edge Tanjong Brakit bears E. $\frac{1}{4}$ S. distant $8\frac{1}{2}$ miles; Tanjong Batu Sow S.W. 3 miles; and Horsburgh lighthouse N. by W. $\frac{1}{2}$ W. 6 miles. A little more than half a mile in a W.S.W. direction from this shoal is a sand patch with 4 and 5 fathoms water.

Langui Shoal, about a third of a mile in extent N.N.E. and S.S.W., lies W. by S. $\frac{1}{2}$ S. $4\frac{1}{4}$ miles from the Diana Shoal. Over its South end there is but $1\frac{1}{4}$ fathom water, and 3 fathoms over its North end. From its North end Tanjong Subong—the N.W. point of Bintang at the entrance of Rhio Strait—bears S.W. $\frac{3}{4}$ W. 4 miles, Tanjong Batu Sow E.S.E. a little over 2 miles, and Horsburgh lighthouse N. by E. $\frac{3}{4}$ E. $7\frac{1}{2}$ miles.

This shoal and bank will be avoided by not bringing the point of Bintang,

which lies a mile W.S.W. of Tanjong Batu Sow, to the eastward of S.S.E., until Pulo Skeree (Doea Island), which lies on the East side of the entrance of Rhio Strait, comes open of Tanjong Subong, bearing about S.W. Horsburgh lighthouse bears from the Langui Shoal N. by E. $\frac{2}{3}$ E. $7\frac{1}{2}$ miles; the lighthouse or light therefore bearing N.N.E. $\frac{1}{4}$ E. will lead about a mile westward of this danger. A *three-fathom patch* lies about half a mile to the southward of the Langui Shoal, and between them are 6 to 7 fathoms water.

The Coast between Tanjong Batu Sow and Tanjong Subong, forms a bay about three-quarters of a mile deep, and off its East point, which is about a mile W.S.W. from Tanjong Batu Sow, are some islets and rocks.

At half a mile S.W. by W. from *Tanjong Pergam*, the West point of the bay, is an islet called *Pulo Pergam*, with a rock awash about a third of a mile N.W. by W. from it. A *rock awash* lies about a third of a mile N.E. $\frac{2}{3}$ E. from Tanjong Subong.

From the above description, it will be seen that the whole of this part of the coast is fronted with dangers; and as it has been but partially explored, and it is extremely probable that other dangers than those marked on the chart may exist, vessels are advised not to attempt to come inside the Diana and Langui Shoals.

Tanjong Subong, the north-western point of Bintang, and the Crocodile and Pan Shoals, in the entrance of Rhio Strait, have been previously described on pages 318 and 325.

TANJONG NONGSA, the most northern point of Battam Island, bears W. $\frac{1}{4}$ N., distant $13\frac{1}{2}$ miles from Tanjong Subong; South, nearly 11 miles from Johore Hill; and S. by E. $\frac{1}{4}$ E. $7\frac{1}{3}$ miles from the eastern extreme of Johore Shoal. The shore reef, which extends a mile off Tanjong Bomban, the N.E. extreme of Battam, decreases in distance from the shore towards this point, and off its eastern part does not extend farther than 1 or 2 cables' lengths.

Pulo Nongsa, a small island a third of a mile in extent, with a high tree upon it, lies $1\frac{1}{3}$ mile westward of Tanjong Nongsa, and about half a mile off the nearest point of Battam. It is rather a conspicuous object when near this part of the strait, and if kept open of Nongsa Point will lead a ship clear of the Little Pan Shoal.

Bollan Bay, lying to the westward of Tanjong Nongsa, is nearly 3 miles wide at its mouth, between *Tanjong Treng* on the East, and *Tanjong Pengair* on the West, and $2\frac{1}{3}$ miles deep, narrowing towards its head. A *detached reef* lies at the entrance of Bollan Bay, a mile distant E. $\frac{3}{4}$ N. from Tanjong Pengair. The best *anchorage* in this bay for vessels of moderate draught appears to be with Pulo Nongsa bearing N.E. by E., and Tanjong Treng about E. by S. $\frac{1}{2}$ S.

BATTAM BAY, the large bight immediately to the westward of Bollan Bay, is nearly $7\frac{1}{2}$ miles wide, and 2 miles deep, being bounded to the east-

ward by the projecting point of which *Tanjong Siquang* is the N.W. extreme, and to the westward by the two Sambo Islands. In the depth of the bay are two islands about a mile apart, the eastern one of which is named Mangrove Island.

The Sambo Islands, forming the western limit of Battam Bay, project from Battam Island in a N.W. by N. direction, towards St. John's Islands on the opposite side of the strait. *Pulo Sambo*, the southern island, is nearly a mile long and about half a mile broad, and is distant a little over $1\frac{1}{2}$ mile from the nearest part of Battam. *Little Sambo*, about half the size of Pulo Sambo, lies about a third of a mile to the northward of it.

A rocky ledge, a third of a mile in extent, lies N.N.W. $\frac{1}{4}$ W., the outer part distant two-thirds of a mile from Little Sambo; and half a mile to the westward of it is another rocky ledge. These ledges are the outermost dangers on the southern side of this part of the strait, and near them are very irregular soundings.

Directions for the Eastern Part of the Strait.—The Middle Channel between Horsburgh lighthouse and the Romania Shoals is the main entrance to Singapore Strait from the eastward. Although the South channel is still recommended as being preferable for sailing through in the night, yet it is so encumbered with dangers, to clear which no good marks can be given, that it is seldom used by those accustomed to the navigation of the strait, more especially since the discovery, in 1161, of the Brakit Rock off Brakit Point, which is extremely dangerous to vessels standing out in the N.E. monsoon. The difficulty and danger attending the navigation of this channel arises from the risk of wrongly judging the distance from the lighthouse when endeavouring to keep clear of the South ledge.

Coming from the eastward or north-eastward in the daytime, the entrance of Singapore Strait may be easily recognized if the weather be fine and clear by Bintang Great Hill, a remarkable saddle hill (1,230 ft. high) on Bintang Island, and the sharp-peaked hill of Barbukit (645 ft. high), on the opposite side of the strait. Bearings of these objects will serve to fix the vessel's position and guide her in shaping a course to sight the lighthouse. In making the entrance at night, if the vessel's position be known, it will be merely necessary to stand on boldly for the light, being careful to make a proper allowance for the set of the current, and when the light is seen, steer so as to pass about a mile to the northward of it. Vessels should not get within about 2 miles of the light until it bears to the southward of W.S.W., on account of the dangers lying off its East side.

It is from the northward, however, that the strait is mostly made (*viz.*, by vessels coming from China), it being now the general custom for vessels from Europe to enter from Rhio Strait.

During the strength of the N.E. monsoon the current sets generally to the southward or S.S.E., between Pulo Aor and the East end of Bintang, by

which vessels running for Singapore Strait in thick weather are liable to fall to the southward of its entrance, if proper allowance be not made.

Departing from Pulo Aor, steer to bring it to bear about North when disappearing; if the weather be clear, Bintang Hill and Pulo Aor may be seen together; but this seldom happens. Do not bring the centre of Bintang Saddle Hill to the eastward of South, until Horsburgh lighthouse is visible from the deck; for with the hill bearing South the vessel will not pass far outside the North patch; but it is a safe bearing if the compass be correct, and will lead down in soundings of 16 to 13 fathoms. Bintang Little Hill, open to the westward of Bintang Great Hill, leads to the eastward of the North patch.

In hazy weather Bintang Hill is seldom visible until the eastern bank is passed, in which case, having Pulo Aor disappearing about North, a course S. by W. to S.S.W. may be requisite to counteract the south-easterly current, or the ebb tide setting out of the strait to the north-eastward. The depths will decrease regularly in steering southward, and the low land will *probably* be seen to the westward, when in 20 or 18 fathoms; if so, coast it along at 10 or 12 miles' distance, until False Barbukit low sloping hill is discerned, appearing a little way from the sea like a clump of trees more elevated than the others. When this hill bears W.S.W., 15 fathoms is the fair track; with it bearing W. $\frac{3}{4}$ S. and W. $\frac{1}{2}$ S., overfalls from 16 to 13 fathoms may be experienced, or probably less water, being then about the parallel of the North patch and the shoal patch, with 8 to 10 fathoms, on the eastern bank.

Having coasted along at 10 or 12 miles distance, with the land distinctly in sight from the deck, and having brought False Barbukit Hill to bear about W. by S., the vessel will be approaching the North patch; and with this hill bearing about W. $\frac{3}{4}$ S., if a cast of 10, 9, or 8 fathoms is got, but uncertain whether these soundings are on the North patch, or on the shoal patch of the eastern bank, haul to the south-eastward until in 14 or 15 fathoms. Steer then South about 2 miles, or until False Barbukit Hill bears West, when the vessel will be to the southward of the shoal patch of the eastern bank, and abreast the North patch; she may then haul in to the W.S.W., and get a cast of 10 or 11 fathoms, and will then be certain that these soundings are on the outer edge of the Romania Shoals, but in doing so, heave the lead quickly, and if there is less than 10 fathoms, haul out directly eastward into 15 to 16 fathoms, and then steer along the S.E. edge of the shoals in 16 or 17 fathoms. If, when the lighthouse is discerned, it bears S.S.W., the vessel will be clear to the eastward of the shoals; but if it is seen bearing S. by W., she will be close to or upon their edge. Having steered round the shoals so far as to bring the lighthouse S. by W., do not come under 16 or 17 fathoms in passing along their southern part; for they are there steep from 16 to 12, and from 12 to 3 fathoms at a cast, on some of

the rocky patches, with the lighthouse bearing from S.E. $\frac{1}{2}$ S. to South. South Island just open to the southward of South Point, bearing about W. by S. $\frac{1}{2}$ S., leads clear to the southward of all the Romania Shoals.

Although Pedra Branca Rock is steep-to on the North side, it should not be approached very closely, for vessels are liable to estimate their distance from it sometimes greater than the truth; and, as the tide runs strong, they are in danger of being drifted quickly towards the rock without warning, if they borrow near it in light winds.

Having passed between the Romania Shoals and Lighthouse, and bound to Singapore Roads, if the vessel be over on the North side of the channel, steer about S.W. or S.W. by W., if in mid-channel about W.S.W., and if near the lighthouse about W. by S., taking care if on the North side of the channel to have Tanjong Stapah open of South Point, before South Island, of the Romania group, is brought to the eastward of N. by E. Having brought the lighthouse to bear E. by N., the opposite course (W. by S.) will lead at a convenient distance from the North shore of the strait until Changhi Point bears North, when steer half a point more to the southward; the ships in the roads will be by this time in sight, and be a guide in approaching the anchorage, and as Tanjong Catong is neared, the flagstaff on Fort Canning Hill overlooking the town should not be brought to the westward of W. by N.

If the tide is running to the westward it is the usual practice for vessels to keep well over on the North side of the channel, especially in light winds, for neglecting this precaution they have often been swept by the rapid current past Singapore Roads and the St. John's Islands—the deep water 45 or 50 fathoms, rendering it difficult or impossible for them to anchor—into the western part of the strait. In doing this, however, they must be cautious not to go too near the Johore Shoal, which will be avoided by keeping South Romania Island open of South Point, or South Point to the northward of E. by N. $\frac{1}{2}$ N.

At Night keep a good look-out for Horsburgh Light (page 388), which being visible in clear weather at 15 miles, will be in sight before the vessel can get too near the dangers at the entrance of the strait.

If entering the strait from the southward or south-eastward, the light is seen bearing to the southward of West, a course may be shaped to pass about 2 miles to the northward of the light, proper care being observed to allow for the set of the tide, so that the light is not neared under 2 miles, on a West or N.W. bearing, to avoid the dangers extending to the East and S.E. from it. Should the light, when first seen, bear about W. by N. or W.N.W., a vessel will be within 2 or 3 miles of the Brakit Rock, over which there are but 2 fathoms water, and from which the light bears W. by N. $\frac{1}{2}$ N. $12\frac{1}{4}$ miles.

If when entering from the northward the light is made bearing anything

to the southward of S.S.W., haul to the eastward until it bears S.S.W., which will lead outside the North patch; approach the light upon this bearing until about 2 miles from it, when a W.S.W. course may be shaped until the light is brought E. by N., when keep it on that bearing, steering W. by S. until the light is lost sight of.

Continuing for 4 or 5 miles farther on a W. by S. course after Horsburgh Light has disappeared, the fixed light at Singapore will soon come in sight, but in case it should not be distinctly made out by the time Johore Hill bears N. by E., do not come under 16 or 17 fathoms towards Johore Shoal, and if a cast of 12 or 11 fathoms should be had haul quickly to the southward, for this shoal is steep, and should not be approached under that depth. Be careful not to mistake Singapore Light, which will be seen some distance above the horizon when first discerned, and high above the lights of the shipping and town as the roads are neared; when plainly seen it may be approached on a West bearing until the eastern extreme of Singapore Island (Changhi Point) bears North, or Johore Hill bears N.E. $\frac{1}{2}$ E., when the light should be brought to bear W. $\frac{1}{2}$ N.; as Tanjong Catong is approached, edge to the southward until the light is to the northward of W. by N.

It is very necessary to observe the precaution of keeping on the North shore of the strait when nearing Singapore Roads at night, for although a vessel may have entered the strait with a strong N.E. monsoon, yet as she nears the roads, the wind will, in the night, generally draw off the land from the north-westward, making it always very difficult and sometimes impossible to fetch into the roads or get into a convenient depth of water for anchoring.

If bound into the strait of Malacca, a W. by S. $\frac{1}{4}$ S. course is the fair mid-channel track from Horsburgh Lighthouse, and when within 5 miles of St. John's Island, the Raffles *fixed* white light on Coney Island will be distinctly seen. A vessel should steer up pretty close to St. John's Island, avoiding the South side of the strait, and proceed through the western part of the strait according to the directions given at pages 364—366; the Raffles Light bearing W.S.W. is the fair channel mark.

The South Channel is sometimes convenient for ships which fall to leeward of Horsburgh Lighthouse during thick weather, as they have no occasion to anchor outside. If the wind be north-easterly, they may run down until within 4 or 5 miles from the Bintang shore, remembering that Barbukit Hill must be kept four times its own breadth open northward of Horsburgh Lighthouse, or the lighthouse kept westward of W. by N. $\frac{1}{2}$ N. to clear the Brakit Rock, then haul to the westward, and pass nearly in mid-channel between the shore and the lighthouse in 11 to 13 fathoms of water. With the wind at N.W. or N., it will be advisable to borrow nearer to the South ledge than to the Bintang shore, observing not to approach too closely to the

South ledge, as it is covered at high-tide. By borrowing towards the weather side of the channel, vessels will be enabled to reach well into the entrance of the strait; and if the wind is scant and the tide against them, they will have smooth water and good bottom for anchorage, until the tide of flood is favourable for proceeding to the westward.

To work through the Eastern Part of the Strait.—No difficulty will be experienced by strangers in working in either direction through the eastern part of the strait. The most prudent plan is to keep towards the North shore, as the depths are more convenient for anchoring on that side of the strait, in case of having to bring up. A vessel should tack towards the Romania shoals, when South Island is seen opening to the southward of South Point; and when standing towards Stork Reef and Congaltons Carr, South Point should not be brought to the southward of W. $\frac{1}{2}$ S. When South Island bears to the eastward of North, Tanjong Stapah must not be shut in behind South Point when standing to the northward; and from thence the shore may be approached into 12 or 11 fathoms. South Island kept open of South Point leads to the southward of Johore Shoal, and when standing towards this danger, if these objects cannot be seen, avoid coming under 17 or 16 fathoms, and on no account under 12 or 11 fathoms, for the shoal is steep. From Johore Shoal to Singapore Roads the shore may be approached to 12 or 11 fathoms; but it is not prudent to go into a less depth.

There are no dangers on the South side of the strait, excepting those fronting the Bintang Coast and the Crocodile and Pan Shoals, &c. But a vessel should not stand so far over as to get near these dangers, for no advantage will be gained by doing so, and the depths there are inconveniently great for anchoring. Pulo Nongsa, a remarkable little island, with a high tree upon it, lying just to the westward of the entrance to Rhio Strait, is very convenient for taking bearings of when getting over to the southward near Rhio Strait, and if kept to the southward of West, will lead clear of all danger at the entrance of that strait.

To proceed from Singapore Roads to the Eastward.—On leaving the roads, steer about E. by S. until past Tanjong Catong, when a course may be shaped about East, and by not bringing the flagstaff on Fort Canning to the southward of West as long as it remains in sight, it will lead well clear of Johore Shoal. When Johore Hill bears North, the vessel will be westward of Johore Shoal, and may steer E. by N. for the lighthouse, and passing about a mile to the northward of it, proceed to sea as convenient.

CHAPTER X.

THE GULF OF SIAM, ETC.

THE Gulf of Siam extends from Pulo Kapas on the Malay coast, 245 miles N. by W. from Point Romania to Pulo Obi, off Cambodia Point, 217 miles in a N.N.E. direction. But in order to complete the description of the coast, that portion of the Malay Peninsula South of Pulo Kapas will be included in the present chapter. A portion of this coast, more than 100 miles in extent, was surveyed in 1849 by Mr. J. T. Thompson, F.R.G.S., the surveyor of the Straits Settlements. The rest is imperfectly laid down, but the Siamese Government have recently made some new surveys.

The Gulf of Siam has not been completely surveyed, but the examination of its shores, more than 1,000 miles in extent, made by Mr. John Richards, R.N., in H.M. surveying vessel *Saracen*, in 1856—8, includes everything required for its safe navigation. The ensuing description of, and directions for the Gulf are chiefly by that officer.

The Winds and Seasons are described on pages 16—17, *ante*.

The Currents on page 28.

The Passages to and from the Gulf, on pages 63 to 67.

The **EAST COAST** of the **MALAY PENINSULA**, from Romania Point, its S.E. extreme, to opposite Pulo Varela, is mostly low and woody, its general direction being about N.N.W. Close to the coast, especially off the points, there are many rocks, both above and below water, but they all, with the exception of the Gading Rocks, near Blair Harbour, appear to lie within the 3-fathom line of sounding; so that when clear of Romania Reef the coast is in most places safe to approach by the lead.

It was formerly a common practice for vessels bound from China to Singapore, or to Banka or Gaspar Straits, to work down close to this coast. Now, however, as has been previously remarked (p. 62), those from China usually stand to the southward as soon as they can weather the reefs. But vessels from Siam bound to the southward against the S.W. monsoon, generally find

it most convenient to keep as close as possible to the Malay coast, where they meet with regular tides, whilst a constant northerly current is found a few miles from the coast.

PULO EU, in lat. $2^{\circ} 7' N.$, long. $104^{\circ} 17' E.$, is the south-eastern of a chain of islets and rocks which lie in a S.E. direction from Pulo Tingy, and East and S.E. of the Sibou Islands; it is described as a round, bluff rock.

Ambong Reef is placed on the chart 7 miles to the N.W. of Pulo Eu; and nearly in a line between them lie four small islets, or rocks above water, named respectively *Chupa*, *Chondong*, *Gantang*, and *Belelei*.

Lima Island, lying about $1\frac{1}{4}$ mile N.W. of Ambong Reef, is nearly half a mile in extent, and there are two rocks above water named Raket, about half a mile E.S.E. from it, another rock just to the northward of its West extreme; and another, named Sangul, nearly a mile W. by N. $\frac{1}{2}$ N. from it. They all appear to be connected, and surrounded to a short distance by a reef.

SIBOU ISLANDS.—Sibou, lying about 5 miles to the S.W. of Pulo Tingy, and the same distance from the coast, is a narrow island, 3 miles long N.W. and S.E., and near its South end is a hill, 553 ft. high. A small island, *Middle Sibou*, and two islets or rocks named respectively *Sibou Kukus* and *South Sibou*, together with other rocks both above and below water, extend in a south-easterly direction from Sibou, for a distance of 2 miles. The western side of the group is dangerous to approach.

Sibou Channel, between Sibou and the main, is about $2\frac{1}{2}$ miles wide in the navigable part between the danger limits on either side, and perfectly clear, with general depths of 6 to 8 fathoms, but of 9 or 10 fathoms near the island.

PULO TINGY, in lat. $2^{\circ} 18' N.$, long. $104^{\circ} 9' E.$, is conspicuous from a very high peak, which, rising gradually from the low land near the sea, terminates at the summit in a sharp spire or cone, 2,046 feet high. The island is nearly 4 miles long, N.W. by W. $\frac{1}{2}$ W., and S.E. by E. $\frac{1}{2}$ E., and 2 miles wide.

A cluster of islets and rocks extend nearly 2 miles southward and south-eastward from Tingy; and on its East side, about half a mile off shore, is a small island named *Ibul*, with an islet between it and the shore, and rocks below water a short distance outside of it. About $1\frac{3}{4}$ mile off the North part of Tingy is a reef, called the *Gebang Rocks*; and to the south-westward of it is the *Siam Knoll*, of 3 fathoms, lying about 1 mile off the N.W. part of Tingy.

Morau Rocks, or *Arethusa Reef*, appears to be a reef under water, extending to the northward and westward of a small islet, which lies $4\frac{3}{4}$ miles N.N.W. from Sibou Island, and W. $\frac{1}{4}$ S. from the peak of Tingy, nearly in mid-channel between Tingy and the main.

BABI ISLANDS.—Babi, or High Island, lying 9 miles N.W. from Pulo Tingy, is $2\frac{1}{3}$ miles long N.N.W. and S.S.E., and three-quarters of a mile broad. On its South end are two peaks, the northern one of which is 911 feet high; some rocks appear to lie close to its southern shore. *Middle Babi*, an island about half a mile in extent, with several islets and rocks close to it, lies nearly $1\frac{1}{2}$ mile north-westward of Babi; and three-quarters of a mile north-westward of Middle Babi, is a rather larger island, named *North Babi*.

Captain Ross, in the *Phlegethon*, in the month of August, having found that the two watering places on the S.W. part of Pulo Tingy had dried up, proceeded to Pulo Babi, and found here three springs of clear fresh water, the principal one on the N.W. point of the island, to the southward of a small patch of mangrove jungle.

Tikus Rocks.—A rock above water, with small detached rocks around it, lies $3\frac{1}{4}$ miles to the eastward of the southern part of Babi. *Sakit Mata* is a rock awash, lying E. $\frac{1}{4}$ N., distant nearly $2\frac{1}{2}$ miles from the North point of Babi.

Rawa is a small island, about half a mile in extent, lying $3\frac{1}{2}$ miles North from Babi, and $2\frac{1}{4}$ miles N.E. from North Babi. From *Rawa* a chain of islets and rocks extend 3 miles to the north-westward.

SIRIBUAT ISLANDS, bearing W. $\frac{3}{4}$ S., 15 miles from the Asses Ears on Tioman, and N.N.W. 7 miles from Gurong, appear upon the chart as two islands, the eastern and larger being about $1\frac{1}{2}$ mile in extent. The western island is a little more than half the extent of the eastern one, but is 748 ft. high. The islands are connected by a reef, upon which are some islets and rocks.

BLAIR HARBOUR.—*Kaban Island*, $1\frac{1}{4}$ mile long N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E., and but half a mile broad, lies W. by S. $6\frac{1}{2}$ miles from the Siribuat Islands, and the space between its West side and a prominent point of the coast named Peniabong Point, about a mile distant, is known as Blair Harbour. About a mile south-eastward of the South entrance of the harbour, is a small group above and below water, named the *Gading Rocks*; there also appears to be rocks extending from the points on both sides of the South entrance, thus materially contracting the channel. A small island, named *Little Kaban*, lies about a mile northward of Peniabong Point; other islets and rocks lie to the westward of the point. North-westward of Kaban is a group of islets and rocks named *Tonos*, and in the same direction, distant 2 miles from Kaban, is a small island named *Leiar*.

Blair Harbour is safe, sheltered from all winds, with anchorage in 4 and $4\frac{1}{2}$ fathoms, stiff mud. It is easy of access by passing between the North point of Kan and the small islands, where the depths are 6 and 7 fathoms, decreasing to 5 and $4\frac{1}{2}$ fathoms inside. There is also good anchorage under some of the other islands farther out.

Capt. Pridham, R.N., who touched here September 8th, 1830, discovered

a rock in the entrance of the harbour, which uncovers with the falling tide, about half a mile South of Leiar Island.

Plenty of *good water* may be procured on Kaban Island by digging wells 5 ft. deep, about 20 or 30 yards from high-water mark.

The **INNER CHANNEL**, between the Malay coast and the groups of islands just described, is safe for ships of any description by keeping along the coast at 3 or 4 miles distance. The depths in it are 8 to 11 fathoms, in the fair track, usually soft ground. The channel is safe in the day, but in the narrow parts, among the islands, it is prudent to anchor at night, because some of the rocks or islets are very little above water.

Tides.—About 20 miles to the southward of the entrance to the Inner channel it is high water, full and change, at 9^h 14^m, and spring tides rise 6 to 8 ft. Near the Siribuat Islands it is high water at 8^h 50^m, and the rise is 9 feet.

PULO AOR, the southern peak of which, 1,805 ft. high, is in lat. 2° 26½' N., long. 104° 34¼' E., is generally adopted as a point of departure by ships bound to China, and they also steer for it on their returning passage. It is small, but high, and covered with trees. Being formed of two hills, with a gap between them, it has the appearance of two islands when viewed at a great distance, bearing N.E. or S.W., and resembles a saddle on a nearer approach; but when it bears N.W. the hills are in one. The easternmost hill is of round form, like a dome, rather higher than the other, and in clear weather may be seen 45 or 48 miles from the deck; at such times Bintang Hill and Pulo Aor are visible together, when midway between them.

The bay on the S.W. side of the island affords shelter in the N.E. monsoon, when the wind is between North and E.S.E.; and here, persons unacquainted with the entrance of Singapore Strait frequently anchor in dark, hazy, blowing weather, until it becomes more favourable for running into that strait. This has not been a common practice since the establishment of the Horsburgh light at the entrance of Singapore Strait. *Pinang Islet*, covered with trees, lies off the S.E. point of Pulo Aor, and *Lang Islet* lies off the N.W. point; to the N.E. of the latter is *Dyang Islet*, larger than the two others, and separated from the North end of Aor by a narrow gut, having 18 or 19 fathoms water in it.

The depths near Pulo Aor are from 32 to 35 fathoms to the northward and eastward, 24 and 25 fathoms to the westward, decreasing to 16 or 17 fathoms towards Pulo Tingy, and to 21 fathoms close to the South end of Pulo Pemangil.

Supplies.—Pulo Aor is inhabited, and there is a considerable number of huts around the bay; firewood and some cocoa-nuts may be procured, but no other refreshments except water. Ships water with their own boats, for the natives, although shy of strangers, are generally found to be inoffensive; it is, however, imprudent to let the sailors go up into the country.

There is a rise and fall of tide about 5 or 6 ft., although the current in the offing sets mostly with the monsoon.

Directions.—If coming from the northward and intending to anchor in the bay on the S.W. side of Pulo Aor during N.E. winds, pass on the West side of the island, in order to fetch into the bay so far as the watering place, which is a small running stream on its North shore. After rounding the West side of the island, which is steep-to, at any convenient distance, haul into the bay until Lang Island is on with the N.W. point, and anchor in 20 to 15 fathoms, sandy bottom, with the extremes bearing from N.W. to S.E. $\frac{1}{2}$ E., off shore about half a mile; but sail ought to be reduced in time; because from 20 fathoms the bank is steep, and it would be imprudent to shoal under 15 fathoms in a large ship.

PULO PEMANGIL (or *Pisang* or *Pambelan*) is distant 11 miles N.W. by W. from Pulo Aor, which it resembles when seen in hazy weather bearing to the S.W. or southward; for it is formed of two hills with a gap between them, giving it the appearance of a saddle, but it is not so high as Aor. Its South peak, 1,507 ft. high, is in lat. $2^{\circ} 34\frac{1}{2}'$ N., long. $104^{\circ} 22'$ E. It is said that water may be obtained upon Pemangil; but ships seldom stop here, for it is not inhabited, and consequently affords no supplies.

PULO TIMOAN, the South end of which is in lat. $2^{\circ} 43'$ N., bearing N.W. $\frac{1}{2}$ W. about 22 miles from Pulo Aor, is 11 miles in extent, North and South, and from 2 to 6 miles wide. This island is composed of lofty mountains, the highest of which rises to an elevation of 3,444 ft. and may be discerned 55 or 60 miles in clear weather. On its South end are two remarkable peaks, called from their aspect *Asses' Ears*, standing on one base, and rising almost perpendicularly from the sea to heights of 2,525 and 2,294 feet. There is a village on the S.E. side of the island in a small sandy bay, which has anchorage in 20 or 22 fathoms, sand, and may be used during fine weather; but the bay on the S.W. side of the island affords the best shelter in the N.E. monsoon.

Water; Wood.—There is a small river on the East side of this bay, where boats can fill their casks; but a bar at the entrance prevents their going in and out at low water. At a small rivulet on the N.W. side of the bay, fresh water may be filled at all times. Firewood may be procured in abundance near the shore. Refreshments are not to be had here, the bay seldom being inhabited. Ships seldom touch at this island, and persons landing on it must be guarded against the deceit of the natives, and ought not to penetrate into the interior.

The flood tide sets to the northward, along the West side of Timoan, and the ebb to the southward, 1 or $1\frac{1}{2}$ mile per hour, at times; it is high water, full and change, at 6 hours, and springs rise 7 or 8 ft.

At 3 miles South of the *Asses' Ears* is a small island named *Geeit*, having a small islet or rock close to the southward of it.

Bara and **Burong** are two rocks or small islets, lying in the fairway of the channel between Timoan and the Siribuat Islands. Bara lies 6 miles westward of Geeit, with the Asses' Ears bearing N.E. by E. $\frac{1}{4}$ E., distant 7 miles; some rocks below water extend about a mile to the northward of Bara. Burong is distant 10 miles N.W. $\frac{1}{4}$ N. from Bara, the same distance eastward of Timoan.

Tolie is the largest of the islands lying off the N.W. point of Timoan, from which it is distant nearly 3 miles. It is about a mile in extent, and rocks above and below water extend about a mile to the southward of it. The channel between Tolie and the N.W. point of Timoan is clear, with depths of 22 and 24 fathoms.

The **COAST** from Blair Harbour falls back 6 or 7 miles in a W.N.W. direction to the *Indau River*; it then takes a north-westerly direction for 9 or 10 miles to the entrance of the *Pontean River*; from thence it curves round gradually until it assumes a northerly direction, which it preserves as far as the entrance of the Pahang River, 48 miles to the northward of the Pontean.

Boyah Rock.—Two small islets, named *Duchong*, lie nearly a mile off the coast to the southward of the Pontean River, and about 3 miles eastward of them is the *Boyah Rock*, *awash*, with 4 and 5 fathoms water around. From the rock the entrance of the Pontean bears W. $\frac{1}{2}$ N., $5\frac{1}{2}$ miles; the entrance of the Indau S. by E. $\frac{1}{2}$ E., 6 miles; and the apex of the western Siribuat Island W. by S. southerly.

MARGARET SHOAL, in lat. $2^{\circ} 59\frac{1}{2}'$ N., long. $103^{\circ} 38'$ E.—The brig *Margaret*, in working to the northward along the coast, January, 31st, 1827, shoaled suddenly from 6 to 4 and 3 fathoms, 3 miles off shore. There are two conspicuous little hills on the low land, of regular form, the northernmost of which bore W. by S., and the other S.W. by W., when the vessel was in 3 fathoms.

PULO VARELA, in lat. $3^{\circ} 18'$ N., long. $103^{\circ} 38'$ E., is a barren rock 12 or 13 miles from the main, crowned with a few bushes, which in clear weather may be discerned about 15 miles. There is a ledge of rocks even with the water's edge, about $1\frac{1}{2}$ or 2 miles nearly North from it, on which the sea breaks in bad weather; and about 6 miles North and N.N.E. of it there is a rocky bank with overfalls, probably not dangerous, for the least water on it is thought to be about 5 fathoms. The channel inside Varela is considered safe.

PAHANG RIVER, the entrance to which is in lat. $3^{\circ} 34\frac{1}{2}'$ N., about 20 miles N.W. of Pulo Varela, was formerly a place of great trade, and is still frequented by Chinese junks; but it is small, very shoal, and contracted by sands, which project from the low points on each side. Pahang Point bounds the river on the South side, and has breakers stretching from it to the N.N.E. nearly $1\frac{1}{2}$ mile; a spit of hard sand, with 3 to 6 fathoms, extends about a

mile farther in the same direction, on the West side of which vessels of moderate draught may anchor in $4\frac{1}{2}$ or 5 fathoms, clay and sand, off shore $1\frac{1}{2}$ mile, with Pahang Point bearing South or S. $\frac{1}{4}$ E. about $2\frac{1}{2}$ miles. Large vessels anchor at a greater distance from the shore.

The **COAST** from the Pahang trends about N. by E. for a distance of 33 miles to a point in $4^{\circ} 8' N.$, having high land near it, between which and South Cape, about 14 miles farther to the northward, a bay is formed with some islands close to the shore. From South Cape the direction of the coast alters to about N. by W., as far as *Tingeran*, a distance of about 28 miles: between are several bays, separated by Middle Cape and North Cape, all of which have from 9 to 10 or 11 fathoms water within 2 or 3 miles of the shore, but the projections or capes are rocky.

A chain of mountains commences inland, nearly abreast of Pulo Varela, which converges towards the coast near South Cape, and then extends along it towards Tringanu.

Between Pulo Varela and Tingeran the coast is, in general, safe to approach to 8 or 10 fathoms water; but there are frequently overfalls of 1 or 2 fathoms in the offing, or ridges lying parallel to the coast; and there are some spots of 7 or 8 fathoms, sand and gravel, with 9 fathoms inside of them, but this portion has not been properly surveyed.

HOWARD SHOAL was passed over by Mr. Howard, commanding the ship *Janet Hutton*, in 1823, in lat. $4^{\circ} 17' N.$, long. $103^{\circ} 38\frac{1}{2}' E.$, bearing South (or S. by W.) 30 or 31 miles from Pulo Brala, and S.E. $\frac{1}{2}$ E. 6 miles from the *River Camaman*. Upon this shoal he got 2 fathoms, rocks, and was informed by the Malay fishermen that there was only 1 fathom on its centre.

Tingeran River, the entrance to which is in lat. $4^{\circ} 49' N.$, is formed close under the South side of Rocky Point, the latter being about 12 miles West from Pulo Brala; this river is barred by rocks.

PULO BRALA, in lat. $4^{\circ} 49' N.$, long. $103^{\circ} 38' E.$, distant 12 or 13 miles from the main, is of considerable size, and may be seen 30 or 32 miles off in clear weather; when it bears S. $\frac{3}{4}$ W. its summit is flat, but appears in hummocks when bearing to the S.W. and westward. There is a black rock or islet 1 or 2 miles distant from its southern extreme, and two islets off its north-western extreme, the outer one being distant nearly 5 miles.

Between this island and the coast opposite, about Rocky Point, the soundings are irregular in some places, and the bottom rocky or sandy.

PULO KAPAS is considered as the S.W. limits of the Gulf of Siam. Its S.W. point is in lat. $5^{\circ} 13' N.$, long. $103^{\circ} 16' 4'' E.$; it is $1\frac{1}{2}$ mile long, North and South, three-quarters of a mile wide, and elevated 478 ft. A large rock lies a cable's length N.W. of it. The island is fertile, and inhabited by fishermen, who cultivate a few vegetables for their own consumption. The channel, inside Pulo Kapas, between the island and main, is $2\frac{3}{4}$ miles broad, and quite safe.

TRINGANO HEAD, bearing W.N.W., distant about 3 miles from the North point of Pulo Kapas, and S.S.E. $\frac{1}{2}$ E. 6 miles from the entrance of Tringano River, is remarkable as the only rocky point in the neighbourhood. A *rock awash* at high water lies a quarter of a mile from the beach, and $1\frac{1}{2}$ mile to the southward of the Tringano River entrance.

TRINGANO RIVER.—The entrance to this river may be easily known by the large gap or opening in the coast line, as well as by a remarkable cone, situated about 1 mile to the southward of the town. There is also in the town a small steep hill, 100 ft. high, with a fort, on which the Rajah's flag is displayed when a vessel passes within signal distance of the place.

The river has a bar, with 7 ft. over it low water. Within the bar, and immediately off the town, there is good anchorage in 5 fathoms, but the river itself above the town is very shallow. The Rajah is hospitable to strangers, and the natives of the coast are friendly. Wood, water, and fresh stock can be procured at reasonable rates.

It is high water, full and change, at the entrance of Tringano River, at 8 a.m., and springs rise 7 ft.

EULO ROCKS.—The coast from the entrance of the Tringano trends north-westward, and is low and slightly convex to Eulo Village, where the high land approaches close to the beach. The Eulo Rocks, a small group of 6 ft. elevation, lie immediately off the village, an eighth of a mile from the beach, N.N.W. $\frac{3}{4}$ W. 9 miles from the entrance of the Tringano River.

Seal Rocks consist of three distinct groups, the extremes of which lie North and South, nearly a mile apart. The South Seal is elevated 9 ft., the other two groups only 3 ft.; there are deep channels between them. The South Seal lies nearly $2\frac{1}{2}$ miles from Seal Bluff, and there is a good channel between it and the bluff, with regular soundings. Care, however, should be taken, when standing towards the bluff, to avoid a rock, awash at low water, lying North a quarter of a mile from the bluff. *Bukit Trokit* is a rock, elevated 140 ft. above the sea, lying 4 miles northward of the Seal Rocks. There is a rock, only 5 ft. high, nearly a mile westward of it. *House Rock*, lying N.W. $\frac{1}{2}$ N., $10\frac{3}{4}$ miles from Seal Bluff, is so named from its appearance.

REDANG ISLANDS.—The Great Redang, the peak of which is in lat. $5^{\circ} 48' 16''$ N., long. $103^{\circ} 0' 48''$ E., is safe to approach on all sides. It is surrounded by small islets and rocks, but they are all bold-to, and have generally good water inside them. There is plenty of wood and good fresh water, and turtle may be caught in abundance on a beach at the North part of the island. There is a fine bay on the North side and a small harbour on the South side of the island. The harbour is protected to the southward by Pulo Pinang, and, although small, might be useful to a ship in distress or in want of repairs. There is a village on *Pulo Pinang*, and a few huts

scattered in different parts of the Great Redang. The conical peak of the *Little Redang* is 985 ft. high. All these islands are quite safe to approach.

PRINTIAN ISLANDS.—This group, lying about 15 miles north-westward of the Great Redang, is also safe to approach. The channel between the two large islands, although narrow, is quite safe for vessels with a leading wind. There is good anchorage on either side of the channel, but the most secure is to the southward. The islands are inhabited, but fresh water is scarce.

TURTLE-BACK ISLAND, so named from its peculiar shape, is elevated 346 ft., and bears N.W., distant 26 miles from Seal Bluff. The intermediate coast is low. Between Tringano and Turtle-back Island, at the distance of several miles inland, there are two ranges of high mountains; the northern one and nearest the coast is elevated 3,388 ft. The channel between Turtle-back and the Printian Islands, as well as the passage between it and the main, is safe.

KALANTAN RIVER.—From Turtle-back Island the coast trends N.W. $\frac{3}{4}$ N. 30 miles to the East point of Kalantan River. There are no dangers on any part of it that are not apparent, and attention to the lead will always indicate the distance from the land.

The *Town of Kalantan* stands on the right bank of the main river, 5 miles from the entrance, near the confluence of its delta, which consists of five streams. The main river at the town is about 2 cables broad and 2 fathoms deep: its banks here are very sandy. The town extends about a mile along the river front, and seems to be densely populated. The greater part of the population are Malays; the remainder are Chinese; Siamese were not seen. The Rajah is a Malay, subject to the King of Siam; both he and his people are friendly and courteous to strangers. The whole delta of the river is very fertile and highly cultivated. It produces immense quantities of cocoa-nuts, and a great variety of fruits. Bullocks, sheep, goats, and fowls were plentiful. Dollars are current.

The main branch of the river is the third stream from the eastern one, and was said to have, in 1856, 9 ft. over the bar at high water springs. The delta of the river is said to be continually altering during the N.E. monsoon.

Vessels approaching the river from the south-eastward will be guided to it by three small hills, situated near the coast, 13 miles to the southward. Two of these hills (close together) are called the *Paps*, and are elevated 300 ft.; the third, named *Wedge Hill*, is elevated 400 ft., and separated a short distance. The Paps bearing S. by E. $\frac{3}{4}$ E. will be in line with the sandy point near the main entrance of the river.

The Coast for 25 miles westward from the main entrance of the Kalantan has not been surveyed, but it is believed to be quite safe. It is all low land for the above distance, at the termination of which there is a remarkable conical hill standing on the coast line. This hill is elevated 1,158 ft., and

bears S.E. by S. 17 miles from Baltu Rackil. *Baltu Rackil*, in lat. $6^{\circ} 40' 36''$ N., long. $101^{\circ} 43' 56''$ E., is a white rock, elevated 35 ft., and quite steep-to.

Hilly Cape is remarkable as the northern extreme of a chain of hills, which rising far in the interior, and cutting the parallel of Kalantan 25 miles westward of it, here jut out into the sea, and form an angle of the coast, remarkable from its two steep bluffs. The easternmost of these bluffs bears from Baltu Rackil N.W. $\frac{1}{4}$ W. 15 miles.

Pulo Lozin, in lat. $7^{\circ} 21'$ N., long. $102^{\circ} 1' 48''$ E., is 7 ft. above high water, steep-to all around, and in size and appearance resembles a vessel of about 100 tons burthen bottom up.

The following information of the navigation of this part of the coast is an extract from the Bangkok Calendar, 1873, and derived from the surveys of H.S.M. surveying brig *Enemy Chaser*, Capt. A. J. Loftus.

“From Hilly Cape to Ligor, vessels may safely approach the shore to a distance of 4 miles, giving Cape Patani a berth of at least 2 miles, as there are shoal sand patches, having 10 ft. of water, in that neighbourhood. Patani Bay is quite choked up, and navigable only for small boats at high water. There is no island existing off the end of Cape Patani, as shown on the old charts. The mouth of Patani River lies a little to the westward of the meridian of the cape.

“Midway between Patani and Row Island, and about 3 miles from the shore, is a hard patch of ground, having 10 ft. of water on it. Pulo Ticos and Pulo Kewshan may be approached on their *eastern* side as close as convenient, there being plenty of water and no hidden dangers near them. Inside these islands the water is shoal, and not navigable for sailing vessels of any size. Small vessels will find snug anchorage in $2\frac{1}{2}$ fathoms water, bottom of mud, one-quarter of a mile off the S.W. end of Pulo Ticos. When coming in, or leaving the inner roadstead, keep the South end of the island (Ticos) close aboard. Large vessels will ride comfortably in 5 fathoms water, with the South end of Pulo Ticos bearing westerly.

“The coast from here to the extreme North end of Pulo Tantalum is quite clear, with good depth of water close-to, mud bottom. The coast line is not, however, as represented on the old charts; the extreme end of the Lamcolam Pook being about 4 miles farther South, and $8\frac{1}{2}$ miles farther East, than is there represented. The Pook itself is a narrow, curved spit of coarse sand, being about 6 miles in length, and 300 ft. at its greatest breadth, and having a compact cluster of young fir trees on its extremity, which may be seen at a distance of 12 miles from the deck.

“The water is shoal off and around this point, and continues so to the mouth of Ligor River, which bears from the Pook about W. $\frac{1}{2}$ N., distant $5\frac{1}{2}$ miles, when it gradually deepens to the northward. No hidden dangers have been discovered from thence to lat. $10^{\circ} 7' N.$

“Between the Pook and Ligor Creek the land forms a deep bight to the southward, where a river named Pakinham, $1\frac{1}{2}$ mile wide at its mouth, leads to the inland sea in the same direction. This bight, like that of Patani, is navigable only for small boats at high tide. To anchor in Ligor Roads, round the Pook at a distance of 4 miles, steer to the westward, and bring up according to draught. If coming from the northward, keep inshore, and anchor in suitable water near the inner fishing stakes. Circumstances are frequently favourable near the shore for vessels to beat down against the S.W. monsoon.”

SINGORA.—The town of Singora stands just within the East point of the river, and contains about 2,500 inhabitants. Its position may be known by two small islands off the port, as well as from a remarkable piece of table land at the entrance of the river opposite the town.

The anchorage for small vessels is in 17 ft. water, close inside the inner island, called by the Malays *Pulo Ticos*. The river has a bad bar at its entrance.

Wood and water may be purchased at the town, the latter from a spring just within the bar of the river. Stock of every description is plentiful and cheap.

The **ISTHMUS of KRAW** or **Kraa** (Monkey Isthmus) is probably the narrowest portion of the Malay Peninsula. Its western side has been alluded to in our *Directory for the Indian Ocean*, page 1067. The eastern inlet is the *Champon* or *Tseoompyoon River*, which has a bar with only 9 ft. over it at low water. A large town of the same name lies on its banks, 20 miles from its mouth. The isthmus between this point and the village of Kraw on a branch of the Pakchan River falling into the Bay of Bengal, was traversed by Captains Fraser and Forlong, under the direction of Col. Fytche, with a view to discover whether it was available for a canal or railroad across. But the desirability of this, although it may be practicable, is very questionable, as two transshipments of goods, &c., would be required to save 93 hours between Calcutta and Hong Kong; and, moreover, there are no good ports at either end.

Koh Krah, in lat. $8^{\circ} 24' 47''$ N., long. $100^{\circ} 43' 30''$ E., is half a mile long, a third of a mile broad, and 530 ft. high. Two high rocks, and a rock *awash*, lie to the southward. A small quantity of stagnant fresh water may be obtained on this island, and turtle are so plentiful that 150 have come up in a single night.

The coast between Singora and Champon, 200 miles to the N.N.W., has not been surveyed.

LEM CHONG P'RA, or Cape Chong P'ra, is a remarkable craggy headland of 1,060 ft. elevation, in about lat. $10^{\circ} 54' N.$, long. $99^{\circ} 28' 10'' E.$ A narrow island, called *Koh Buot*, lies 2 miles south-westward of the cape, and within the island is a snug bay named Chong P'ra.

LEM TONG LAN.—From Lëm Chong P'ra, Lëm Tong Lan bears N. by E., distant 18 miles. About midway within the bay, formed by these points, is a level cliffy island, called *Koh Tlu*, 342 ft. high, and nearly $1\frac{1}{2}$ mile long. There is no safe passage for vessels between Sing and Koh Tlu. Lëm Tong Lan is 814 ft. high, and the coast being very low within it, at a distance it makes like an island. At 11 miles northward of Lëm Tong Lan there is a remarkable clump of conical hills, and a low dangerous island lies immediately off them, at the distance of a quarter of a mile from the shore.

From Lëm Tong Lan, Koh Chan, an island 80 ft. high, lying 4 miles off the coast, bears N.N.E., and the distance is 27 miles, and to Koh Luem it is 37 miles, on nearly the same line of bearing.

KOH LUEM, 406 ft. high, is the outermost of several islands which lie off the bays called Ao-ti-bon-lai (?) and Ao-ti-now (?).

Ao-ti-bon-lai, the northern bay, affords the best anchorage for ships. W.S.W. 15 miles within the South horn of Ao-ti-now, is the mountain named *Kow Luang*, elevated 4,326 ft., which is by far the most conspicuous landmark on the whole coast.

KOH TA-KUT, 300 ft. high, is 1 mile long, N.N.E. and S.S.W., and a quarter wide, lying about N.N.E. 28 miles from Koh Luem; the coast between these islands is clear, and the soundings regular.

Samroi-yot Hills.—*Cui Point* (corrupted by Europeans into Cin) is the end of a spur running down from a remarkable clump of rocky hills near the coast, called by the natives Samroi-yot, or 300 peaks. At a distance their appearance is that of a serrated table island; the highest peak is elevated 1,900 feet. Samroi-yot is unlike any other land in the gulf, and all vessels bound to Bangkok in the S.W. monsoon endeavour to make it.

Water.—The only fresh water to be obtained between Chong P'ra and Cui Point is from wells, which have been provided at places convenient for the use of native craft by wealthy benevolent Siamese.

PRAN ROCKS, two in number, and each 100 ft. high, bear N. $\frac{3}{4}$ W. 17 miles from Koh Ta-kut. The village of Pran stands on the shore at the entrance of a river 4 miles southward of these rocks.

Between Koh Ta-kut and the Pran Rocks is a dangerous rocky patch of 1 fathom water, from the centre of which the North patch of Koh Ta-kut bears S. $\frac{1}{4}$ E. 8 miles, and a remarkable head on the coast line W.S.W. 2 miles. Vessels should not approach this part of the coast nearer than $2\frac{1}{2}$ miles, nor stand into less water than 7 fathoms.

A small headland stands out prominently from the coast line at 2 miles N. by W. from the North Pran; and East three-quarters of a mile from the centre of this headland is a rock which covers at half flood.

CHULAI POINT is 34 miles N. $\frac{3}{4}$ E. from the Pran Rocks. At 17 miles N. by E. $\frac{1}{4}$ E. from the North Pran there is much rocky ground, and some

dangerous patches of only 2 fathoms water lie 5 miles off shore; from the outer patch Chulai Peak bears N.W. by W. $\frac{3}{4}$ W.

When passing the neighbourhood of this rocky ground, it is recommended not to approach the coast nearer than 6 miles, nor to stand into less water than 7 fathoms.

The Coast about Chulai Point and to the northward of it is all very low. The edge of the bank extends a considerable distance from the shore and is steep-to, especially off the village of Banlam, 8 miles northward of Chulai Point, where there are only 2 fathoms at the distance of $3\frac{1}{2}$ miles from the shore.

Immediately round Banlam Point the low coast trends to the north-westward, and the soundings in the offing become regular. From this point along the head of the gulf to the bar of Bangkok River the lead will be found a safe guide by day or night.

The town of *Pechaburri* is 8 miles up a river, the principal entrance to which is $5\frac{1}{2}$ miles N.W. of Banlam Point. It is clean, well built, and densely populated, the centre of a great rice-producing district, and evidently of considerable importance. In point of climate it is preferable to Bangkok, and more likely to agree with the constitutions of Europeans. The anchorage off the entrance of the river is far more sheltered in the S.W. monsoon than that off the bar of Bangkok River, and cargo might be safely embarked at all times.

EAST COAST OF THE GULF.

PULO OBI, the main island of the Obi group, lies about 11 miles S.E. by S. of Camao Point, the south-western extreme of Cambodia, which bounds the East side of entrance of the Gulf. The island is nearly $2\frac{1}{4}$ miles long N.E. and S.W., and rather narrow near the middle, the widest and highest part being the S.W., which is elevated 1,046 ft. From its S.W. end *Camao Point* bears N.N.W. $\frac{3}{4}$ W. 12 miles; and Hull Rock S.E. $\frac{3}{4}$ E. 4 miles. There are also two small islands within a mile of the S.E. point of Obi, which contract the channel between them and Hull Rock to little more than 2 miles. The approaches to, and passages between all these islands, are quite safe by keeping at a prudent distance from the shore.

The channel between Pulo Obi and the depth of 3 fathoms on the bank extending from the coast of Cambodia, is rather less than 2 miles wide, has 6 to 15 fathoms in it, and is quite safe to navigate. Marsh Reef, lying N. $\frac{1}{2}$ W. $3\frac{1}{4}$ miles from the North point of Obi, is a dangerous group of rocks awash at low water.

There are two small pebbly bays, one on the N.W., the other on the S.E.

side of Pulo Obi. The best anchorage is directly off these bays, on either side of the island, according to the monsoon, at about half a mile from the shore.

Fresh water is plentiful in the N.W. and S.E. bays, but the shores are not convenient for embarking it. All the islands are densely wooded. No inhabitants were seen.

M. Wüst, commanding the *Alan Prah*, made some examination of Pulo Obi in 1867. He found good anchorage off the S.W. side of the island, and traces of human beings on the coast in the vicinity. The bay on the N.E. side of the island he found to consist of two bays, the southernmost of which has the deepest water, and is most frequented. In the valley extending from the head of this bay was found a small chapel, said to be visited by Chinese sailors at times.

PULO PANJANG, the main island of the Panjang group, is in lat. $9^{\circ} 18' 14''$ N., long. $103^{\circ} 28' 14''$ E. It is 3 miles long, East and West, 2 miles wide, and of a nearly uniform height of 550 ft., making like table land from the sea in every direction. There are two small islands, having deep channels between them, at about a mile from its East end; and one connected with its South point. Besides these there is a large white rock, 75 ft. high, S. by W. $1\frac{3}{4}$ mile from its South point; and two large rocks, named East Island and Table Rock, elevated 110 and 40 ft. respectively, bearing from the N.E. part of Panjang N.E. by E. $8\frac{1}{2}$ miles.

During the N.E. monsoon the bay on the S.W. side of Pulo Panjang affords capital shelter and good anchorage. Fresh water and wood can be obtained in abundance in the bay, and fish may be caught in any quantity with a seine. The anchorage on the S.E. side of the island is very indifferent. The island is not inhabited.

Caution.—Pulo Way, Veer Islet, Koh Prins, the Tanqualah group, and the Depond Reef, were regularly surveyed, and the soundings taken in the neighbourhood seem to denote that the passages between them are safe; but as time would not permit these approaches from the northward and westward to be sounded, caution must be observed when steering for them from those quarters.

The channel between these islands and Koh Tron is believed to be quite clear and safe.

PULO WAY, or *Koh Kwang Noi*, about 50 miles N.W. of Pulo Panjang, consists of two islands about the same size, nearly the same height (250 ft.) each being nearly 2 miles long, E.S.E. and W.N.W., and a quarter to three-quarters of a mile wide. They are distant nearly a mile from each other, East and West, and the channel between them is quite safe. A rock, elevated only 3 ft. above high water, lies E. by S. three-quarters of a mile from the East point of the eastern island; and there is a dangerous patch on which H.M.S. *Saracen* struck, with only 4 ft. on it, lying N. by W. $\frac{1}{2}$ W.

three-quarters of a mile from the N.W. end of the same island. Good anchorage will be found off the North side of the eastern island, but the best berth is off a sandy bay on the N.E. side of the western island.

The natives obtain their *fresh water* from a well about the middle of the eastern island; and from appearance, good water might be obtained in this way on any part of either island at a moderate distance from the shore. The islands are covered with wood; the beaches afford turtle; and a single cast of the seine will generally procure a boat load of fish.

KOH TANG or *Tanqualah Island*, bearing N.N.E. $\frac{3}{4}$ E., $23\frac{1}{2}$ miles from Pulo Way, is $3\frac{1}{4}$ miles long, very narrow, and has a peak rising to an elevation of 440 ft. near its North end. The fine clean sandy bay on its eastern side will afford good anchorage in the S.W. monsoon.

DEPOND REEF, in lat. $9^{\circ} 58\frac{1}{2}'$ N., long. $103^{\circ} 7' 33''$ E., is about half a cable's length in diameter, just awash at low water, steep-to on all sides, and in fine weather might not be noticed until close upon it. From it the peak of Tanqualah is faintly seen bearing N. $\frac{1}{2}$ W., distant $19\frac{1}{2}$ miles; and the peak at the South end of the western Pulo Way is visible over the middle of the eastern Pulo Way, W. by S. $\frac{1}{2}$ S. nearly $14\frac{1}{2}$ miles. The islands forming Pulo Way are well in sight from an elevation of 15 ft.

Condor Reef.*—The Bremen barque *Condor*, 3rd February, 1860, was totally lost on a sunken reef, said to lie in lat. $10^{\circ} 42'$ N., long. $102^{\circ} 48'$ E. The reef was afterwards searched for by Lieut. Ellis, R.N., in the gunboat *Weazel*, but without success, owing to rough weather. A patch of 9 fathoms with 15 to 20 around it was, however, found in $10^{\circ} 41'$ N., $102^{\circ} 51'$ E.

* **DOUBTFUL DANGERS**.—The following dangers may be considered not to exist, as, coupled with the fact that they have been carefully and unsuccessfully searched for, there are hundreds of vessels every year navigating in their vicinity without noticing their existence:—

John Wade Rock.—Commander Fitzroy, of H.M. gun-vessel *Avon*, on a recent passage from Singapore to Bangkok, passed over and carefully searched about the position ascribed to the John Wade Rock, in lat. $10^{\circ} 40'$ N., long. $101^{\circ} 48'$ E., but no sign of danger could be discovered. This very doubtful rock, on which the American ship of that name was reported to have been lost at 3 p.m. on 26th March, 1858, has been frequently looked for in other vessels with the like result, and its existence is altogether discredited by those accustomed to the navigation of the Gulf of Siam.

Emanuel Reef, reported in 1862 by the French ship *Emanuel*, in lat. $11^{\circ} 49'$ N., long. $101^{\circ} 19'$ E., and with Chong Samit bearing N. $\frac{1}{4}$ E., was also searched for in the *Avon* with no better success; nothing like danger could be met with in the locality. Captain Bush, harbour master at Bangkok, reports that after a careful search of nearly three days, under very favourable circumstances, he was unable to discover anything like danger in the vicinity, and is sure that the look-out man was deceived.

A shoal reported, in 1864, to lie in lat. $11^{\circ} 59'$ N., long. $101^{\circ} 10'$ E., was also passed over in the *Avon*; the soundings on and near the spot were 20 fathoms. This doubtful danger appears to have found a place on the chart from very insufficient data.

Captain Thompson, of the brig *Katinka*, in March, 1872, saw the reef, which he placed in lat. $10^{\circ} 43' N.$, long. (by their good sets of observations) $102^{\circ} 51' E.$ The most complete account is by Lieut. Veron, of the French navy, who examined the reef in the steamer *Le Frelon*, who describes it as follows:—Condor Reef is a rocky plateau half a cable in extent, and from 16 to 20 ft. below the surface, except at six points which rise above the general level of the reef to within 6 to $1\frac{1}{2}$ ft. of the surface. The shoalest point is on the S.W. part of the reef; from this point the depth increases in the same proportion toward the North and South; that is, $5\frac{1}{2}$ fathoms at 110 yards, and 13 fathoms at 220 yards. Toward the East the depth increases gradually to 13 fathoms at half a mile from the same point, but it changes rapidly to $16\frac{1}{2}$ fathoms outside of that distance. On the West side the change is more rapid; 6 fathoms of water is found at 55 yards, from thence it increases rapidly to $16\frac{1}{2}$ fathoms, and 22 fathoms water is found at 3 cables West of the shoalest point. From the head of the reef or shoalest spot the bearings *true* are as follows: The western island of the Koh-Samit group, N. $37^{\circ} E.$ The islet situated between the Koh-Kong and Middle Island, N. $76^{\circ} E.$ The highest peak of Koh-Kong S. $88^{\circ} E.$ These bearings give the position of the reef: Lat. $10^{\circ} 43' 40'' N.$, Long. $102^{\circ} 53' 19'' E.$

Hans Reef is marked in lat. $10^{\circ} 43' N.$, long. $102^{\circ} 35'.$

CAMAO or **CAMBODIA POINT**, the south-western extreme of Cambodia, is low and covered with trees, and cannot be seen farther than about 9 miles from the deck of a small vessel. The edge of the bank off the point is very steep-to, the soundings decreasing at once from 8 to 2 fathoms, which latter depth will be found at the distance of 2 miles off shore. Abreast Pulo Obi the edge of the bank is fully 5 miles off shore; it is very steep also to the eastward along its southern edge, and as several rocks have been found within the 5 fathoms line, it will be prudent when passing not to go into less than 8 fathoms water.

To the northward of Camao Point the soundings are regular, and the coast may be approached with safety.

From Camao Point the land trends in an E.N.E. direction 17 miles to the *Camao River* entrance, which is nearly dry at low water. Excepting the scattered huts of a few solitary fishermen, no signs of inhabitants were seen near it.

From hence the coast takes a northerly direction to abreast Pulo Dama. The land is all very low, with the exception of the Paps, two small rocky bluffs, elevated 100 ft. on the coast line, bearing N.E. $\frac{1}{2}$ E. 20 miles from False Pulo Obi.

FALSE PULO OBI, bearing N.N.W. $\frac{2}{3}$ W. 23 miles from Camao Point, is three-quarters of a mile long, half a mile broad, elevated 500 ft., with cliffy sides, and steep-to all round. At 4 miles to the S.S.E. $\frac{1}{2}$ E. is a small rocky island, elevated 167 ft., with a ledge of rocks projecting a quarter of

a mile from its East side. The channel between these two islands is quite safe; and there is a fine safe channel 12 miles wide, between them and the main.

Pulo Dama is $3\frac{1}{2}$ miles long, North and South, 1 mile wide, and near its centre is a sharp peak, elevated 1,077 ft. Three small islands lie off its North point, and there are also several off its S.E. end. No fresh water, and no inhabitants.

Tammassou is a high table island, elevated 1,390 ft., with steep cliffy sides, bearing about E.N.E. 16 miles from Pulo Dama. The island is safe of approach in every direction. A little fresh water was found on it.

Teeksou Island, N.E. $\frac{1}{2}$ E. 13 miles from Tammassou, is of conical form, and elevated 1,380 ft. There is no passage for ships to the eastward of this island.

Teksia Peak is a cone of 810 ft. elevation, bearing N.N.E. 7 miles from Teeksou, and remarkable as the first high land on the main seen on approaching from the southward. Between this peak and Teeksou there is an anchorage for large trading junks, whose cargoes are brought out from the neighbouring town in the flat boats of the country.

TABLE HEAD is a rocky headland, elevated 600 ft., bearing W. by N., 15 miles from Teksia Point. The coast between forms a deep sandy bay, having several small rivers falling into it. This bay is very shoal; and a dangerous rock, awash, lies S.E. $\frac{1}{4}$ S. $4\frac{1}{2}$ miles from Table Head.

TEKERE or **MINGHUE**, a cone-shaped island, elevated 1,120 ft., and bearing S.W. $\frac{3}{4}$ S. 8 miles from Table Head, is the largest of an archipelago of islands and rocks, that extend westward and south-westward from Table Head. There are two islets, named *Outer Island* and *Shark Island*, to the south-westward of Tekere; and there is one also, called *West Island*, lying about midway between Tekere and the Twins, in the fairway channel for vessels approaching Cancao from the southward.

CANCAO RIVER has on either side of its entrance high bluffs, which, together with the gap dividing them, are remarkable from the westward: and from this direction the town of Cancao, which stands at the entrance, may be seen at the distance of 6 or 7 miles. The anchorage off the town is good, and the soundings regular. In working up to it from West Island, care should be taken not to make too free with the islands on either hand; many of them being surrounded by dangerous rocks.

Cancao, named on the French charts *Hatien*, is said to have a population of 8,000. The entrance of this river now belongs to the French, having been recently ceded to that government by the King of Cambodia. There is a large fort in front of the town to seaward to defend the entrance of the river. This river communicates by a canal with the great Cambodian river Makiang, and is the route by which the produce of the interior is brought down to the coast. Some native boatmen assured a French missionary

resident at Kamput that there is a 13-foot channel into the Cancao River. Lieut. Richards only found 7 ft. at high water. Government boats were sent out to warn the *Saracen* off, but it was done with civility. The fort occasionally fires on merchant vessels passing near.

As no European vessel is allowed to anchor off Cancao, they are obliged to rendezvous at Kamput, to which anchorage their cargoes are conveyed in Cancao junks.

Between Cancao and Kep Point, 10 miles to the north-westward, the coast is only navigable for junks. There is no safe passage for ships inside the Pirate Islands; the *Saracen* grounded twice in making the attempt.

Anchorage.—Mr. Brown, commanding the English brigantine *Acis*, January, 1860, recommends the following anchorages to vessels bound to Cancao, the approaches to which are marked on the chart. That eastward of Great Pirate Island will be most useful to vessels trading with Cancao in the S.W. monsoon. The anchorage eastward of North Pirate Island may also be of service to vessels of light draught in the same monsoon, and so may that under the South side of Peaked Island in the N.E. monsoon; but it is to be feared that the channels leading to the two latter anchorages will be found rather intricate. A $2\frac{1}{2}$ -fathom shoal is reported by Mr. Brown as extending $2\frac{1}{2}$ miles W. by N. from North Pirate Island; and he further states that he found a $4\frac{1}{2}$ -fathom channel between Ragged Rock and the nearest Pirate Island, where $2\frac{3}{4}$ and $3\frac{1}{4}$ fathoms are marked on the chart.

The anchorage under the South side of Peaked Island is stated to be the best in the N.E. monsoon for vessels that have sometimes to receive cargo both from Kamput and Cancao. A vessel of large draught should approach this anchorage from the westward, by the main channel about 3 miles West of the Pirate Islands.

East and West Brother are two small islands, 473 and 406 feet respectively in height, lying off the South point of Koh Tron. They bear nearly E.N.E. and W.S.W. from each other, and are 3 miles apart.

KOH TRON, called by the natives *Koh Dud*, is of a triangular form, 26 miles long, North and South, and 14 wide at its broadest part, which is near the North end. Along its N.E. side is a mass of high table land, elevated about 1,600 ft.; farther southward is a remarkable quoin-shaped hill, and there are some remarkable conical hills and bluffs at the South end of the island. There are also some hills of moderate height near the N.W. point; the remainder of the island is low. The eastern shore is dangerous to approach, it being fringed with coral reefs and sunken rocks, but the island is quite clear of danger in every other direction. Fresh-water streams abound, especially along the eastern shore.

Directions for South Channel to Kamput.—The Brothers, with Pulo Dama, are the chief guides when bound to Kamput from the southward. Vessels

intending to take the South channel to Kamput may, if necessary, pass northward of the Brothers, but they should not approach Round Hill Point (the South point of Koh Tron) nearer than 3 miles, as a rocky ridge with $2\frac{1}{2}$ fathoms on it extends E.S.E. $2\frac{1}{2}$ miles from the point.

The eastern shore of Koh Tron, particularly from abreast Pulo Cici to its North point, is very dangerous. In standing towards the Koh Tron shore, always tack when the soundings deepen suddenly. *Pulo Cici*, or the Twins, are two small islets covered with trees, and connected together by a reef of rocks; the northern islet is 213 ft. high. A vessel may pass at a mile on either side of them.

Caution.—Between Koh Tron and Pulo Cici lies the *Rosita Rock*, on which an English schooner of that name struck. It is of coral, half a cable's length in diameter, of only 2 ft. water, and steep-to on all sides, but may be seen at a short distance from aloft by the discoloured water. The high Twin bears from it S.E. by E. $4\frac{3}{4}$ miles; South Pirate Island, E. $\frac{3}{4}$ S.; Gunung Susu or Paps, 300 ft. high (about a mile North of Bumbi Bluff), N. $\frac{1}{2}$ W.; and Byoot Peak, 1,608 ft. high (near the N.E. point of Koh Tron), N.W. by W. $\frac{3}{4}$ W., westerly.

North Channel to Kamput.—For all large vessels the channel northward of Koh Tron is recommended, as the water is deep and the soundings regular. Caution should be used in standing towards the edge of the North bank near the western entrance of the Kamput River, as it is steep-to and rocky. The ground is also foul at the North point of Koh Tron. A number of large rocks 20 ft. high extend about 2 cables' lengths from the point, having others near them under water.

The western entrance of the North channel between Water Island and Koh Tron, is $2\frac{1}{4}$ miles wide, but there is a large flat rock just within it, and lying North half a mile from the N.W. point of Koh Tron; and a rocky island covered with trees lies W. by S. $1\frac{1}{2}$ mile from the same point. There are also two other small rocky islands to the southward of the entrance.

In passing through this channel vessels should not, if possible, pass inside Flat Rock or any of the above small islands, as the ground is foul between them and Koh Tron, and the set of the tides irregular.

The Anchorage off Kamput is in 4 fathoms, with Bumbi cone in line with the Paps, N. $\frac{1}{4}$ W., and Kep Peak E. $\frac{3}{4}$ S. Bullocks, pigs, fowls, ducks, and eggs were purchased very cheap. Of vegetables there were great variety, and the market had a good supply of fruit. Wood was plentiful; water can be obtained from wells near the town, but it is muddy and bad, and procured with great difficulty.

Good anchorage will be found on the N.W. side of Water Island in 4 fathoms water, at a quarter of a mile from the shore; and all vessels intending to remain any length of time at Kamput would do well to anchor here and complete their water. The watering place is in a sandy bay on

the N.W. side of the island; there is a fine running stream, and as the beach is very steep, the water is easily embarked. This bay is also a good place to haul the seine.

BAY ISLAND.—Sailing from Kamput to the westward, after passing Water Island, and a shallow inlet in the bight of the bay to the northward of it, Bay Island will become conspicuous from its position, as well as comparative magnitude. It is $2\frac{1}{2}$ miles in diameter, elevated 380 ft., and its outer or South point bears W. by N. $\frac{1}{2}$ N. 13 miles from the southern extreme of Water Island.

Kapongsom River.—From Bay Island the coast trends to the northward towards the estuary of the Kapongsom River, which is 13 miles wide, and, as far as it was examined, quite safe. The deep water appeared to be along the southern shore.

RONG SAM LEM, the southernmost of a chain of islands that front the estuary of the Kapongsom, is 5 miles long, North and South, elevated 780 feet, and its shores are steep and quite safe of approach. On its N.E. side there is a fine bay, named after the *Saracen*, which indents the island so deeply as almost to divide it into two parts, and affords good anchorage for the largest vessels. Wood and fresh water may be had in abundance at the head of the bay, but it is easier procured just without the bay to the northward, where the beach is steep-to. Between Rong Sam Lem and the nearest point of the main, a distance of 9 miles across, may be considered the proper entrance into the estuary of the Kapongsom.

KOH RONG, lying $2\frac{1}{4}$ miles northward of Rong Sam Lem, is 8 miles long, N.W. and S.E., and 5 broad. The greater portion of the northern end of this island consists of table land, the highest part of which, elevated 1,158 feet, descends with a slope to the southward, and rises again near the southern extreme, where it terminates in a sharp peak. Its shores are generally steep and foul.

There are no inhabitants on any of these islands.

The channel between Koh Rong and Rong Sam Lem is quite safe, although generally rocky ground and unfit for anchorage.

Koh Samit, $1\frac{1}{2}$ mile long, 1 mile broad, and elevated 400 feet, is the southernmost and largest of a chain of islands and rocks that front the coast for 12 miles northward of Samit point. There is a deep-water channel inside all these islands. The highest and most remarkable hill about this part is elevated 1,155 feet, and is named the *Quoin*, from its peculiar wedge shape.

KUSROVIE ROCK, in lat. $11^{\circ} 6' 25''$ N., long. $102^{\circ} 47' 49''$ E., and distant about 17 miles from the nearest part of this coast, is about three-quarters of a cable's length in diameter, and 36 ft. high, without a particle of vegetation on it. Its sides are shelving, and isolated rocks extend half a cable's length from it. The bottom can be plainly seen near it in 6 fathoms.

Ellen Bangka Shoal.—The commander of the Netherlands India barque *Ellen Bangka* reports that his vessel, whilst under sail on the 12th November, 1870, in the neighbourhood of the Kusrovie Rock, struck twice on a shoal, on which there was only 11 ft. water. The vessel was at that time North, 5 or 6 miles from the Kusrovie Rock, which was visible from the deck. The danger has accordingly been placed in lat. $11^{\circ} 11' N.$, and long. $102^{\circ} 47' E.$ (The London and China Telegraph of March 14th, 1871.)

KOH KONG is a level table island, 11 miles long, North and South, 4 miles wide, and elevated 1,500 ft. It has some fine sandy beaches along its western shore, which is steep-to, and quite safe of approach, but the island offers no sheltered anchorages or other advantages to shipping. There are no inhabitants.

Within Koh Kong there is a large shallow bay, into which numerous small rivers disembogue; but they are generally unapproachable.

The main land within Koh Kong is very low as far as visible to the eastward, but it rises to the northward with great regularity until it joins the high table land abreast Koh Kut.

Two rivers of considerable magnitude enter the sea a short distance northward of Koh Kong; the northernmost river is called *Klong Koh Kong*.

The **COAST**, from the Klong Koh Kong, takes a N.N.W. $\frac{1}{2}$ W. direction 40 miles to Tung Yai Bay, and is quite safe to approach with regular soundings. With the exception of two rocky bluffs, the land near the sea is low, and fringed by a straight sandy beach; parallel to the coast, at the distance of 2 or 3 miles inland, a table land rises with great regularity to the height of more than 2,000 ft. One of its highest points was found to be elevated 4,000 ft.

Tung Yai Bay affords good anchorage, but the eastern shore must be approached with caution, as several rocks lie nearly a mile off it. A small stream, the Tung Yai River, falls into the head of the bay, but it is only navigable for boats. *Lem Nam*, forming the western point of entrance of Tung Yai Bay, makes like a low woody island from the southward. From thence the coast takes a W.N.W. direction 20 miles to *Lem Ling*, or *Junk Point*, and is fronted all the way by an extensive flat named *Tung Yai Bank*. A small mangrove islet lies close to Lem Ling, and the ground is foul for some distance off it; but Lem Ling is quite clear to the S.W.

KOH KUT, lying 16 miles off the coast between the parallels of $11^{\circ} 34'$ and $11^{\circ} 46'$, is a high level island, with steep, cliffy sides. There are two small conical peaks near its South end, the highest of which (the northern) is elevated 1,171 ft. The island has no permanent inhabitants. Good anchorage will be found in a bay near the N.W. end of Koh Kut, with a fine stream of fresh water running into it.

KOH MAK, lying 3 miles N.W. of Koh Kut, and S.S.E. 7 miles from Koh Chang, is 3 miles in diameter, and very low, excepting at its West end, which

presents a rocky head to seaward, elevated 300 feet. It is inhabited by fishermen engaged in collecting biche-de-mer.

KOH CHANG, 16 miles long, N.W. and S.E., and 6 miles wide, consists of a mass of peaked hills intersected by rocky and precipitous ravines. The highest part of the island (a table peak near its centre) is elevated 2,446 ft. Notwithstanding the numerous islands and rocks that fringe Koh Chang, no dangers were discovered near its shores but what were apparent. There is a native government station at a low jutting point on its eastern side, with about twenty persons, who are the only inhabitants. Tigers are said to be numerous. Fresh water can be obtained on the western side of Koh Chang, about 3 miles from the North point.*

The Coast from Lem Ling trends N.W. $\frac{1}{4}$ N. 21 miles to *Lem Sing*, which forms the western side of entrance to the Chentabun River. The shore between is low mangrove; but a short distance from it, and 5 miles from Lem Sing, are three small, high islands. There is also a large river at the distance of 6 miles northward of Lem Ling.

ALABASTER ROCKS, in lat. $12^{\circ} 20' N.$, long. $102^{\circ} 14' E.$, $7\frac{1}{2}$ miles S. by W. from the entrance of the Chentabun River, were examined and their positions determined by Mr. Alabaster, of H.M. Consulate, Bangkok, who describes them as two small rocks, about 40 ft. apart, lying N. by E. and S. by W. from each other. The southern and larger one is, at low water spring tides, about 14 ft. long by 5 broad, and 3 ft. above the surface of the sea; the northern one is smaller, and shows but 2 ft. above water. From the Alabaster Rocks Cone Island bears N. $\frac{1}{2}$ W., westerly; the summit of Khao Sabap mountain, N.E. $\frac{2}{3}$ N.; the southernmost of three small islands, N.E. by E. $\frac{1}{3}$ E.; and Table Peak, the highest part of Koh Chang, S.E.

The *Allan Prah*, on her voyage from Saigon to Bangkok, saw a rock in lat. $12^{\circ} 25\frac{1}{2}' N.$, long. $101^{\circ} 39\frac{1}{2}' E.$, which position was determined by bearings.

CHENTABUN RIVER.—The position of this river may be recognized from a distance by a mountain called *Khao Sabap*, which rises to an elevation of 2,090 ft N.E. by E. 9 miles from its entrance; also by Lem Sing, which at a distance appears like an island, and may be further known by a conical islet, named *Cone Island*, 405 ft. high, lying a mile westward of it, as well as by a remarkable white cliff on its eastern face.

The eastern side of entrance begins at Koh Chula or Bar Island, between which and Lem Sing is the channel into the river, with 13 ft. in it at low

* *Doubtful Dangers.*—Some of the old manuscript charts show a sunken rock midway between the Kusrovie Rock and the South point of Koh Kut; and another 24 miles West of the North point of Koh Chang. The *Saracen* passed over these positions without meeting any token of their existence, but caution is recommended to all vessels passing their neighbourhood.

water, but as it is only a quarter of a mile wide, it would be necessary to warp a large vessel in against a head wind. Vessels can ascend the river as far as the fork, which is within 10 miles of the town. A convenient anchorage without the bar is, with Koh Chula N.E. by E., distant about half a mile. Fresh stock is scarce, but an abundance of good water may be procured in a small bay westward of Lem Sing.

It is high water, full and change, at the entrance of the Chentabun, at 10^h 0^m, and the rise is 5½ ft. The highest tide took place on the day after the change.

Koh Samit, 377 ft. high, bears W N.W. 52 miles from the North end of Koh Chang. It lies off Lem Ya, from which it is separated by a channel, called *Chong Samit*, 1½ mile wide, with a depth in it of 3 fathoms.

Mr. Alabaster reports that the native pilots declare a rock exists in Chong Samit, towards the western end of the strait, about mid-channel; their directions for avoiding it are—"It, on entering the strait from the westward, Koh Plateen is sighted, stand over close to the main land; if Koh Plateen is not sighted, keep as near as possible to the island."

LEM YA may be known by a clump of conical hills extending from it 15 miles inland; the highest, which is the northernmost, is elevated 2,470 ft. On each side of this headland the coast is low. The bay to the westward is slightly concave, and fringed with a sandy beach to Lem Sahemsan, or Cape Liant. The bay to the eastward has several small islands in it.

Mr. Alabaster also reports that the native pilots say a rock, named *Hin-ai-eorp*, lies in about lat. 12° 35½' N., long. 101° 46½' E., in a direct line between the island of Mon-Klang and the small bay on the main named Tung Kaben, about 5 miles distant from the latter.

CAPE LIANT or Lem Sahemsan.—On approaching this cape from the southward, the outer islands off it, *Chuen* and *Me-san*, being the highest land in the neighbourhood, will be first seen. *Hin Chalan*, in lat. 12° 27' 46" N., long. 100° 58' 29" E., will not be observed until it is within the distance of 5 miles; it is a white rock 40 ft. high, a cable's length in diameter, very steep-to, and quite safe to approach.

The channel between Hin Chalan and Chuen is 2½ miles wide, and quite clear. The channel between Chuen and Me-san is a mile wide; and there is also a channel between Cape Liant and Koh Riat, but it is only a quarter of a mile wide, and although much used by small vessels, is dangerous during spring tides, and certainly should never be attempted by a sailing vessel, without a fair and commanding breeze. All these channels seem to be remarkably clear of danger.

Sheltered Bay, at 3 miles north-westward of Cape Liant, is about 4 miles wide and 2 deep, with good anchorage all over it. *Koh Yoh*, the outer island off its entrance, is remarkable from its resemblance to an erect triangle. The eastern horn of this bay may be known by a remarkable cone 454 ft. in

height. *Lem Putau*, the N.W. point of Sheltered bay, is a bold bluff headland of 600 ft. elevation, and close round it, to the northward, is a bay, called *Tung Kitea*. Fresh water can be obtained in the S.E. corner of this bay.

Tung Plong Bay lies 1 mile northward of Tung Kitea, and being sheltered by Koh Kram and Koh Ira, offers secure anchorage to vessels detained in the channel.

A remarkable rock, called *Sombrero*, lies three-quarters of a mile from the S.E. side of Koh Kram, and the channel between it and Koh Ira is about a mile wide. The *Sombrero* should not be approached closely to the northward, as there is much foul ground for a considerable distance in that direction.

Koh Kram, lying 9 miles north-westward of Cape Liant, is 3 miles long, North and South, and 2 miles wide. There is a remarkable sharp peak of 704 ft. elevation on its S.E. side, and a bay on its N.W. side; its western shores are quite safe to approach, but reefs extend three-quarters of a mile from its eastern, and half a mile from its southern shores.

KOH LUEM, or **Pilot Island**, bears N.N.W. $\frac{1}{2}$ W. 16 miles from the N.W. point of Koh Kram; along this line runs a chain of small islands, called *Rin*, *Kring Badung*, *Mana Mechy*, and the comparatively large island of *Pai*, which is 2 miles long and 1 mile wide. The channels between all these islands are free from danger.

Koh Luem, three-quarters of a mile long, North and South, and half a mile wide, is as steep as a wall to the southward and westward, and rises from the sea bold and cliffy all around, its peak of a dome-like appearance, and 445 ft. high, being in lat. $12^{\circ} 57\frac{1}{2}'$ N., long. $100^{\circ} 38' 59''$ E. This island, from its conspicuous and peculiar position, has long been considered the principal landmark at the head of the gulf; all vessels bound to the Me-nam make it, and taking their departure from it, run boldly for the anchorage off the bar by day or night.

KOH LAN, lying E. by S. $7\frac{1}{4}$ miles from Koh Luem, is $2\frac{1}{2}$ miles long, a mile wide, and has a remarkable sharp peak, elevated 685 ft. On its eastern side is a village, containing about 200 inhabitants.

The Coast between Tung Plong Bay and Koh Klet-keo, 4 miles to the northward, is high, presenting rocky bluffs to seaward, with sandy bays between. *Lem Pataya* is N. $\frac{1}{4}$ E. 9 miles from Klet-keo, and E. by S. $2\frac{3}{4}$ miles from East Lan, the small island off the East side of Koh Lan. One mile E. by S. of East Lan there is a rocky bank about a cable's length in extent, with 3 ft. on it, which narrows the channel between it and *Lem Pataya* to $1\frac{1}{2}$ mile. From *Lem Pataya*, *Lem Kwan* bears N.N.E. $\frac{1}{2}$ E. distant $3\frac{1}{2}$ miles, and *Lem Kra-bang* N. $\frac{1}{4}$ E. $9\frac{1}{4}$ miles.

KOH SI-CHANG.—W.N.W. 4 miles off *Lem Kra-bang* commences the Koh Si-Chang Group, between which and the coast there is a clear channel. Koh Si-chang, the largest of the group, is $3\frac{1}{2}$ miles long, North and South,

1 mile broad, and its peak, which rises at the North end of the island to an elevation of 697 ft., bears N.E. by N. $15\frac{1}{2}$ miles from Koh Luem. An island named *Kangku*, with a sharp peak 325 ft. high, lies one-third of a mile off the South end of Koh Si-chang, and a rock 10 ft. high, like the hull of a ship, about two-thirds of a mile off the North end; an island, also, called Koh Kam, and three islets, lie off the N.E. side; the western side is quite clear. E. by N. half a mile from the rock 10 ft. high, is a rock with only 4 feet water on it; and there is another with 3 ft. N.N.W. one-third of a mile from the North point of Koh Kam.

The bay on the N.E. side of Koh Si-chang affords anchorage partly sheltered by Koh Kam and the islets to the eastward. The village on the South shore of this bay probably contains about 200 inhabitants, who appear less shy of foreigners than the natives of the coast to the southward.

SI-MA-HA-RA-CHA.*—Koh Si-ma-ha-ra-cha is a rocky islet, about 90 ft. high, lying about a third of a mile from the coast, N.N.E. $\frac{1}{4}$ E. $6\frac{1}{2}$ miles from Lem Kra-bang, and East $6\frac{1}{2}$ miles from the North point of Koh Si-chang. The town of Si-ma-ha-ra-cha stands on the shore about S.E. half a mile from the islet, and contains 500 inhabitants; and the town of Bang Pra, about 3 miles to the northward, has about 1,000 inhabitants. The latter town cannot be approached nearer than 2 miles by a vessel of large draught.

With Si-ma-ha-ra-cha bearing E. by N. half a mile, in $3\frac{1}{4}$ fathoms at low water, or for a large vessel a quarter of a mile farther out on the same line of bearing in 4 fathoms, is apparently the best anchorage at the head of the gulf, for communicating with the shore, for it is better sheltered than any other part.

Supplies.—Fresh water is abundant on shore when the springs elsewhere are dry, and the towns of Si-ma-ha-ra-cha and Bang Pra could furnish large quantities of fresh stock. At the distances of half and three-quarters of a mile southward of Bang Pra are two fine streams of water that run into the sea through the beach, and the natives say that they are never dry, even in the hottest seasons. A boat might fill from these streams at high water, but at low tide the sands dry out so far that they could not be approached within half a mile.

BANG-PASOI.—From Si-ma-ha-ra-cha the coast curves round to the northward, and at the distance of 8 miles is Double Head (native name *Lem Samook*, the Nose Point), a prominent bluff rising from the low land to the height of 270 ft., and appearing at a distance like an island. At 2 miles north-eastward of Double Head stands the village of *Anhin* (a royal watering place), and 4 miles E.N.E. of Anhin, in the depths of a shoal muddy bight, is the large town of Bang-Pasoi, a place of considerable importance. The

* Si, beautiful; maha, great; racha, royal, in Pali.

town is governed by a high noble, and has a good market, but unfortunately it is only accessible from the sea at high water.

The **BANG-PA-KONG RIVER** empties itself into the gulf at 4 miles northward of Bang-Pasoi, and appears to be a fine navigable stream; from hence to the Me-nam entrance the coast is all low mangrove.

ME-NAM CHAU-PHYA or Bangkok River has on the western point of entrance a clump of high trees like a small mound, elevated about 30 ft. above the surrounding mangrove, and this is the first land seen on approaching from the southward. From this mound Pilot Island or Koh Luem bears S. $\frac{3}{4}$ E. $34\frac{1}{2}$ miles; Double Head, S.E. by E. $22\frac{1}{2}$ miles; and Koh Si-chang Peak S.E. by S. 25 miles.

LIGHT.—A pile lighthouse is erected on the western side of a sand-bank, inside the bar of Bangkok River, and from it, in the year 1874, a *fixed bright light* was shown at an elevation of 44 ft., visible 10 miles off. The lighthouse lies 3 miles S. by E. $\frac{1}{2}$ E. from the West entrance point of the river, and in lat. $13^{\circ} 29' 26''$ N., long. $100^{\circ} 35' 20''$ E.

The river is deep and free from shoals for a distance of 60 miles. At about 3 miles within the entrance, on the eastern bank, is *Paknam*, where vessels must anchor to discharge guns and ammunition, and take on board a custom-house officer. Here is a fair market, from which vessels remaining at the bar anchorage can obtain their daily supplies of fresh food, but it is considered better to send to Bangkok for stock for a voyage.

Paklat Lang, on the western bank of the river, 4 miles above Paknam, is the entrance to a canal which saves a circuit of nearly 10 miles to boats proceeding to or from Bangkok; ships must take the circuitous route by the river. The entrance is marked by a guard-house on each side, and its vicinity may be known by a long range of batteries half a mile above on the same side of the river. The canal re-enters the river alongside some floating houses at the small village of Paklat Bon.

BANGKOK, the capital and seat of trade of Siam, is about 25 miles from the sea, following the river course, or about 14 miles direct. The first important objects seen, in approaching the city, are the American consulate on the West, Puddicombe's ship-building yard and Russell and Co.'s godowns on the East. Above these are some handsome temples, the French consulate and cathedral, the custom-house, British and Portuguese consulates, and the godowns of some English merchants, all on the East bank; the only conspicuous object on the other side being a fort nearly opposite the British consulate. Beyond this the river on either bank is lined with floating houses, over which can be seen thick clusters of wooden houses built on piles, and several magnificent temples. The second creek above the British consulate leads to the Sampeng Bazaar, an extensive and well-supplied market. Farther on is the walled city, on the East bank; and in the opposite suburb are

some European stores and lodging-houses, the palaces of the Pra-klang and Kalahome, the old British factory, palace of the Kromma Luang, several European merchants' residences, and some temples, one of them a lofty pyramidal building, above which vessels seldom anchor.

In the city itself are many temples conspicuous for beauty. The palaces of their Majesties the First and Second Kings are extensive buildings, with a long river frontage furnished with elegant and commodious landing-stages for royal use. Floating-houses continue for 3 or 4 miles above the First King's palace, with few interruptions. The population of Bangkok is estimated at 300,000.

"In running for the anchorage off Bangkok River, make Koh Luem, and from that departure steer boldly up, allowing for a westerly set, according to the strength of the N.E. monsoon. The lighthouse will be seen before the land is made, and is an excellent guide for running in; bring it to bear North, and run for it, keeping the lead going, and anchor according to the draught of the ship. During the N.E. monsoon the land is generally obscured by smoke, so that the lighthouse will be the only mark to show the mouth of the river. *Anchorage* during the N.E. monsoon, lighthouse bearing N. 35° W.; during the S.W. monsoon, lighthouse bearing N. 17° E. *Pilot-boats* cruise between Koh Luem and the bar, having competent European pilots on board; they generally anchor vessels in about 6 fathoms water, with the lighthouse bearing as above, according to the season, and distant about 5 miles."—*Lieut. Nichols, U.S.N., 1873.*

Owing to the shifting nature of the bar, it is not safe to enter without a pilot. The pilot boats carry a flag red and white horizontal.

It should be borne in mind that the soundings become hard when nearing the East banks, which are composed principally of sand, and very soft when nearing the West flat, which is all soft mud.

Lieutenant Ellis, in 1868, examined the entrance, and searched in vain for the four piles of stones sunk across the mouth of the river, and said to have as little as 3 ft. over them. He found one mass of stones about two-thirds of the way across the channel on the eastern side, but over which there was 1½ fathom at low water; he could find no less water anywhere about the entrance.

The *best anchorage* off the bar for communicating with the shore is in 3½ fathoms, with the two river points well overlapping, and the West point mound bearing N. ¼ W. or North, distant 6½ miles.

Caution.—Approaching the bar of the Bangkok River from the southward in the N.E. monsoon, it will be necessary, when near the head of the gulf, to allow for a westerly current which occasionally runs with great strength along the edge of the bank, and vessels set to leeward by it have found considerable difficulty in regaining the anchorage. For this reason boats work-

ing out of the river should not attempt to cross the bar before they can make sure of fetching their ships.

The Tides near the entrance are very irregular. It is high water at from 4^h 30^m to 8^h 0^m, and the rise varies from 7½ to 11 ft. At and near the springs there were only two tides in 24 hours, and four tides at neaps. These irregularities, caused by the gradual change from one to the other, are occasionally increased and confused by changes of wind in the gulf.

In the month of April the river is at its lowest level, and the tide observations during this month gave 3 ft. on the bar at low water springs, and 10½ feet at high water. Towards the end of the rainy season (the beginning of October) the river is much swollen, and its banks are frequently flooded and the country inundated. The bar has then 5 ft. on it, at low water springs, and 14 and 15 ft. at high water, and the water is said to be quite fresh at low tide.

Outside the bar and near the anchorage the flood sets to the westward, and the ebb to the eastward, altering its direction occasionally according to the strength of the river stream. Along the eastern shore of the gulf towards Cape Liant the ebb sets to the southward and flood to the northward.

It is high water at Cape Liant about the same time as at the bar of the Bangkok, and the rise is only 6½ ft.

Tachin River.—The mouth of this river lies about 20 miles to the westward of the Bangkok River; it was navigated for about 35 miles by H.M.S. *Teazer*, in November, 1871. This river has a similar bay to that of the Bangkok River, but the entrance is more difficult to distinguish, the land in the neighbourhood being low, and covered with trees.

In clear weather the high land of Bang-Pasoi brought to bear E. by S., will lead to a position off the bar, which may be crossed on a N.N.W. course. Tachin River has about the same general depth, and is of the same general width as Bangkok River.

The *Teazer* anchored off *Maconchisi* in lat. 13° 39' N., long. 100° 11' E., nearly 35 miles from the mouth of the Tachin. At Maconchisi are the new mills of the Indo-Chinese Sugar Company; the sugar is at present sent in barges by canal to Bangkok, but it is expected that vessels will shortly navigate the Tachin River as easily as they now do the River Bangkok, whereby an expensive freight will be saved.

CHAPTER XI.

THE COAST OF COCHIN CHINA, TON-KING, ETC.

THE coast described in the present section borders the empire of Anam, which is 960 miles in length from North to South, and averages about 300 miles in breadth. It is divided into three distinct portions, French Cochin China or Saigon, Cochin China, and Tonquin. The first, of which Saigon is the capital, was ceded to the French (together with the free right of navigating the several arms of the Cambodia River), by the Emperor of Anam, in 1863. Saigon was first occupied by the French in 1857. Subsequently additional territory has been acquired by the French, and several ports have been opened to commerce. Kiung-Chow (Hoi How), in Hainan, is now open; the ports of Haip-hong and Han-oi, in Tonquin, were declared open to commerce in a treaty signed in August, 1874, and the port of Quin-hon in November, 1875. The Empire of Anam contains from 12,000,000 to 15,000,000 of inhabitants, and the French territory 900,000. There were in the latter only 10 European British subjects resident in 1874. The chief export is rice: of this article, 340,000 tons were exported from the French territory of Saigon in the year 1876, chiefly to China and Java. Cotton, pepper, sugar, silk, coffee, fish, &c., are also exported. The trade is chiefly in the hands of Chinese merchants.

The view which the country of Cochin China and Tonquin presents from the sea is that of a varied landscape, composed of bold headlands, picturesque valleys, well cultivated slopes, extensive downs, and low plains, frequently terminating in sand-hills with a back-ground of rather lofty mountains in the distance.

1.—COCHIN CHINA.

The Coast of Cambodia, or Lower Cochin China, from Cambodia, or Camao Point, its south-western extreme, to the Saigon River, is very low land, inundated by the sea at times; and in most parts the trees are just discerned nearly level with the water's edge, from the deck of a large ship, at the distance of 11 or 12 miles. The whole coast is fronted with shoal banks of sand, which project 10 or 12 miles from it in some places, having

2½ and 3 fathoms on them, and 6 to 7 fathoms near their edges. The soundings are regular in the offing, and decrease gradually until the edges of these banks are approached: then from 9 or 8 fathoms the water shoals suddenly in some places; the bottom near the edges, and also a considerable distance seaward, is mostly fine sand and oaze.

As the coast here is very low and destitute of any particular mark, it must be approached pretty closely to observe its bearing, but this must be done with great caution; when its trend changes from eastward to north-eastward, the entrance of the Cambodia River will be abreast.

ROYALIST BANK.—The late Lieut. D. M. Gordon, of H.M. surveying-vessel *Royalist*, sounded on a bank, about S.E. by E. 24 miles from Pulo Obi, which he thus described:—"On January 15th, 1848, we discovered a bank, having 17 fathoms water at each end; and crossing it in a S.S.E. direction, we continued in from 10 to 6 fathoms, sand and hard bottom, for about 1½ mile, where we again deepened to 17 fathoms. Pulo Obi was occasionally in sight through the haze, but no correct bearing could be obtained. I could not see the bottom, and am not positive that it was coral, the lead only bringing up reddish sand. We made it in lat. 8° 12½' N., long. 105° 11½' E."

There is another patch of 6 fathoms upon the Admiralty chart, about E. by N. ½ N., 20 miles from the Royalist Bank.

The **BROTHERS** are two small islands, about 2½ or 3 miles apart, N.E. by E. and S.W. by W., lying about 80 miles eastward of Pulo Obi, and nearly 40 miles from the coast of Lower Cochin China. The westernmost, in lat. 8° 34' N., long. 106° 11' E., is a barren rock, not more conspicuous than Pedra Branca at the entrance of Singapore Strait, and has high breakers on its eastern side during blowing weather. The easternmost is a high round islet, with trees on its summit, bearing W. by S., 18 miles from Pulo Condore.

PULO CONDORE GROUP (called *Con-non* by the Cochin Chinese), lies about 50 miles from the coast of Cambodia or Lower Cochin China, and 60 or 70 miles to the westward of the fair track of vessels bound up or down the Main route of the China Sea, but right in the track of those proceeding between Singapore and Saigon. The principal island is nearly 9 miles in length N.E. and S.W., from 2 to 4 miles in breadth, and the head of the landing place at the village in Great Bay, on its S.E. side, is in lat. 8° 40' 57" N., long. 106° 36' 11" E.* It is encompassed by several islands much smaller, which are mostly all high and covered with trees, and is formed of a ridge of mountains, the summit of the highest of which is elevated 1,954

* The mean of observations obtained in 1862 by the officers of H.M. surveying-vessels *Swallow* and *Rifeman*.

feet, and has been seen 50 miles off in clear weather. The island is thinly inhabited by people from Cambodia and Cochin China, who reside in a village on a plain at the bottom of Great Bay. The French are in possession of the island, which they make use of as a penal settlement.

The approaches to Pulo Condore are safe. The coral banks only occur near the shores, and more particularly in those parts that are sheltered from the N.E. and S.W. monsoons.

The **CAMBODIA RIVER** is of great commercial importance. It has been termed the Me-kong, or Me-kiang, but by the French surveyors it is called the Cambodia River. Taking its source in the mountains of Thibet, it traverses two of the south-western provinces of China, and passing along the entire western frontier of the Annamite empire, enters Cambodia, where it divides into three branches or arms, two of which flow through Lower Cochin China, and are there known as the rivers *Hau-giang* and *Tien-giang*.

This great river, the surveys of which are the result of the labours of M. Manen and other French hydrographic engineers, is navigable for a great distance into the interior. The waters commence to rise in the month of May, attain their maximum in October, and decrease until March. They rise 26 to 33 ft. at Nam Van, and 17 ft. about Chau-doc and the Rach Ong Nu. Tides are only felt during the season when the waters are low, and their height is 10 inches at Nam Van, and nearly $4\frac{1}{2}$ ft. at Chau-doc.

DELTA of the CAMBODIA RIVER.—The several mouths of the Cambodia River form a delta more than 60 miles in extent, in a N.E. and S.W. direction. The land is low, and subject to frequent changes in consequence of the accumulation of the rich alluvial deposit brought down by the different branches of the river. Shoal banks front the whole delta, and extend so far to seaward that the land is nearly always invisible from their outer edges. The 5-fathom line of soundings bounding these banks passes about 30 miles to the westward of Pulo Condore, and imagining a line to be drawn from that island to Cape St. James, the 5-fathom line will be about 8 or 9 miles distant from it at the Co-khien mouth, and about 3 miles at the Cuatieu mouth. Between the extreme mouths of the river, from lat. $9^{\circ} 20'$ to 10° N., lies the most advanced part of the coast, and it is in front of this part that the bank projects farthest. The soundings near its edge decrease suddenly from 10 or 11 to 3 fathoms, and the land, which is here 7 or 8 miles distant, is generally invisible.

Many ships have gone on shore in this locality, on account of the great risk arising from the rapid decrease of the soundings and the absence of any land marks. It is therefore necessary in approaching this coast from the offing to exercise extreme prudence, and the greatest possible caution should be observed when navigating to the westward of the line of Cape St. James bearing N. by E. $\frac{1}{2}$ E. At the first cast under 11 fathoms, or as soon as trees become visible, it is necessary to haul out quickly to the eastward, especially

during the N.E. monsoon, when the currents set strong on to the banks to the south-westward. The direction of these currents vary from West, S.W., and S.S.W., and their rate, which depends a great deal upon the force of the wind, is sometimes as much as 40 or 50 miles in 24 hours. Near the mouths of the Cambodia River the rate of the current increases with the flood and diminishes with the ebb.

The waters of the Cambodia are charged with yellowish mud, and discoloured water may at times be seen 7 or 8 miles out at sea towards the end of the ebb, but it is driven back by the flood. This change of colour indicates the approach to shoal water, and is therefore a limit which it is not prudent to pass.

The formation of deposit is so rapid in these parts, that the limits which we have given may perhaps be altered in a few years. There is so much sea on the edges of these banks, and the currents which set towards the land are so strong, that this coast should be absolutely avoided during the N.E. monsoon.

The mouths *Ba-thac* and *Dinh-nan*, which limit to the westward the delta of the Cambodia River, bear N.N.W. $\frac{1}{2}$ W., and are distant 45 miles from Pulo Condore. The shoal banks fronting them extend about 9 or 10 miles, and are for the most part uncovered at low water. The bar at the entrance of the former has not been completely sounded; upon that of the *Dinh-nan* there are 8 ft. at low water spring tides.

The mouths *Cong-hau* and *Co-khien* are about 20 miles farther to the north-eastward; the shoal banks fronting them extend 10 or 11 miles, and partly uncover. Upon the bar fronting these entrances there are but 6 ft. water, low spring tides. There is a clump of trees on the right bank of the *Cong-hau*, and a fort on the right bank at the entrance of the *Co-khien*.

The *Ben-nhau* mouth, 7 or 8 miles farther to the north-eastward, appears to be more accessible; from 8 to 10 ft. was found upon the bar at low water springs, but the channel is long, tortuous, and difficult. Two torts, one upon each point of the entrance, defend it. It was near this entrance that the *Weser* was lost, the wreck of which is, or was very recently, still visible upon the bank to the southward of the entrance, at a distance of 8 miles.

A few miles farther to the north-eastward is the entrance of the *Ba-lai*, upon the bar of which 9 or 10 ft. water was found at low water spring tides.

The *Cua-dai* and the *Cua-tieu*, the two northernmost mouths of the Cambodia River, are defended by forts built upon the banks at their entrances. On the bar of the former but 5 or 6 ft. was found, and on that of the latter 6 or 7 ft., at low water springs. The shoal banks, near which it is necessary to pass in entering these mouths, are numerous and extensive, the shallow water covering them forming large plateaux of very dangerous breakers.

In the actual state of things it would be useless to give instructions for entering these different mouths, the banks and channels being subject to

change of position; the coast, moreover, is very low, and covered with a vegetation so uniform, that in all probability any bearings we might give here would but have the effect of leading into error. None of these mouths are therefore practicable, in our opinion, unless they be first carefully buoyed, or unless with the assistance of a local pilot.*

DELTA of the RIVER DON-NAI.—Six miles to the eastward of the Dongtranh mouth lies *Cangio Point*, which limits on the West the bay of Ganh Ray, into which flows the Don-nai, as well as the *Viam-tcheou*, the *Viam-kai-mep*, the *Ba-bou*, the *Tchavia*, and the *Rach-lap*.

Caution.—In front of the mouths Cua-dai and Cua-tieu, and to the south-eastward of Cangio Point, the banks are the most numerous and extensive, and as they limit on the West the channel leading to Saigon, it is necessary to be extremely careful that the vessel is not drifted towards them by currents.

When the vessel is abreast of the Cua-dai mouth, or about 15 miles distant from the light on Cape St. James, take care that the light is not brought to the East of N.E. $\frac{3}{4}$ N., upon which bearing at that distance it leads in 4 fathoms about $2\frac{1}{2}$ miles outside the dangerous banks and breakers at the entrance of the river. From thence that bearing of the light appears to be a prudent tacking mark when standing towards the banks fronting the shore; it is however possible, when distant from 5 to 7 miles from Cape St. James, to stand farther to the westward, until the light bears N.E. $\frac{1}{4}$ E., but we consider it advisable not to do so, especially in large vessels.

DON-NAI or SAIGON RIVER.—The *Phuoc-binh-giang*, commonly called the Don-nai, or Saigon River, has not been surveyed higher up than the cascades, situated about 25 miles above *Bien-hoa*, the chief town of a province of that name, and which lies 12 miles to the N.E. by N. of Saigon. It does not become navigable until below the ancient barriers, at the point where the Tay-giang branches off, 6 miles below *Bien-hoa*. From thence it follows a south-easterly direction for 3 or 4 miles, and then trends with several windings to the south-westward, until it receives the Saigon arm and forms the Tam-giang-khau, which runs nearly North and South. At Phami Point it divides into two arms; the one turning to the westward is the Loirap, that turning to the south-eastward reassumes the name of the Phuoc-binh-giang or Don-nai. Four or five miles below the point at which the Loirap diverges, a smaller branch, named Rach-mon-gom, turns to the eastward. This sepa-

* At present the only port useful for trade is Saigon, nor is it probable that any other port will be utilised, for the whole country being intersected with numerous rivers and canals, it is an easy matter to convey its products to Saigon, the river leading to which can be safely and easily entered at any time by the largest class of ships. The Company's ships which traded to Cambodia in the 16th century frequently got aground in the river, and it appears always to have been an intricate navigation for large ships.

rates into two streams, both of which rejoin the main river at one point, and form that part known as the Quatre-bras (four-arms). The Don-nai disembogues at Cangio Point in Ganh Ray Bay, 8 miles below Quatre-bras.

The Saigon arm of the Don-nai is its sole affluent, and, like it, is replenished by the inundations from the great river of Cambodia. It flows from the N.W. to the S.E., leaves on its right the mountain of Badinh, passes by the Cai-cong, Thu-dau-mot, and Dai-thieu, and, pursuing a very serpentine course, passes Saigon, joining the Don-nai about 8 or 9 miles below that city.

CAPE ST. JAMES, bearing from Pulo Condore about N. by E. $\frac{1}{4}$ E., distant 98 miles, and forming the eastern boundary of the entrance to the Don-nai or Saigon River, is the first high land seen when coming from the south-westward, the whole of the coast from thence to the Gulf of Siam being very low drowned land. The mountain forming the cape has at its southern part a low gap, and on its northern part a high gap, which give it the appearance of three islands when first seen at a distance of about 30 miles, but on a near approach the connexion is perceived. The extreme of the cape is a narrow tongue projecting to the southward, and at a short distance to the eastward of it is a small islet.

The village of *Vang-tau* stands in *Cocoa-Nut Bay*, on the western side of Cape St. James, about $1\frac{1}{2}$ mile from its South extreme. The bay is about a mile long and half a mile deep, the beach being lined by a grove of cocoa-nut trees. The shore between the extreme of the cape and the bay is bold, and may be passed at half a mile with safety; but the bay is shallow and affords anchorage only for vessels of the smallest class. At the southern part of the bay the soundings decrease pretty regularly from 5 to 3 and 2 fathoms, but at the northern part they decrease suddenly from 5 to $1\frac{3}{4}$ fathoms; vessels, therefore, intending to anchor off this bay should approach it with caution, and anchor in 7 or 6 fathoms; the bottom is soft mud, and the holding ground good. "Be careful not to drop the anchor on a sunken rock in 7 fathoms of water; the extreme S.W. point of the bay bearing S.E. by E., and the N.W. point N.E. by E."—*Capt. A. J. Loftus*.

Water.—Good water may be obtained from wells, easy of access, at the village of Vang-tau; water may also be found at a village in the Ganh Ray River, a short distance from the point marked in the chart.

Lights.—A *fixed white* light of the first order is exhibited from a light-tower, 26 ft. high, standing on the southernmost of the heights of Cape St. James, and 776 yards within the South extreme of the cape. The light is elevated 482 ft. above the mean level of the sea, and is visible in clear weather at about 28 miles. The position of the light-tower is lat. $10^{\circ} 19\frac{1}{4}'$ N., long. $107^{\circ} 5' 25''$ E.

A *fixed white* light, elevated 32 ft. above the sea, and visible 10 miles, is

exhibited from a lightvessel moored head and stern N.W. and S.E., in 5 fathoms water, close to the right or West bank of the Don-nai River, N.W. $\frac{1}{2}$ W., distant $2\frac{1}{4}$ miles from Cangio Point.

CANGIO or BASSOK BANK, forming the western boundary of the entrance to the Don-nai River, is very extensive, and has but 3 to 4 ft. water over it at low tides. From its southern extreme, in 2 fathoms, the lighthouse on Cape St. James bears E. by N.—northerly, $4\frac{3}{4}$ miles, but shoal soundings of 3 and $3\frac{1}{4}$ fathoms extend from thence to a $2\frac{1}{2}$ -fathoms patch, which lies S.W., from $3\frac{1}{4}$ to 4 miles from the lighthouse. The edge of the bank from the southern extreme in 2 fathoms, takes a north-easterly direction till abreast of Vang-tau, when it trends to the northward as far as abreast of Point A, where the navigable channel is about $1\frac{1}{2}$ miles broad; from thence the bank curves away gradually towards Cangio Point, passing it nearly three-quarters of a mile off.

The edge of the Cangio Bank may generally be known by rows of fishing stakes, the extremes of which are usually close to the deep water; these stakes, however, cannot be depended upon for marks, being occasionally shifted by the natives.

Shoal Banks at the Entrance.—The shoal path, lying about $2\frac{1}{4}$ miles S.E. of the 2 fathoms' extreme of the Cangio Bank, is a hard bank of sand and gravel about half a mile in extent, with 13 to 15 ft. water over it. From its north-eastern extreme the lighthouse on Cape St. James bears N.E. by E., distant 3 miles. Between the shoal patch and the Cangio Bank the depths are 3 and $3\frac{1}{4}$ fathoms; $3\frac{1}{2}$ and 4 fathoms extend a mile to the eastward of it, and irregular soundings of $3\frac{1}{2}$, $5\frac{1}{4}$, and 4 fathoms, about $1\frac{1}{2}$ mile to the north-eastward; from thence to Cape St. James the depths are 6 to 8 fathoms.

The Formosa Bank, the West extreme of which lies S.E. by E. three-quarters of a mile from the South point of Cape St. James, is a mile in extent E. by N. and W. by S., and composed of hard sand and gravel, with but 13 to 15 ft. water over it. About a mile E.N.E. from it is a patch of 3 fathoms, about half a mile in extent.

Two miles S.S.E. from Cape St. James there are shoal patches of $4\frac{3}{4}$ fathoms on a bank of irregular soundings, which extends from thence about E. by N., nearly 3 miles. Between this bank and the Formosa Bank and 3 fathoms patch, are depths of 6 fathoms, and 6 to 7 fathoms in other directions from it.

The Formosa Bank, and the shoal patches to the southward and eastward of it, will be avoided if the lighthouse is not brought to the westward of N. by W.

The Channel at the entrance of the Don-nai forms an elbow to Cangio Point, the first land met with on the left hand when entering. It is 10 miles long, and, between the North point of Cocoa-Nut Bay and the Cangio Bank,

2 miles broad, but gradually narrows to three-quarters of a mile abreast of Cangio Point, where the river is usually considered to begin. The channel is bounded on the West and South by the Cangio Bank, on the East by the cape land, and a mud bank which extends about 2 miles from the East side Ganh Ray Bay, and on the North by a mud bank which extends nearly 2 miles to the eastward of the land opposite Cangio Point; these mud banks are separated by a passage with 5 to 8 fathoms water in it. The bottom of the channel is soft mud; the general depths are 7 to 12 fathoms, and ships may anchor in any part of it.

The entrance of the river at Cangio Point cannot be made out when distant, the land being very low, and covered with brushwood. Should the guard-ship be moored in her proper position at Cangio, the trees and her hull will be seen close together, forming an excellent mark for the entrance of the river.

CANGIO is a small fishing village on the right bank of the river, not far from Cangio Point, but it was, in 1862, nearly deserted on account of the numerous pirates in the river.

Supplies.—Sometimes a few fish, ducks, pigs, eggs, and a small supply of vegetables may be bought at the village, at moderate prices. The native boats are numerous here, and sail very fast, with two and sometimes three triangular sails made of matting, and, if wanted, may be hired for a small sum to go to Saigon or elsewhere.

Guard-ship, Pilots, &c.—A French frigate is stationed as a guard-ship off Cangio, but she is sometimes lying off Cape St. James. All vessels arriving must be brought to an anchor where she is, their small arms and ammunition, of whatever kind and quantity, must be packed up, numbered, and taken on board of her, and the manifest, port clearance, list of passengers, and the ship's draught of water must also be shown to her commanding officer; after which a receipt and pass to proceed up the river will be granted. Printed port regulations may be obtained on board, and also pilots for the river, if necessary. Rate of pilotage 3 dollars per foot.

Caution.—Should the guard-ship be at her station off Cangio, large vessels should not pass on her South side, there being no room between her and a hard bank of sand, extending some distance from the South bank of the river. The best anchorage is midway between the frigate and the North bank, in 8 fathoms, soft bottom. By proceeding farther into the river much deeper water will be found, making it sometimes very awkward for a large ship to get the anchor in the strength of the N.E. monsoon.

Banks and Dangers in the River.—Banks extend from both sides of the river between Cangio Point (B) and the points marked E. and F. considerably narrowing the channel, which must there be navigated with caution; the soundings are irregular, and the banks shoal suddenly. The river from thence to Point P is free from danger, with the exception of a bank pro-

jecting a short distance from Point M, another from the point opposite N, and another from Point O.

Coral Banks.—There is a coral bank in the bend opposite Point P, which extends more than half-way across the river; along its edge are $1\frac{1}{2}$ and 2 fathoms water, with less depths near the shore. There is also a detached bank with as little as $1\frac{1}{4}$ fathom water over it between the southern part of the shore bank, and the shore just to the southward of Point P; and another detached bank, with $2\frac{1}{4}$ fathoms water over it, just to the northward of Point P.

Mr. Phillips, master of H.M.S. *Vigilant*, remarks that these banks are well buoyed; and upon the French charts they are or were* marked as follows:—

Three *red* buoys are placed upon the outer edge of the shore bank.

A horizontally striped *red* and *black* buoy is placed upon the South extreme of the lower detached bank, abreast of the southern red buoy on the shore bank. A *black* buoy is placed upon its northern edge; and a *red* buoy marks its western limit.

A perpendicularly striped *black* and *white* buoy is placed on the northern end of the northern detached bank.

Three trees with their stems painted in *black* and *white* bands, mark the limits of these dangers on the eastern or right hand bank of the river, going up; and a tree, similarly painted, marks the northern limit on the opposite side of the river.

The best channel for large ships appears to be between the *red* buoy on the western edge of the southern bank and the shore on the left hand, going up; and afterwards between the middle *red* buoy of the shore bank, and the perpendicularly striped *black* and *white* buoy on the northern detached bank. The usual plan, however, is to closely hug the shore on the left hand, going up the river.

A shoal bank projects some distance from the shore at Point S at the junction of the Loirap, to avoid which vessels going up should keep over on the left bank or eastern side of the river.

Dangerous Bank commences nearly $1\frac{1}{2}$ mile above Point T, and extends about $3\frac{1}{2}$ miles along the bank on the eastern side of the river, from which it is separated by a narrow channel of 3 fathoms. It reaches about halfway across the river, and is composed of sand and rock, the latter prevailing at its South end; it is also coated with mud and clay. Several ships have been much injured on this bank, and have experienced great difficulty in getting off it. When beating up or down this reach, tack just before getting in mid river, and never shoal the water anything under 6 fathoms.

* We have received no notice of the arrangement of the buoys as above described, having been altered since the French system was adopted of marking channels with *red* buoys and beacons on the starboard side, entering from sea, *black* to port, and *red* and *black* to be passed on either side.

Dangerous bank extends to abreast of Point V, where the river turns sharply from a N.N.E. to a W.S.W. direction; from thence to Saigon the river is free from danger.

The CITY of SAIGON, the capital of the French possessions in Cochin China, stands on the right or West bank of the Don-nai, about 45 miles from Cape St. James. It was formerly the principal arsenal and marine depôt of the king of Cochin-China, who, in 1790, caused it to be extensively and strongly fortified by Colonel V. Olivier, a French officer in his service. Saigon consists of two towns connected by a straggling suburb; Pingeh with the citadel being on the West side of the river, and the commercial town being on a tributary stream navigable by large boats. It is regularly built and intersected by canals, some of which are lined with quays of stone and brick-work. The houses are mostly of earth, one story high, and thatched with palm-leaves. The citadel, fortified in European style, contains barracks, officers' quarters, and the governor's residence. Saigon has also a naval yard and arsenal, a palace, and large rice magazines. It communicates with the Mekong by a canal 20 miles in length, and has a foreign trade with China, Siam, Java, the Philippines, &c. In 1876, there were 317 vessels of all nationalities, and aggregating 234,299 tons register, loaded at Saigon, of which 215 vessels, of 158,151 tons, were British. The markets are well supplied with provisions, especially fish, and the environs fertile and carefully cultivated. Exports, see page 428. A railroad from Cholon to South Fort, a distance of 6 or 7 miles, was determined on in 1875.

The observatory, about half a mile from the principal landing-place, is reached by a straight road. It is, according to the French charts, in lat. $10^{\circ} 46' 40''$ N., long. $106^{\circ} 41' 52''$ E. The observations obtained in 1853 in H.M.S. *Rifleman* agree very closely with this position, viz., lat. $10^{\circ} 46' 39''$ N., long. $106^{\circ} 42' 31''$ E.

Anchorage.—The anchorage for men-of-war is off the city in from 5 to 7 fathoms; merchant vessels are obliged to anchor below the mouth of the Viam-Benghé. Ships' papers must be shown to the harbour master on arrival, and a berth for mooring ship will be pointed out by him.

Supplies.—Captain Loftus says that water is obtained from a well at the Chinese bazaar on the Viam-Benghé; it is brought alongside in boats. The fish are small and black, and inferior eating. Ducks and fowls sell for about three dollars per dozen; vegetables are scarce. There is but a limited quantity of ships' stores, and little variety for visitors.

A plentiful supply of excellent beef was obtained here by H.M.S. *Rifleman*, and also snipe at moderate prices.

Climate.—During the day the heat is very great, the thermometer often rising to 100° in the shade, and during the night also the air is very close and the heat oppressive.

Few strangers escape from what is called the Saigon fever; it seems to

be of a chronic form, and not easily got rid of. Emetics, purgatives, and large doses of quinine are used for its cure. Attacks of cholera and sun stroke are also frequent. Bathing, moderate exercise in the shade, spare regular diet, and ample rest, are the best preventives. Exposure to the sun, indolence, costiveness, irregular diet, and drinking fermented liquors must be avoided.

Tides.—At Cape St. James it is high water, full and change, at 2^h 30^m; * at Cangio Point at 3^h. Upon the bars of all the Cambodia rivers, as far as the mouth of the Ben-nhau, it is high water nearly at the same time as at Cangio. Equinoctial springs rise 13 ft., neaps 9 ft. Spring tides run strong; ebb tides last longer than the floods. Neap tides are feeble and irregular; sometimes strong currents set into the river at that period, and raise the height of the tides a little. On the coral bank up the river it is high water at 3^h 50^m; and the rise is the same. At Saigon the tides are tolerably strong and regular about the springs; it is high water at 4^h 30^m, and the rise is 11 to 12 ft.

“Neaps are weak and irregular, with strong under currents and very little rise and fall. Vessels dropping down during neaps will find great advantage in having a square sail sunk under the stern, with two guys leading forward. From the pitch of the cape the flood sets to the Cangio Bank, almost direct to the mouth of the river; the ebb takes the opposite direction. The passage up the river generally occupies two days.”—*Captain Loftus*.

Directions for making the Land and Entering the Don-nai River.—In the N.E. monsoon ships from the southward should make the land well to windward of the port, or they will be set quickly to leeward of Cape St. James, and too near the Cangio Bank, by the flood tide and the sea current setting about S.W. by W. along the coast. But a strong set in the opposite direction may be expected with the ebb tide, which, at the full and change of the moon, begins to run out of the river about midnight.

Entering the River, the fairway mark is the two points of the cape land northward of Cocoa-nut Bay in one, N. by W. $\frac{1}{2}$ W.; this will lead between the shoal patches in regular soundings of 6 or 7 fathoms.

Cape Bakek just open of Cape Ti-wan, bearing N.E. by E., leads to the southward of the shoal patches which lie south-eastward of Cape St. James, and the lighthouse bearing N. by W. leads to the westward.

The western extreme of the North point of the cape land (A) bearing North, will lead clear of the shoal patch on the western side of the channel, and bearing N. by E. $\frac{1}{4}$ E. will lead between the shoal patch and the Cangio Bank in 3 fathoms least water.

* Mer de Chine, p. 210. Capt. Loftus gives 11^h as the time of high water at the cape, and 5^h 30^m at Saigon.

In the South-west Monsoon, when the East end of Pulo Condore is brought to bear South with a westerly wind and lee current, steer northward, and the vessel will soon gain the edge of the bank fronting the Cambodia rivers, and extending to the mouth of the Saigon River.

Strong freshes run out of these rivers during this monsoon, and join the sea current, whereby vessels are obliged to keep the edge of the bank aboard to prevent being set to leeward of the meridian of Cape St. James.

Continue along the edge of the bank, with the lead going in not less than 10 fathoms, and keep on until Cape St. James bears about N.N.E., then steering direct for it on that bearing, will lead to the fairway of the entrance to the river.

CAPE ST. JAMES to SAIGON.—A steam vessel will have no difficulty in proceeding up the Don-nai River for the first time, guided by the chart only, and without the assistance of a pilot, by keeping as nearly as possible in mid-channel, and being careful in rounding the points. Of course, near the Coral Banks and Dangerous Bank, it will be necessary to be guided by the buoys (page 436) which mark the former, and to keep over to the fort side when passing the latter. A stranger may proceed boldly up to the city, as there is plenty of room to anchor and swing upon the flood tide. It is a different matter however with sailing ships, and the following directions for their guidance are by Captain A. J. Loftus, commander of the barque *Kensington* of Singapore, 1862.

In the North-east Monsoon.—Having rounded Cape St. James at a moderate distance, either with the flood or ebb, keep mid-channel, and steer for point A until it bears East, distant three-quarters of a mile, then steer N.W. $\frac{1}{4}$ W. till the trees on point B. bear W. $\frac{1}{4}$ N., or the guard ship W. $\frac{1}{2}$ N.; at the same time point A must be brought to bear S.E. by E. Then steer W. by N. for the entrance of the river. Take care to make these courses good, attending carefully to the lead. Having arrived at the entrance, bring up midway between the guard ship and the North bank in 9 fathoms water. Do not pass inside the guard ship.

When turning to windward between Cape St. James and Cangio Point, the lead should be kept constantly going, and the water not shoaled to less than 7 fathoms on either side, the banks being steep-to in many places; with a hard bottom the vessel is on the edge of the bank.

Having complied with the regulations of the guard ship, weigh at low water, with a commanding breeze from the eastward, and proceed towards point E, keeping in mid-channel, and giving the small islet lying off point E a good berth.

When near point E,* brace up and luff, run close to it through the next

* Many seamen have mistaken point D for that of E, and having luffed round it have got aground on hard sand.

reach. Should the wind be scant, make a tack and proceed on to point J, keeping it close aboard; then brace up and luff along the South reach, giving the mouth of a river below the point a moderate berth; steer on in mid-channel until near point M, then haul up, and if the ship is handy, work through the East reach, otherwise back and fill, or drop through if the tide be strong. Make sail again at the end of the reach and proceed, rounding point O in mid-channel, as there is a little shoal water off it. Keep very close in to that side of the river until the painted tree that grows out of the water at point P* and the Coral Bank are passed, giving the tree a berth of half a ship's length.

Having passed the bank, run on, keeping clear of the bight Q, which is shoal. When off point T, cross over to U, sailing along that side at a convenient distance. Keep close to point V if the wind be scant, and luff through the next reach; then keep away and brace sharp up at point W, keep a close luff through the South reach, and bring up below the shipping.

In the South-west Monsoon.—Having arrived at Cape St. James, proceed on and anchor in mid-channel off point A if the tide is ebbing; if not, brace up and work to windward in a N.W. direction until point A is brought to bear S.E. by E., and the group of trees on point B W. $\frac{1}{4}$ N., or the guard ship W. $\frac{1}{2}$ N., then work up for the mouth of the river on these bearings, keeping the lead constantly going, and not shoaling the water under 7 fathoms.

This is the rainy season at Saigon, and the prevailing winds are from the West and S.W. Ships are able to partly drop and sail up the river in this monsoon. But when under canvas be prepared for heavy squalls, with rain from the West and S.W., which travel across the southern part of Cambodia from the Gulf of Siam. The tides also are stronger and of longer duration now than in the N.E. monsoon.

Having arrived at the guard ship and complied with the regulations, at a favourable opportunity get away at low water with a westerly or south-westerly commanding breeze, and proceed up the river, making short tacks, if necessary, in the upper part of this reach between points E and D.

When standing over to either side of the river above the branch C, do not shoal the water to less than 10 fathoms; but having rounded point E, in working, approach either side to any distance, as both shores are steep-to.

When close to the Four Arms, the water deepens suddenly from 12 to 17 and 20 fathoms, and it would be advisable to pass these rivers under canvas, until beyond the influence of their conflicting currents, and shoaler water is met with.

In kedging or sailing past these rivers with the flood, keep in or about

* It is doubtful if this painted tree now exists; it is not marked on the latest French charts.

mid-channel, and be guarded against the tide, which sets strong from the N.W. arm into the small river below point J. Having cleared the small river at J, proceed sailing or kedging, according to the size or handiness of the ship. The flood tide at the rivers K and L enter the main branch, consequently ships passing their mouth will be set on the opposite shore.

Having passed point O, if under sail, it will be advisable to take it in, and kedging past the coral bank, with the anchor under foot in the manner formerly mentioned, as it very seldom happens in this monsoon that a ship can luff round point P, and clear the bank.

In passing this bank with a fresh wind and flood tide, take great care to starboard the helm quickly when rounding point P, as the tide sets from that point directly into the opposite bight, and ships from neglect of this precaution would be apt to tail on the West end of the bank. Having cleared it, proceed, and pass the mouth of the river at R closely, as the flood tide sets out of it over to the opposite bank.

When under sail or kedging, pass point S in mid-channel, and make directly over to U, as the flood rushes out of the river at S, and sets over to point T, sweeping the tail of the Dangerous bank. Ships are very apt to be set on the South end of this bank when kedging past, if the point of the river opposite S be not kept close aboard.

Continue on and give point V* a close shave in passing, as the greater bulk of the flood tide runs to the northward, which is apt to carry vessels beyond the mouth of the smaller river, and with a head wind would lose a tide or so in getting back again. Whereas by hugging the point close, a couple of tacks will easily clear the reach, then bear away for Saigon, and drop up to the shipping at leisure.

From Saigon to Cangio Point the ebb tide from the main branch enters the minor rivers and flows in a circuitous direction to the sea; whilst the flood, on the contrary, empties itself into the principal stream, the small river at J being the only exception.

SAIGON to CAPE ST. JAMES.—In the *North-east Monsoon* the average passage of small vessels to the mouth of the river is about five days, while large vessels have taken from fifteen to twenty days. The former have the advantage of being able to beat through nearly all the reaches, whilst the latter have to back and fill or kedge with the anchor under foot.

When unmooring at the city, cat the starboard anchor, keeping the port one down for kedging, and having broken ground, sheer from side to side,

* Ships dropping up or down this part of the river should, if possible, avoid the deep bight to the westward of point V, and keep close to the opposite point, as there are some obstructions in the bottom of that bight, by which vessels have lost their anchors.

lying athwart the tide when convenient, and hugging the points when there is no shoal off them, to prevent being set into the bights.

After rounding point V, keep on the same side of the river as far as U, and from thence sheer direct over to point T, passing it closely, to prevent being set into the river Loirap opposite. The ebb runs very strong into its mouth, and many ships have been hoisted on the soft mud bank lying off point S, through delay in crossing over. Proceed on, and when a short distance from the river R,* change anchors, giving that branch a good berth whilst passing, as the ebb tide sets strong into it. Having passed the bight Q in mid-channel, keep close in to that side, and look out for point P; if the tide runs strong when the painted tree is approached, run out a line and check the ship round it, keeping the bushes close aboard to prevent being set on the rocky patch below the point; this precaution is necessary, particularly during the springs, as the ebb tide runs very strong, setting from point P, directly over the rocky path.

Proceed, passing point O in mid-channel; strong sets will be found in the bight at N and off point M, and also into the rivers L and K, the former of which is nearly blocked up with soft mud. Vessels should hug the points opposite these rivers very closely whilst passing, otherwise they will be hoisted into them, and meet with more or less delay.

Proceeding, take care in passing the Four Arms, as the ebb tide sets strong up the two northern arms, the water also increases in depth at their junctions, making it very unhandy for kedging, and troublesome work for the men at the windlass.

The best way to pass is to keep as close as safety will permit to the mouth of the river at J, which is rather shoal, having but 3 fathoms across its mouth. Having passed it keep very close to point J, where plenty of water will be found, until beyond the tidal influence of the rivers.

Should the ship sheer off the point, carry a line out to the trees at J, and snub her round it, otherwise she will be hoisted into one of the northern arms, and be delayed. Several vessels have been delayed from one to two days through this cause. After passing the Four Arms, proceed, keeping close to point E, as the tide sets strong into the bight opposite. The channel from E to D is much contracted by the extent of the banks on both sides of the river.

Having passed point E, proceed in mid-channel until the small island off point D is rounded, keeping the North shore aboard until arriving at the guard ship. By these means the strong set in the river C and the extensive hard banks which lie on that shore will be avoided. These banks are pretty

Vessels dropping past the river at R, and the Coral Bank should always use the starboard anchor with the ebb tide, and the port anchor with the flood. By these means the river at R and the bank will be passed without much trouble.

steep-to, and vessels tacking or dropping in any part of this reach should borrow, if anything, towards the North shore, as the water shoals there more gradually. The lead at the same time should be kept carefully going, and very short tacks made by vessels working through the narrows at the upper part of this reach.

Having anchored at Cangio, receive the arms, and clearance from the guard ship; then get away with the sea breeze on the ebb tide, and work the vessel through the channel to the eastward, being careful not to shoal the water under 7 fathoms when standing towards the banks.

When the guard ship is brought to bear W. $\frac{1}{2}$ N., or the trees on point B W. $\frac{1}{4}$ N, bring the point A to bear S.E. by E.; work up for the point on these bearings, taking care not to stand too close to the high land of St. James, as the wind is generally puffy and unsteady, causing ships at times to miss stays. Should the tide be nearly done before getting clear of the cape, it would be advisable to anchor off Cocoa-nut Bay until the next ebb makes, for, should the wind fall light outside, the flood tide would in all probability set the ship on the Cangio Bank.

In the South-west Monsoon, ships leaving Saigon will find little difficulty in getting down to Cape St. James, as the prevailing winds are almost invariably favourable for most of the reaches in the river.

When large ships cannot be worked through the smaller reaches, or are obliged to kedge in consequence of foul winds, &c., the directions already given for dropping down in the N.E. monsoon will be applicable. During settled weather in this monsoon the sea breeze sets in from S.W., South, S.E., and sometimes E.S.E. at Cape St. James.

From Cangio work out of the bay with the ebb tide to the cape, following the directions already given for the N.E. monsoon.

CAPE TIWAN, bearing E.N.E. $10\frac{1}{2}$ miles from Cape St. James, is high, and may be seen in clear weather 40 miles off. It is the termination of a chain of hills, which, stretching northward, end in a long slope to seaward, and it is generally the first land made in coming from the southward. When off it, Cape St. James will be seen resembling two islands of moderate height.

The bay between Cape St. James and Tiwan is filled by a shoal bank, the 3 fathoms edge of which is from 1 to 4 miles off shore. Four miles off the entrance of the Cua-lap River, in the middle of the bay, with the lighthouse bearing W. $\frac{3}{4}$ S., and Cape Tiwan N.E. $\frac{1}{4}$ E. $3\frac{3}{4}$ miles, is a patch with $4\frac{1}{4}$ fathoms over it. *Pernambuco Rock*, on which the vessel of that name struck in June, 1875, was afterwards examined by the French ship of war *Surcouf*, and found to lie 8 ft. below the surface of the water, S.E. $\frac{1}{4}$ S., 2 miles from Cape Tiwan, and E. $\frac{3}{4}$ N. from Cape St. James lighthouse. To avoid these rocks, it is advisable for vessels passing between Capes Tiwan and St. James

to avoid coming under a depth of 10 fathoms until they open the entrance of the Saigon River.

BRITTO BANK, named after a Portuguese captain who was wrecked upon it, was examined by Captain Ross, I.N., in 1817, who found it to be a dangerous shoal about $1\frac{1}{4}$ mile in length, E.N.E. and W.S.W., and its breadth does not exceed one-third of a mile. The shoalest spot has but 2 fathoms water over it, and consists of a large patch of rocks near the North part of the shoal, from which the summit of the highest hill over Cape Bahek bears W. $\frac{1}{4}$ N. distant $19\frac{1}{2}$ miles; Cow Island, N. by W. $9\frac{3}{4}$ miles; and the islet close to Kega Point, N.E. $\frac{2}{3}$ N. $15\frac{3}{4}$ miles. There are 3 to 5 fathoms over other parts of the shoal.

Otram Point, formed of yellowish white sand hills, about 120 to 150 ft. high, which render it easily discernible, bears N.E. by E. $\frac{3}{4}$ E. $12\frac{1}{2}$ miles from Cape Tiwan.

Off this part of the coast, at from 2 to $3\frac{1}{2}$ miles distant, are several shoal patches, of from 4 to 5 fathoms water. These banks, from the water shoaling suddenly over a hard bottom, cause overfalls, particularly near the edge of the shore bank. The patches under the depth of 5 fathoms will be avoided by keeping Cape Tiwan to the northward of West, until Cape Bahek bears N. by W.

CAPE BAHEK, or **Ba Ke**, N.E. by E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles from Otram Point, consists of a hill about 400 ft. high, surrounded by smaller ones, and is connected with Otram Point by a range of sand hills.

The soundings for 12 miles eastward of Cape Bahek decrease regularly towards the shore, but inside the Britto Bank there are several shoal patches, only two of which, however, are dangerous to any but the largest ships.

The first of these patches, with only 3 fathoms water over it, lies about 7 miles N.W. of the Britto Bank, and $3\frac{1}{2}$ miles from the nearest land, which is a point bearing about N. $\frac{1}{2}$ W. from it; the summit of the highest hill over Cape Bahek, bearing W. by S. $\frac{1}{2}$ S. $14\frac{3}{4}$ miles; and Cow Island N.E. by N. 6 miles.

About $2\frac{1}{2}$ miles to the S.W. of the 3-fathom patch is another of 5 fathoms, with 6 and 7 fathoms around it, and from it the summit of Cape Bahek bears W. by S. nearly $12\frac{1}{2}$ miles, and Cow Island N.E. $\frac{1}{2}$ N. $8\frac{1}{2}$ miles. Three miles E. by S. from this patch is another, of $4\frac{1}{2}$ fathoms water.

Vessels passing between the Britto Bank and the shore should not attempt to go inside the 3-fathom patch, for there are no objects sufficiently near to afford safe marks for passing between it and the tail of the spit.

COW ISLAND, bearing N.E. by E. $\frac{1}{2}$ E. $19\frac{3}{4}$ miles from Cape Bahek, is a small round island, with trees upon its summit, lying about a mile from the nearest part of the coast, and $1\frac{1}{4}$ mile westward of the entrance of a small river. It is safe to approach, the soundings decreasing regularly towards it.

KEGA POINT (in lat. $10^{\circ} 42' N.$, long. $107^{\circ} 59' 40'' E.$ by the French chart),

bearing from Cow Island E. by N. $\frac{1}{4}$ N., distant 12 miles, is the extremity of a tongue of low land, the prolongment of a spur from Mount Taiku, terminating in an islet which resembles from a distance a fort in ruins.

The land is low and woody near the sea; inland the country is high, and the regular sloping mountain Tai-ku rises to an elevation of 1,312 ft., at 9 miles N.W. $\frac{1}{2}$ N. from Kega Point. This mountain is visible a great distance from seaward, being the most conspicuous land in this part of the coast, and detached from any other high land.

The shore may be approached by the lead for a distance of 6 or 7 miles eastward of Cow Island, but about $4\frac{1}{2}$ miles W.S.W. from Kega Point, and $3\frac{1}{2}$ miles from the shore, the water shoalens suddenly from 6 or 7 to $3\frac{1}{2}$ fathoms. W. by S. 4 miles from Kega Point is a patch with only $2\frac{3}{4}$ fathoms water over it. A patch with $4\frac{3}{4}$ fathoms water over it, and 6 to 8 fathoms around it, lies E. $\frac{1}{4}$ S., distant 8 miles from Cow Island, with Mount Tai-ku bearing North, and Kega Point N.E. by E. $\frac{1}{4}$ E., distant $6\frac{1}{2}$ miles. About three-quarters of a mile to the south-eastward of this patch is another of $5\frac{1}{2}$ fathoms.

Kega Point is safe to approach, there being 9 or 10 fathoms water close to it.*

VINE POINT, bearing from Kega Point N.E. $\frac{1}{2}$ E. 22 miles, has a small bank on its West side, northward or inside of which there is good anchorage in 5 fathoms, opposite a fishing village in the small bay on the West side of the point. *Phan-thit Bay* is formed by the land trending northward from Kega Point to the Pho-hai River, and from thence eastward to Vine Point. Tiger Island lies close to the East side of Vine Point. Although covered with birds' dung it is not conspicuous, and only perceived when a ship is near the land. The coast hereabout is speckled with alternate patches of sand and verdure.

GUIO POINT, bearing N.E. $\frac{1}{2}$ E. about 12 miles from Vine Point, forms the South point of the bay of *Phan-ry*, and is known by a high, steep sand-hill close to the sea. From Guio Point the coast trends nearly North to the entrance of the Phan-ry River, and is of a reddish colour. Phan-ry is a large fishing village.

LOGAN POINT, bearing N.E. by E. $\frac{1}{4}$ E. 15 miles from Guio Point, is a narrow, low neck of land, projecting a considerable distance into the sea. On its West side there is a small bay with a fishing village. Shoal water appears to extend nearly a mile from the point.

* The description of the coast of Cochin China has, so far, been principally derived from the late French surveys; what follows, with the exception of the more recent descriptions of the Treaty Ports, is chiefly from the surveys made by Mons. Jean Marie Dayat in 1793, and from the remarks of Captain Daniel Ross, of the Bombay Marine, who visited this coast during the years 1806—10.

A bank about a mile in extent, with $4\frac{3}{4}$ fathoms water over it, was discovered in 1862 by H.M.S. *Vulcan*, lying about $2\frac{1}{2}$ or 3 miles southward of Logan Point, with the East extreme of the point bearing N.N.E., and the West extreme N.N.W. Another $4\frac{3}{4}$ -fathom patch, named *Amazon Bank*, lies about 4 miles south-eastward of the point; it is surrounded by depths of 11 and 14 fathoms.

PULO CECIR de TERRE (called *Hon-cau* by the natives), lying N.E. by E. $\frac{1}{2}$ E. 8 miles from Logan Point, is a low island, extending nearly E.N.E. and W.S.W., having near its centre a mass of rocks higher than the other parts, which is visible about 15 miles from the deck of a large ship. When first seen it appears like a small peak or spire, and sometimes like a boat's sail; the whole of the island is rocky and barren, with the exception of a little grass or green moss on the flat part. The two low extremities of the island are encompassed with rocks, which project out above and below water to a considerable distance. There are also some rocks above water on the South side, but as the danger is generally visible, the island may be approached in the day to $2\frac{1}{2}$ or 3 miles; in the night it ought not to be given a wider berth, for then the island cannot be perceived unless it be very near.

Breda Bank.—The coast behind Pulo Cecir de Terre forms a deep and extensive bay, stretching from Logan Point to the land of Cape Padaran; and the high land of Cecir to the N.W. and North of the island is very mountainous close to the sea. Between Pulo Cecir de Terre and the N.E. side of this bay, opposite the Gap of Padaran, lies the Breda Bank, having 2 fathoms, coral rocks, on its eastern edge, and there is said to be much less water to the westward. This danger is not in the way of vessels passing outside Pulo Cecir de Terre, unless with a working wind they stand far into the bay between that island and the land of Padaran.

CAPE PADARAN (called *Muidin* by the natives), in lat. $11^{\circ} 21' N.$, long. $108^{\circ} 58' E.$, is high land, steep and convex to seaward, forming the projecting part of the continent to the S.E. The high land of Padaran is joined to the adjacent mountain of Cecir by a neck of low level land, visible only when near the shore on the North or South side of the cape. The neck of low land forms a deep gap between the land of Padaran and the mountain to the westward; and this gap or chasm in the land is generally called the *Gap of Padaran*, and by the natives *Cana*. It is very conspicuous at a great distance, and serves as a mark to avoid Holland Bank to the W.N.W. of Pulo Cecir de Mer, described hereafter, and to point out the direction of Pulo Cecir de Terre, this island being on with the Gap, bearing from N. by E. $\frac{1}{4}$ E. to N. by E. $\frac{1}{2}$ E.

Soundings do not extend far out from Cape Padaran, it being a steep headland, bold to approach, having from 25 to 30 fathoms very near the shore.

Amazon and Althea Banks.—The soundings about Pulo Cecir de Terre, being in general irregular, are not always a sufficient guide in the night to

show the proximity of the island. The ship *Althea* got on a bank of 8, 7, and $6\frac{1}{2}$ fathoms, with the island bearing N. by E. $\frac{1}{2}$ E. just in sight from the deck, and Logan Point N. by W. $\frac{1}{4}$ W. Lieut. Banare, of the French navy, examined these banks cursorily in 1872, and believes the two banks, *Amazon* (page 446) and *Althea*, to be only one bank, making out from the North point of Cecir Island Bay, surrounding the latter; thence trending out to the S.W., and terminating at about 14 miles distance from the southern point of the bay.

Over an extent of about 16 miles, in a N.E. and S.W. direction, he found but shallow water, at times being able to see distinctly the sandy bottom covered with coral heads.

Although having obtained not less than $5\frac{1}{4}$ fathoms water, he is not positive that there may not be less.

Before a more thorough examination has been made, large vessels should keep clear of these banks, and not approach the coast South of the parallel of Cape Padaran.

PHANRAN BAY and Harbour.—Cape Padaran is the southern boundary of the great bay of the same name, called also Phanran Bay, after a considerable town at its head, where there is a tolerable harbour, formed by a reef, dry at low tide, that projects about 2 miles from the western shore, and shelters vessels from the sea.

After having passed Cape Padaran, if bound to the harbour, steer for the middle of the bay, to avoid a reef and foul ground contiguous to the western shore, then keep to the northward, for the North entrance point of the harbour until the reef on the western side is plainly seen.

When near the entrance, a mass of rocks, one over the other, like ruins, will be perceived close to the shore at the N.W. side of the harbour, and beyond it an isolated hill; keep the highest rock of the mass on with this hill, in steering past the reef at the distance of a third of a mile; 6 or 7 fathoms will be the least water. When inside the reef, steer more westerly, and anchor in 4 fathoms, good holding ground. There is a rivulet at the bottom of the harbour, and a stream of fresh water where the reef joins the shore.

From Phanran Bay to Davaich Head the coast runs about N.E. by N., and is very mountainous and steep. A little to the southward of Davaich Head there is an opening into *Vung-Gang*, a large basin or cove, inhabited by fishermen, which is darkened by the steep surrounding mountains.

DAVAICH HEAD, or *Fulse Cape Varela*,* called Mui-Davaich by the natives, in lat. $11^{\circ} 44' N.$, long. $109^{\circ} 13' E.$, is formed by a high oblong mountain of great magnitude, which, from the steep cliffs that front the sea, rises

* Named from a rock or knob upon the mountain, a little inland, having some resemblance to that over Cape Varela, although not nearly so conspicuous.

with a gentle acclivity inland; it may be known from the other prominent headlands by its great height, its convex outline, and by its regularly sloping to seaward.

CAM-RANH BAY and Harbour.—The entrance to Cam-ranh Bay is bounded on the South side by the land of Davaich Head, and the contiguous isles, and on the North side by the high island *Tagne*: this is called the large entrance, in which there are from 18 to 14 fathoms water. The small entrance is between the North point of *Tagne* Island and the opposite point of the main; it has 7 and 8 fathoms water in it, but it is very narrow, and should not be used except in a case of necessity. The bay carries 10 and 12 fathoms water, and is protected from the sea by *Tagne* Island.

About $1\frac{1}{2}$ mile to the N.W. of *Tagne* Island is the entrance to Cam-ranh Harbour, about three-quarters of a mile wide, formed by a point of land on the North side, and a long neck or narrow peninsula to the S.W. The inner harbour is an extensive lagoon. There are no hidden dangers in either the bay or harbour, and they are safe for ships of any description, the bottom being generally mud, and good holding ground. The harbour is mostly inhabited by fishermen.

FISHER ISLANDS, in lat. $12^{\circ} 2'$ to $12^{\circ} 4'$ N., are of moderate height, and lie $3\frac{1}{2}$ or 4 miles off the mainland to the northward of Cam-ranh Bay. The southernmost island is called *Hon-noi*; the other, which is the largest, and named *Hon-ngai*, has some islets and rocks near it. The channel inside these islands is said to be safe, with 12 fathoms water near the shore, and there is good anchorage opposite to them in the S.W. monsoon, close to the coast at the sandy plain.

The passage inside the Fisher Islands is thought to be safe, and it may be adopted if intending to proceed into Nha-trang Bay by the southern entrance; but caution must be used, for there is to the N.W. of these islands, in the fair track, a rocky patch, on which the ship *Lord Castlereagh* shoaled suddenly, August 18th, 1807.

Capt. A. C. Strode, R.N., H.M.S. *Vulcan*, 1862, reports having seen "what was evidently a *sunken rock*, lying three-quarters of a mile W.N.W. of the southernmost of the Fisher Islands, in lat. $12^{\circ} 1'$ N., long. $109^{\circ} 19'$ E."

Tré Island, in lat. $12^{\circ} 16'$ N., is high, and contains several coves, where vessels may repair damages. The ship *Upton Castle* anchored to the westward of Tré Island, between the inner of the small islands and the main, to the southward of Nha-trang Bay, and found it good anchorage, and convenient for watering.

NHA-TRANG BAY is large, and protected by Tré Island and its adjoining isles to the southward, and by the mainland and Pyramid and Dune Islands to the northward and eastward. The anchorage is in 8 fathoms, good holding ground, with the entrance of Nha-trang River bearing about N.W. or N.W. $\frac{1}{2}$ N., distant 1 mile, and Tré Island E.S.E. The river has a bar,

will only admit vessels drawing 7 or 8 ft. water, and communicates with Nha-trang city, about 5 miles to the westward. This city is the capital of the provinces Nha-trang and Binkang, and has a fort, built in the European manner, by Monsieur Oliver, a French engineer. Here they manufacture some silk and other articles, and carry on trade with different parts of the coast.

A ship in want of wood or water may obtain them by touching at this place.

To proceed into Nha-trang Bay by the South entrance, a vessel may pass on either side the Fisher Islands, then between Tré Island and the two isles to the S.W. of it. Between the West point of Tré Island and the main, the channel is $1\frac{1}{4}$ or $1\frac{1}{2}$ mile wide.

The northern entrance into Nha-trang Bay, although wide, has a coral bank nearly in mid-channel, opposite the large Bay of Binkang, which makes it necessary to keep nearest to Tré Island.

It is high water, full and change, at Nha-trang Bay, at $8\frac{1}{2}$ hours; and the rise and fall is 5 or 6 ft. There is only flood and one ebb in 24 hours.

The **FISHER ISLANDS** are three small barren islands, with some rocks close to them. *Pyramid*, the southernmost island, in lat. $12^{\circ} 19' N.$, is a high regular cone or pyramid, conspicuous as a mark in sailing along the coast. The channel between it and Tré Island is safe.

Dune Island, lying about a mile to the N.E. of Pyramid, is of moderate height, flat on the summit, like the crown of a hat, when viewed in some directions; to the south-eastward of it are some islets or rocks. *Shala* lies 5 or 6 miles to the northward of Dune Island, and about 3 miles to the south-eastward of the peninsula of Hon Cohe.

HON COHE BAY, the next large bight to the northward of Binkang Bay, which is shallow, has several islands in it, the outermost of which, called *Bac*, has, about a mile eastward of it, a rock called the *Button*, and three islands to the westward. Between Bac and the eastern of these three islands there is a safe passage, and also between the latter and the other two islands, which lie much nearer the western shore; but the widest channel is outside Bac, between it and the East point of entrance of the bay. At the head of the harbour is the village of Hon Cohe.

On the East side of the bay are several islands at the entrance of Couabé Harbour, into which ships may warp, and moor to the trees, there being plenty of water and no danger; but vessels do not usually go there, as the harbour is inhabited only by a few fishermen. This harbour or cove is formed by high mountains.

At Hon Cohe it is high water, full and change, at $11\frac{1}{2}$ hours; and the tide rises 5 ft.

The **Three Kings** are three rocks, lying about $1\frac{1}{2}$ mile eastward of the

eastern point of entrance of Coua-bê Passage. They are bold to approach, having 30 fathoms water near them, with a passage between them and the point.

HONE GOME BIGHT.—About 5 miles northward of the Three Kings, and close to a point of the main land, lies the small island *Doi-moi*, at some views resembling a turret or sentry-box. The point, from which this island is separated by a very narrow channel, is the easternmost land of Cochin China, being a little to the eastward of the meridian of Cape Varela. Between it and Cape Varela, the land forms a concavity called Hone Gome Bight, in which the soundings are regular, and there is good anchorage in 8 or 10 fathoms, sandy bottom, at the South side, about 2 miles W.N.W. of the point, near a small island. The sandy flat, which extends from the high land of Coua-be to that of Cape Varela, is a neck of land scarcely a mile broad in some places, separating the head of Hon Cohe Bay from the sea; and the three islands in the middle of that bay may in passing be perceived over the sandy flat.

Water can be obtained at the southern extremity of the sandy flat, but in the dry season wells must be dug in the sand, at some distance from the sea. Fresh water may be procured in this manner on most parts of the coast.

PORT ONG-RO, at the northern extremity of Hone Gome Bight, seems safe at all times. It is about a mile wide at entrance, stretching about 3 miles inland, in a north-easterly direction, with soundings of 8, 7, and 6 fathoms, close to the village at its head. The bottom is fine clay. *Pulo Varela* is a small island near the shore, to the south-westward of the entrance.

Water.—On the West side of the harbour fresh water may be procured in several places, but the best watering place is about half-way up on the same side, to the north-eastward of a little cove.

CAPE VARELA, or *Pagoda Cape*, in lat. $12^{\circ} 55' N.$, long. $109^{\circ} 24\frac{1}{2}' E.$, is formed of steep cliffs, extending nearly North and South $2\frac{1}{2}$ miles, having in the middle of them a small sandy bay, where a stream of excellent water descends from the mountain into the sea. The cape itself may be seen from a distance of 28 or 30 miles, and when first perceived in coming from the northward appears like an island, the gap of low land which joins it to the mountain behind being then depressed under the horizon. This mountain* rises directly over the cape, and upon its summit there is a large perpendicular rock, resembling a pagoda or chimney, called *Da-bia* by the natives, which makes it very conspicuous; and it may be seen about 60 miles distance from the deck of a large ship, either from the northward or southward, in clear weather; but the summits of the mountains are frequently obscured by clouds or vapours, particularly in the N.E. monsoon. The cape may be

* There is a hot spring in the middle of the cape mountain, and there is said to be silver ore in some of the mountains, which form double and treble ridges behind the cape.

approached close to, there being 20 and 25 fathoms water around it at a small distance from the shore.

Directions.—From abreast Davaich Head or False Cape Varela the course is N. by E. $\frac{1}{2}$ E. and N. by E., until Pyramid Island and the other islands adjacent to it are passed, then N. $\frac{1}{4}$ E., and North to Cape Varela. The best track in the night, with a fair wind, is to keep from 6 to 9 miles off the different headlands, which, with the Fisher Islands and Pyramid group, will be visible at that distance in passing along, if the weather be clear. When the weather is unfavourable, edge farther out, to give the islands a prudent berth: and if soundings are obtained, the vessel will not be far from them, or some of the headlands.

From Cape Varela to Cape San-ho the course is N. by W., or N. $\frac{1}{2}$ W., about 50 miles, but soundings will not be obtained in this track unless near the coast. A little inland there is a mount in the vicinity of the city of Quinhon, with a spired pagoda on it; further to the northward there is a mountain, on the summit of which there is a tower crowned with a small spire or funnel; the latter is in about lat. $14^{\circ} 6' N.$, and they are discernible when sailing along the coast at a considerable distance.

PERFORATED ROCK.—About 4 miles North from Cape Varela lies a mass of rocks, some of them level with the water's edge; but the central rock is considerably elevated, with a large stone on its summit, appearing as if placed by art; in passing near it, when abreast, a hole through will be perceived below the upper stone, which has given it the name of Perforated Rock. There is safe passage, with 20 to 25 fathoms water, between it and the mainland.

PHUYEN BIGHT is formed by the land taking a West and N.W. direction from Cape Varela to the Phuyen River, which is distant from the cape about 11 miles. About 18 or 20 miles N.W. from the cape, not far inland, stands a high isolated mountain, which, being a regular cone, is called *Conical Mountain*, or *Epervier*; a little to the S.W. of it there is a sloping piece of land, with a rock or pagoda on it, which is only discerned when near the shore. Here the mountains recede to the westward, a great distance inland, and the Cape Varela chain stretching also to the westward, a large space of low land is formed close to the sea round Phuyen Bight, between Cape Varela and Conical Mountain.

PHUYEN HARBOUR.—The entrance to this great inlet, in lat. $13^{\circ} 23' N.$, is about 2 miles wide, with 10 and 11 fathoms water on either side the small island that lies a little inside, called Nest Island, from the West side of which a reef extends in that direction nearly a quarter of a mile. The country around this excellent inlet, one of the best in the world, is well cultivated, and, together with the houses and huts interspersed along the hills, presents on entering it a beautiful landscape. The province of Phuyen is better cultivated than any other in Cochin China.

The inlet has general depths in it from 12 to 5 fathoms; and three anchorages, *Port Xuan-dai* on its South side, *Port Vung-lam* on its West side, and *Port Vung-chao* in its N.E. corner. The anchorage of *Port Xuan-dai* is in 7 or 8 fathoms, sandy bottom, with the entrance of the river bearing South, and *Nest Island* about N.E. by E. That of *Port Vung-lam* is in 7 fathoms, mud, on the North side of an island that fronts the port, with the village bearing S.W. by W. *Port Vung-chao* is sheltered from every wind by circumjacent mountains, and the anchorage is in $4\frac{1}{2}$ or 5 fathoms, with the houses in the grove of cocoa-nut trees bearing S.E. to S.E. by E. The North shore of this port is fronted by a coral reef, which is visible at low water. In proceeding towards *Vung-chao* the *Buoy Rock* must be avoided which lies nearly awash about a third of a mile from the eastern shore of the inlet. There is a small cove, called *Vung-la*, on the North side of entrance of the inlet, where two or three vessels might be hove down, if requisite.

The *watering place* is in a small bay to the N. by E., in which is a fine cascade close to the beach, and very convenient for watering.

Gain-Ba Point, about 3 miles northward of the entrance of *Phuyen Harbour*, has small bays formed on each side of it. About 3 miles to the northward of *Gain-ba Point* is another point called *Vung-trich*; and $4\frac{1}{2}$ miles beyond the latter is another, named *Vung-mon*; these two points are also bold.

COU-MONG HARBOUR.—Between *Vung-trich* and *Vung-mon* Points is the bay of *Vung-mon*, which is safe to approach, with regular soundings in it towards the shore. On its South side, in lat. $13^{\circ} 30' N.$, is the very narrow entrance of *Cou-mong Harbour*, with 7 and 8 fathoms water in it, 5 and 4 fathoms a little inside, and 3 to 4 fathoms to the southward of the small island, *Cou-mong*, in the middle of the harbour. This is an excellent cove for small vessels, or those of middling size; and there is a little village among the cocoa-nut trees to the northward of the island.

PULO CAMBIR (the centre), in lat. $13^{\circ} 32\frac{1}{2}' N.$, and 4 or 5 miles westward of the meridian of *Cape Varela*, has a regular sloping appearance, and is visible about 18 miles from a ship's deck; it is of considerable size, extending N.N.W. and S.S.E., having a few fishermen's huts on the S.W. side; and at a short distance S.E. from its South end there are some sharp-peaked rocks, called the *Two Paps*. This island is nearly abreast and about 2 or 3 miles distant from *Vung-mon Point*; and the channel between it and the coast is safe.

Date Island, lying about 6 miles N.N.W. of *Vung-mon Point*, and $1\frac{1}{2}$ mile distant from the main, is of round form, and covered with trees. From *Vung-mon Point* to opposite *Date Island* the coast is steep and very mountainous, forming a considerable bight, called *Cambir Bay*.

QUIN-HON HARBOUR, the entrance to which is about North distant 6

miles from Date Island, is bounded on the West by a neck of sand about 4 miles long, and on the East by high steep land. This harbour, once a place of considerable trade, is likely again to become of importance, as it was opened to foreign commerce on November 1st, 1875. It is sheltered from southerly winds by the curved form of the high land on that side of the entrance, and is protected by forts built on the point; but vessels of large draught are prevented from entering it by a shoal bank that extends a long way out from the western point, and which, stretching across to the land on the East side of the entrance, forms a bar, on which there are only 3 and $3\frac{1}{2}$ fathoms water.

The deepest water is close to the eastern point of entrance, where, it is stated, a vessel may carry from $3\frac{1}{2}$ to 4 fathoms on the bar, at high water spring tides; inside of it the depth increases to 7, 8, and 10 fathoms. The western part and bottom of the harbour is a spacious lagoon, with shoal water; several small rivers fall into it, one of which communicates with the city of Quin-hon, situated about 15 miles to the westward, and is the capital of the province of the same name.

CAPE SAN-HO, in lat. $13^{\circ} 44' N.$, long. $109^{\circ} 14' E.$, about $2\frac{1}{2}$ or 3 miles eastward of the entrance of Quin-hon Harbour, is a high bluff headland, forming the eastern point of the Bay of Quin-hon. Close to the land, a little to the northward of the cape, there is an island, called Hau by the natives; and the coast, which extends about 5 miles North from the cape, is steep and high.

Abreast the North point of this high land there are some small islets, one of which, called Cau, is of a round form, and lies about one mile off the point; and nearly $1\frac{1}{2}$ mile outside of this there are some rocky islets, named Hom-Co by the natives, and by Europeans Black Jack.

BUFFALO ISLAND, in about lat. $14^{\circ} 5' N.$, and 4 miles distant from the high land abreast, is a convex rock of sloping form, moderately elevated, but will not be seen in the night until it is approached very close. It lies 15 miles to the northward of the North point of the high land that forms Quin-hon Harbour; from which point the coast is low for some distance, and again becomes high opposite Buffalo Island. The water is very deep outside this rock, and the coast to the westward is bold and safe to approach, having soundings of 14 and 16 fathoms near the shore.

Nucc-Ngol, or *Fresh-water Point and Bay*, lie about 9 miles to the N.W. of Buffalo Island. *Turtle Island*, about 9 miles farther to the northward, and 3 miles off shore, is small, and very little above water; but there is a safe channel between it and the shore. *Tam-Quam River* disembogues in about lat. $14^{\circ} 32' N.$, at the northern extremity of a sandy flat; the bar at the entrance is passable only by boats at high water. *Tiphou River* falls into the sea at 5 miles to the southward of the Tam-quam, in the middle of the sandy flat.

The Coast from Tam-quam Point trends about North 6 miles, and then N.W. by N. about 33 miles to the entrance of the *Quan-gai River*. It is steep and bold to approach. Contiguous to the sea the coast is of moderate height, but the country is very high inland. There is anchorage off the *Quan-gai River*.

Cape Batangan, in lat. $15^{\circ} 16' N.$, about 6 miles to the north-eastward of the river, projects to seaward, and forms on its South side a bay, in which, at about a mile distant from the cape, there are some rocks, called *Rocky Islands*, nearly even with the water's edge; the country vessels sometimes pass between these rocks and the cape. There is also a rock with $2\frac{1}{2}$ fathoms of water over it, in about $15^{\circ} 13' 15'' N.$, a short distance off the coast, on which the French transport *l'Indre* struck in 1875. From it Plat Rock bore S. $28^{\circ} E.$, true, distant $1\frac{1}{3}$ mile. The coast from this cape to Cape Bantam runs about N.N.W. 12 miles, and the soundings are 20 and 25 fathoms near the shore.

PULO CANTON, called *Collao-ray Island* by the natives, in lat. $15^{\circ} 24' N.$, long. $109^{\circ} 6' E.$, is of considerable size, and visible 26 or 27 miles from the deck of a large ship. It has a level aspect when viewed from southward; its West side is inhabited, well cultivated, and fresh water may be procured. A reef projects from its S.E. end; and to the northward there are overfalls and rocky bottom, extending about 3 miles from it, and a low island that lies about 2 miles to the north-westward.

The channel between Pulo Canton and the main is safe, with soundings of 25 to 40 fathoms.

Caution.—It may be proper to observe, that vessels adopting the inner passage to China during the strength of the S.W. monsoon, in June, July, and August, ought not to edge off from the coast of Cochin China until they pass within sight of Pulo Canton, particularly if the winds are light and baffling. On an old French manuscript chart, a reef is placed in lat. $13^{\circ} 58' N.$, long. $110^{\circ} 20' E.$

QUI-QUIK BAY, formed on the West side of Cape Bantam, close to the foot of high mountains, is about 4 miles wide and 6 miles deep, with some islets in it, and small creeks where fresh water may be procured; and it affords good anchorage in the S.W. monsoon. At its N.W. extremity there is a small bay or cove under *Cape Happaix*, said to afford shelter in the N.E. monsoon.

FALSE COLLAO ISLAND.—From Cape Happaix the coast trends nearly N.W. by N. about 45 miles to Cape Touron, and in this space the country is mountainous a little inland. About 9 miles northward from Cape Happaix, and about 11 miles off the coast, lies the island of False Collao, of considerable height, and a reef is said to project from its South extreme.

CHAM-COLLAO (the South part), in lat. $15^{\circ} 54' N.$, long. $108^{\circ} 36\frac{1}{2}' E.$, and 9 miles distant from the main, is a high island, about 6 miles in length

N.N.W. and S.S.E., having some islets adjoining its South end, and others as far as 6 miles westward from its N.W. part. It is inhabited, well cultivated, and the anchorage on the West side, in 4 or $4\frac{1}{2}$ fathoms near the village, may be considered a safe harbour in all winds. Opposite this island lies the entrance of the Fai-foh River, which, by a narrow arm of the sea, communicates with Touron Bay. Near the entrance of this river there is a mass of marble rocks, very conspicuous when sailing near the coast.

TOURON BAY.—*Cape Touron*, or *Tien-Tchu*, in lat. $16^{\circ} 8' N.$, long. $108^{\circ} 21' E.$, is the eastern extreme of the peninsula that forms the East side of Touron Bay (called *Han-san* by the natives); and Collao-Han, or Touron Island, in lat. $16^{\circ} 12' N.$, long. $108^{\circ} 16' E.$, lies close to the point of land that forms the N.W. side of its entrance. The entrance is $2\frac{3}{4}$ miles wide, with regular soundings of 15 and 14 fathoms, decreasing inside to 8, 7, and 6 fathoms. The northern shore of the peninsula must be given a berth, for a reef, on which the sea sometimes breaks, projects about three-quarters of a mile from the third point. A rock awash lies a quarter of a mile off the North point of the peninsula, with a depth of 6 and 7 fathoms between it and the shore. The inner point of the peninsula is also joined to a small contiguous island by a shoal. This small island is in lat. $16^{\circ} 7' N.$, long. $108^{\circ} 17' E.$, and the usual anchorage for ships is to the southward of it, in 4 or 5 fathoms, sheltered from all winds.

This was formerly a great place of trade, and some European nations had factories here; but no trade has been carried on by Europeans to this port for a considerable time past.

In Touron Bay it is high water, full and change, at 3^h, and springs rise 4 feet.

CAPE CHOUMAY, or *Chouway*, in lat. $16^{\circ} 21' N.$, and $22\frac{1}{2}$ miles N.W. by W. from Cape Touron, is the extremity of a round and rugged peninsula of moderate height, which, united to the coast by an isthmus of sand, appears like an island with two summits when seen from the N.E. or S.W. A chain of high mountains with round summits extends almost to the coast. There is good anchorage in a small bay on the West side of the cape, where there is a river. A canal leads from Cape Choumay to Hue, and facilitates the communication between that city and Touron.

The **RIVER HUE**, or *Hue-Fo*, the entrance to which is in lat. $16^{\circ} 34' 50'' N.$, is generally considered the boundary between the coast of Cochin China and Tong King. Between Cape Choumay and this river the coast is formed of sand-hills, the summits of which are covered with numerous villages, surrounded by trees and cultivated fields; a peculiarity which will prevent mistaking this part of the coast for that North of Hue, where the villages are on the sides and not on the summits of the sand-hills. The position of the river is marked by a large fort with a flagstaff, built on the West point of entrance; at half a mile West of this is a small hill with a remarkable

pagoda. There is good anchorage off the mouth of the river in 6 fathoms, muddy bottom; but it is said that there is a heavy swell along the coast during the N.E. monsoon. The bar of the river has only 10 ft. on it at low water,

The city of Hue, situated about 12 miles from the mouth of the river, is sometimes the residence of the king of Cochin China. It is composed of two parts, the inner, and the outer town where the mass of the population resides, which has been estimated at 100,000 souls; the inner town is a large square fortress, built after Vauban, according to the plans of the French engineers. The river encloses it on two sides, besides a canal 130 ft. broad, by which it is entirely surrounded.

2.—THE GULF OF TONG KING.

The **GULF of TONG KING**, or Tonquin, is the great bend of the coast comprised between the parallels of 17° and 22° N., and which is rendered a deep inlet by the peninsula of Lien-chew and the island of Hainan, which protect it to the eastward. The entrance between Cape Lay on the West and the S.W. part of Hainan on the East is about 120 miles wide, which is the general width of the gulf itself. Several islands lie contiguous to the western shore of the gulf, and numerous small islands and shoals at its head. Soundings may be obtained all over it, 45 and 40 fathoms in the middle, decreasing towards either shore; the bottom is generally soft, fit for anchorage. In some parts the soundings appear to be irregular, for the ship *Rolla*, in lat. 17° 25' N., to the northward of Tiger Island, shoaled from 35 and 30 fathoms mud, to 10 fathoms on a bank, steering W. by S.; and soon deepened again to 25 and 30 fathoms, steering W. by N.

CAPE LAY.—From the Hue River a low and sandy coast trends about N.W. $\frac{1}{4}$ W. 47 miles to Cape Lay, which itself is rocky, of moderate height, and covered with several patches of trees. A bank extends a short distance off this cape; within 2 miles of the cape the depth varies from 15 to 20 fathoms.

TIGER ISLAND, distant about 12 miles E. by N. from Cape Lay, was explored in 1831 by Laplace, Commander of *La Favorite*. It is small, about a mile in extent, and its centre rises to a peak about 328 ft. in height, which is visible in clear weather at a distance of 15 to 18 miles. The South point is perpendicular; the North point terminates in a low, narrow neck of land. The channel which separates it from the coast is clear, with 17 to 23 fathoms water.

The Coast north-westward of Cape Lay is sandy and low; it trends first to the N. by W. for about 31 miles, after which it inclines towards the West as far as the entrance of the river Quia Hoy, at which stands a fort; from

thence the coast runs N. by W. for about 30 miles to Cape Boung Quioua, forming a bay of moderate depth.

CAPE BOUNG QUIOUA.—To the northward of Quia Hoy the sand-hills are of a reddish colour, and their summits are covered with brushwood. The coast here is elevated, and forms two bays of considerable depth, in each of which is a small stream. Cape Boung Quioua, easily known by its large red spots, is formed of elevated land. There are two islands near it, and a third at $2\frac{1}{2}$ or 3 miles to the S.S.W.; the latter is named *Boissieux Island*, and it terminates towards the West in a long reef which projects $1\frac{1}{4}$ mile towards the coast.

The anchorage of Boung Quioua is very good for all kinds of vessels during the N.E. monsoon. A vessel can anchor in $4\frac{3}{4}$ to 6 fathoms, sandy bottom, under shelter of the islands.

About 27 miles E.S.E. from Cape Boung Quioua the charts show a *shoal* with 10 fathoms water; its position, however, is uncertain. Lat. $17^{\circ} 50' N.$, long. $107^{\circ} E.$

SOUTH WATCHER.—At $7\frac{1}{2}$ miles E. by S. from the cape, in lat. $17^{\circ} 55' 10'' N.$, is a barren and rugged rock, called South Watcher Island, having 17 fathoms at less than a cable's length from its western side, decreasing to $9\frac{3}{4}$ fathoms near the small islands near the cape.

TSEU or *Goat Island*, also called *Sovel*, lies near a promontory 1,410 ft. high, and is distant 12 miles N.N.W. from Cape Boung Quioua. When seen from the East it appears like two pointed hummocks, with a perpendicular cliff towards the North, and sloping to the South; it is surrounded by a reef which extends more particularly to the South and West. There is an islet at 2 miles N.E. of Sovel. It is a jagged rock with a number of pointed peaks.

Tides.—A short distance to the southward of Sovel, during a period of two weeks, only one tide was observed in 24 hours; excepting for three or four days, during which there were two tides per day. The range of tide was about 10 ft., but this rise decreased in proportion in going southward.

At 6 miles to the West of Sovel is a small port open only from the North to N.W. The bottom is sandy, and it is sheltered from the East and N.E. by a rocky peninsula, connected with the coast by a narrow sandy isthmus, which running to a point projects half a mile from the shore.

The Coast from Cape Boung Quioua has been entirely mountainous, but from the small port just mentioned it trends to the N.W. by W., and alters to a sandy shore occasionally interrupted by isolated mountains, the first of which, called the *Mamelles (Paps)*, is easily distinguished by its two summits, 1,656 ft high, which in coming from the South are liable to be mistaken for those of Sovel.

NORTH WATCHER (marked *Hot Island* on the chart) is a small island, lying 10 miles N.W. from the Mamelles, 21 miles N.W. $\frac{3}{4}$ W. from Sovel,

and 3 miles North of a prominent hill 2,033 ft. high. To the SE. of it is a much smaller island, a short distance southward of which the sea has been seen breaking.

The coast from abreast the North Watcher changes its direction to N.W. by N. for 45 miles, and then runs N.N.E. as far as Bien Shan Island, thus forming a large bay, in which, at 2 or 3 miles from the shore, the depth is $6\frac{1}{2}$ fathoms. A short distance before arriving abreast of the North Watcher, high mountains appear in the N.W. and N.N.W., and in front of this part of the coast lies Matt Island.

Matt Island, formerly called *Frakaki*, in lat. $18^{\circ} 50' N.$, and about 10 miles from the shore, is 1 mile in length, N.N.W. and S.S.E., and precipitous on all sides except the South.

Besides two small islands lying at less than half a mile E. by S. from Matt, there are between Matt and the coast two rocks; the one, distant about 4 miles S.W. of Matt, is 32 ft. above the sea, and at a short distance resembles a junk under sail; and the other, about 1 mile N.N.W. of the former, is low and flat, and consequently dangerous.

GNEU ISLAND, lying about 6 miles West of Matt, and about 2 miles from the coast, consists of two hills separated by a neck of low land; so that from a distance, with the island bearing South, it will appear like two islands.

PORT of LACHT KOUENN.—The coast from abreast Gneu Island advances more towards the sea, and forms a bay, at the head of which are high mountains, with a flat shore at their base. The port of Lacht Kouenn, situated in this bay, in about lat. $19^{\circ} 4' 30'' N.$, long. $105^{\circ} 43' 9'' E.$, is a good anchorage for small vessels; its entrance, which faces the S.S.E. and is not more than a cable wide, has on the West side a large rock, called Dog Rock, which is connected with the shore by a narrow isthmus, only seen at low water.

This harbour, which is the best of those that have been explored on the coast of Tong King by M. E. Ploix, is sheltered from all winds, except those from the West, by rather higher mountains.* It is 2 to 3 cables in width, with about $1\frac{1}{2}$ fathom least water in it at low tide. The river Lacht Kouenn empties itself into it, coming from the W.N.W.

* The size of the rivers of Tong King, which flow into the sea between lat. 20° and 21° North, is shown by the great amount of alluvion that has been deposited, and which is estimated to be about 328 ft. per annum, being the amount which the bank of the river encroaches on the sea. At their entrance the fall of water is about 10 ft., and about 16 ft. during spring tides, if we can believe the inhabitants. The depth varies, no doubt, with the quantity of rain that falls into the basin, the melting of snow on the hills, where the rivers find their source, and the force and direction of the wind on the coast; but 10 ft. rise and fall may always be depended on, and vessels of a certain draught are always sure of being able to penetrate into the country.—*M. E. Ploix.*

Coal is found at the village of Magne Shan, on the East shore of the harbour.

It is high water, full and change, at this harbour, at 10^h, and the range of tide is from 8 $\frac{3}{4}$ to 9 $\frac{3}{4}$ ft.

ME ISLAND, in lat. 19° 21' N., and 8 miles from a projecting point of the coast, is the most northern of a considerable group of islands, about 25 in number, of different forms, and nearly all precipitous. The most western, which is flat and precipitous on all sides, is called *Bong Island*.

BIEN SHAN ISLAND lies to the westward of Mé Island, and rather near the coast. It is about 2 or 3 miles long North and South, and its northern part turns abruptly to the West, and forms a bay, which affords anchorage for small vessels, sheltered from the westward. Larger vessels can anchor at the entrance of this bay.

At Bien Shan it is high water, full and change, at 8^h 30^m, and the rise of tide is about 10 ft.

The *Coast* from Bien Shan Island runs northward, and afterwards N.N.E. At 6 miles North of the island is the river *Keun-bong*, in which the water is very shallow. Here the coast changes its aspect, the hills are at a greater distance from each other, and as the country with which they are surrounded is very low, they appear like islands.

Ne' Island, lying about 3 miles from the shore, and in lat. 19° 52' 30" N., is the last island met with before arriving at the head of the gulf. It affords a temporary shelter from North winds in about 6 $\frac{1}{2}$ fathoms water.

To the S. W. of Né, and upwards of a mile from the coast, is an islet about 13 to 16 ft. high; here the river *Trann* falls into the sea, and on its bar is a depth of 2 fathoms at low water. It is high water, full and change, at the mouth of the Trann River, at 8^h 30^m, and springs rise about 10 ft.

KIAO RIVER.—About 4 or 5 miles to the S. W. of the point before which lies the island Né, and on a low beach, is the mouth of the river Kiao, on the bank of which, and 6 miles in the interior, stands the arsenal of Hamatt, where the king's vessels are built. These pass across the bar without any cargo, with 1 $\frac{3}{4}$ fathom at high tides. This river communicates with the river Trann, which, as mentioned before, falls into the sea opposite Né.

The *Coast* to the northward of Né Island is a chain of serrated mountains, and from them the country, for a considerable distance inland, is entirely flat. As far as these mountains, the depths appeared to decrease in a regular manner on approaching the coast, but on leaving it they were irregular. From these mountains the land forms a great convex bend towards the East; nothing is to be seen but a low shore, relieved at a distance by trees, which here and there appear to rise out of the sea. Fronting this shore are extensive banks, stretching in some places from 8 to 10 miles eastward. Mountains become visible in the N. W., but they are far inland.

Three great rivers, the Dai, Lak, and the Balat, form here a great delta;

they communicate with each other partly by natural means, and partly by canals constructed by the inhabitants. Pilots are also indispensable in order to anchor before their mouth. A line of soundings, of 8 to 11 fathoms, rock and sand, was carried by the *Primauguet* at about 7 miles from the visible coast.

The RIVER DAI falls into the sea to the eastward of the above serrated mountains. The *Pregent*, which anchored off its mouth at the end of December, 1859, found on the bar a depth of $6\frac{1}{2}$ ft., muddy sand, at low water, which would give, according to the tidal observations made along the coast, about 13 ft. at high water, in ordinary weather. After crossing the bar the depth increases to $3\frac{3}{4}$ fathoms at the entrance. The missionaries assert that there are $3\frac{1}{4}$ fathoms water before their house, which stands about 20 miles up the river.

RIVER BALAT.—The *Primauguet* anchored in lat. $20^{\circ} 12' N.$, about 6 miles S.S.E. from the mouth of the River Balat or *Keua-dong*, the deepest of the three rivers, and rather near the banks to the West, having at less than a mile another bank to the N.E., at the West side of which terminates the canal which joins the branch West of Balat (*Keua-dong*), this being the deepest channel to enter the country. The pilots state that there are $5\frac{1}{2}$ ft. at low water, and $10\frac{3}{4}$ to $12\frac{3}{4}$ ft. at high-water spring tides.

At 15 to 20 miles from the mouth of the Balat, and near the junction of a natural branch, which flows to the South and unites the rivers Dai and Lak, the river becomes much broader. The fort Mom-rö is erected here, and opposite to it a toll-bar is established, which seems to be halfway between the coast and Nam-binh, the first town of Tong King after Keicho. Beyond Mom-ro the rivers, which discharge themselves into the sea partly by the Dai and Lak, and partly by the three or four branches of the Balat, unite and become one large river, which is no doubt deep.

Nam-binh does not stand quite on the River Balat, but on a canal of little depth, which joins the river about 3 miles from the town. The other part of this canal enters at Roukbo into the river Dai, a little below the old establishment of the French missionaries, and the important town of Nim-binh,* the second in the province. A little above Nam-binh are the old factories, and farther to the N.W. lies *Keicho*, the capital of Tong King, which it appears can be reached by vessels drawing about $9\frac{3}{4}$ ft. water.

Tides.—From tidal observations made on board the *Primauguet*, at the anchorage off the mouth of the river Balat, the establishment appeared to be 4 hours, and the rise of tide from 6 to 9 ft., the flood coming from the South,

* At Balat, the former limits of the coast, at the time of the commerce with Holland (about 200 years ago), is at present about 4 or 5 miles in the interior. Balat is one of the three ports opened to French commerce by the treaty of Saigon.

and the ebb from the North. It was difficult to determine if there was only one tide every day.

Keicho, or *Hanoi*, hereafter described, the capital of Tong King, is about 28 leagues up the river Balat. It is more than 150 years since European vessels traded to this river, and the knowledge of the navigation of the gulf not having been carefully recorded, it is now almost lost to Europeans. Trade, however, may again open up, but for the present the treaty port of Haiphong, on the Cua Cam River to the northward, will probably absorb the little trade there is. According to M. Ploix, it appears that vessels of about 10 ft. draught can go as far as the capital, but that there are dangerous gravel banks before reaching it. Keicho is in about lat. 21° N., long. $105^{\circ} 47'$ E. It is badly fortified; the houses are constructed of earth and wood, covered with cane, leaves, or thatch. The Dutch and Portuguese had commercial establishments here, but they have been destroyed long ago. The silk and porcelain manufactures of Keicho are the most valued of this part of the East.

The *Coast* North of the entrance of the Balat, as far as Cape Daushon (Too-shan), is low, and its direction is N.N.E. nearly. It appears that there are some rivers within this limit, and a line of soundings, from $3\frac{1}{4}$ to 9 fathoms, was carried at a distance of 5 or 6 miles from the shore.

RIVER LACHT HUEN.—Between Daushon and another projecting point the coast forms a bay with an opening 10 or 12 miles wide, but it is almost entirely filled with banks. Into this bay fall the two principal and numerous smaller branches of the Lacht Huen River (probably the Songka, Sangkoi, or Red River). Up the southern of the principal outlets is the newly-opened treaty port of Haiphong. The coast northward of the bay, into which the River Lacht Huen flows, is steep-to, and is formed by extremely rugged mountains, which determine deep bays, where a vessel drawing 11 ft. water will find safe shelter.

The branches of the river forming the delta of Sangkoi may be navigated by vessels drawing 16 ft. water, but which should not enter without the aid of a local pilot, as the channels frequently change. Between the delta and Hai-Dzeuong, about 50 miles up from the mouth of the Cua Cam branch, there is usually a current running out of the river at the rate of half to one knot. Above Hai-Dzeuong, in a narrow channel leading to Keicho, the current runs $1\frac{1}{2}$ to 2 knots an hour. The water of the river is thick and of a *red* colour, hence one of its names.

Tides.—According to the observations of Lieutenant T. Pepham, of the French navy, the water on the bar of the Cua-cam entrance of Sangkoi River rises and falls as follows:—When the moon's declination is North: On the moon rising the water falls, and again commences to rise as the moon sets. When the moon's declination is South: On the moon rising the water

commences to rise, and again commences to fall as the moon sets. The greatest range of tide is 13 ft.

Hondau Island and Lighthouse lie off the South extremity of Daushon Point, in lat. $20^{\circ} 40' N.$, long. $106^{\circ} 47' E.$, and mark the West side of the entrance to the Cua-Cam branch of the Lach Huen River. The island is small, 100 ft. high, and the light, exhibited at an elevation of 164 ft. above the sea, is a *fixed* white light, visible between the bearings of S. by E. $\frac{1}{2}$ E. and N.E., and in clear weather should be seen from a distance of 8 miles, but it is not a very reliable light.

A European *pilot* is either stationed on Hondau, or is cruising between it and Apowan; he will take vessels up the Cua-Cam branch to Haiphong. Pilotage is compulsory, the charges being 3.05 dollars a foot for steam vessels, and 4.55 dollars a foot for sailing vessels. If no pilot come off, vessels should anchor to the eastward of Hondau Island, and send to Haiphong. Care should be taken not to bring Hondau Island to bear southward of W.S.W., as the water shoals quickly inside that bearing from $3\frac{1}{2}$ to $2\frac{1}{2}$ fathoms.

A vessel drawing 17 ft. can cross the bar at high water ordinary springs; at neaps there are about 14 ft. at high water, but the range of tide is very uncertain, as is also the time of high water, at full and change.

HAIPHONG.—The following description is chiefly extracted from a pamphlet drawn up by N. B. Dennys, Esq., Ph. D., Secretary of the Hongkong Chamber of Commerce :*—

The port of Haiphong, named also Haidong, or Hwafung, recently opened to foreign trade under a treaty made with the Tonquinese, is situated about 16 miles up the Cua Cam branch of the Lacht Huen River. The town, a collection of huts, in about lat. $20^{\circ} 49' N.$, long. $106^{\circ} 40' E.$, is at the mouth of a creek, which enters the Cua Cam on its right bank. It contained, in 1876, a population of about 10,000; of whom 850 were Chinese and 142 French, 120 of the latter being soldiers and marines who have charge of two forts which command the passage of the river. These forts are only to be held until indemnity is paid to the French and Spanish governments. A French consul is resident. Only three steamers and three sailing vessels had visited the port between September, 1875, and April, 1876, which does not look very promising for future trade.

Supplies can be easily obtained. *Water* for drinking purposes is supplied at one dollar per ton, but it can be more easily procured, and of better quality, from the French commissariat; the charge for this is three dollars per ton.

* A most valuable work for captains to have who intend visiting. Its title is, "Report on the newly-opened Ports of Kiung-chow (Hoi How) in Hainan, and of Haiphong in Tonquin (Visited in April, 1876), by N. B. Dennys, Ph. D., etc." Hongkong: Printed by Noronha & Sons, Oswald's Terrace, Wellington Street.

In the narrow creek, on the bank of which is situated the custom-house, are four wooden jetties, two on either side, one of which, on the East bank, is used as a public wharf.

The river at Haiphong is $2\frac{1}{2}$ cables wide and $4\frac{1}{2}$ fathoms deep. Vessels drawing 15 ft. can anchor in mid-channel. Merchant vessels anchor N. and E. of the northern fort; man-of-war vessels N.W. from it.

Keicho, or Hanoi, the centre of commerce (Haiphong being its port), is the capital of Tonquin, and head-quarters of French influence in that country, and is situated inland, upon the river, at the mouth of which lies Haiphong. By the most direct water route, the distance from its port is about 60 miles; but as the water in this channel is frequently too low to float even the lightest draft boats, the usual route taken is by the main river, which extends the journey to about 150 miles. The enormous rise of the upper waters during the rains (some 25 ft.) renders both channels equally available for a short period in each year.

This latter lies through the Tai Bing Canal and Red River, upon the banks of which latter Hanoi lies. It is very intricate, and the sands, which abound in its course, are at times impassable. Vessels drawing only 6 ft. can, however, generally manage to get up, the depth at low water varying from $\frac{3}{4}$ fathom to 2 fathoms. Keicho may be also reached by proceeding up the Balat River as described on pages 460-1.

Hanoi is notable as the place where Lieut. Garnier (whose description of this country, in a splendid work published in Paris in 1873, is so well known), was murdered in November, 1873. The town is situated on the left bank of the river, and is said to contain 60,000 inhabitants, exclusive of 2,000 to 3,000 Chinese and some 175 Frenchmen. Missionaries have long been resident in the district, which is said to contain 20,000 Christians. The houses are mostly of brick. The chief trade is silk. No shipping, except river and cargo boats, is seen at Hanoi. One or two steam launches, however, run weekly between Haiphong and Hanoi. As at Haiphong the French have some land on the river bank at Hanoi, ceded to them and other foreigners, and some buildings are erected on it. So far wines and stores have been the chief imports; further trade is, however, likely to arise, especially as South-Western China can be reached by the Songka River. M. Dupuis was the first to do this successfully. In October, 1873, he conveyed an expedition up the river with arms, &c., for the Chinese, who were then engaged in quelling disturbances. He describes the country as abounding in the precious metals, as well as copper, iron, zinc, &c. The river at Hanoi is 5 to 6 cables broad, and small vessels (probably of 8 or 9 feet draught) may reach this point. There is a rise of 30 ft. in the summer, the river being consequently wider and deeper then. Imports and exports are, as agreed by treaty, taxed 5 per cent. *ad valorem*, salt 10 per cent. The

money, weights and measures will be described in the Appendix at the end of this volume.

Directions for Haiphong from the Southward.— Having passed Hondau Lighthouse (the light from which is not to be depended on), bring Daushon Point to bear S.W. by W. $\frac{3}{4}$ W. distant half a mile, and steer N.W. $\frac{1}{4}$ W. for a distance of $1\frac{1}{4}$ miles, passing between fishing stakes on either side.

When Petit Mirador (a hill over a point lying N.W. from Hondau), bearing S. by E. $\frac{1}{4}$ E., is in line with the western base of Daushon Hill, seen between a group of trees and the hill, steer in with this mark astern, allowing for a strong tide off the mouth of the Cua-Cam River; when Petit Morne Conique, which is easily recognised, bears W. by S. $\frac{1}{4}$ S., the entrance of the Cua-Cam River will be plainly visible to the eastward. Off the mouth of this river, the shores of which are very low, a sharp shoulder of the higher range of hills is in line with a low peak rising from the plain below; from this peak a table land extends westward, terminating in two conical shaped hummocks. From this position a mid-channel course leads to Haiphong.

Or another leading mark is, after passing the fishing stakes, to bring Hondau Island in line with Daushon Point, bearing S. by E. $\frac{1}{4}$ E., and keep it so until Petit Morne Conique bears W. by S. $\frac{1}{4}$ S., when proceed as before. This mark leads close to a sand-bank North 2 miles from Daushon Point, and as this is the shoalest part of the channel, the soundings should be carefully attended to. When a remarkable tree on shore comes in line with Petit Morne Aplati, the sand-bank is passed. In order to keep in the deep water channel, Petit Mirador must be kept open East of the group of trees lying westward of the base of Daushon Hill.

Vessels can anchor off Petit Mirador in 14 ft. water, obtaining shelter from N.E. winds.

PORT OUNONG is on the East side of entrance of the East channel into the River Lacht Huen. Off it is a rock called the *Ninepin* from its shape. W. by S. three-quarters of a mile from the Ninepin is a dangerous rock with about 11 ft. on it, and 8 fathoms close around it at low water.

In 1849 H.M. ships *Columbine*, *Fury*, and *Phlegethon*, entered the East or Main Channel of the Lacht Huen River in chase of pirates. The entrance, in lat. $20^{\circ} 41' 40''$ N., is obstructed by a bar which they crossed at high water, carrying $2\frac{3}{4}$ to 3 fathoms. Inside the bar the water deepens, and the shores are generally bold, except off the West side, where there is an extensive sand-bank. Wood was plentiful, but little water or provisions. The natives said there was coal in the vicinity, but their accounts were vague.

The French ship *Pregent* entered this channel in 1859, and at that period there were 11 ft. on the bar at low water.

During the *Pregent's* stay in the Lacht Huen, there was only one tide every 24 hours; during neap tides, however, there were 3 or 4 days during which

there were two tides per day, but they were weak, and then one tide succeeds the other, so that the establishment at full and change is alternately at 1^h p.m. and 1^h a.m. every 14 days. The rise and fall was about 10 ft.

Apowan Harbour lies about E. by N. 10 miles from Hondau Island. It is reported to be a good typhoon harbour. The soundings inside are from 4 to 5 fathoms (soft mud), shoaling to 2 and 1 fathom towards the village. The entrance is about 500 yards wide N.N.E. and S.S.W., with from 4 to 6 fathoms through it.

The *Egeria* anchored in 3½ fathoms, with centre of village bearing N.E. by E. ½ E.; left extreme of island to the south-eastward S.E. ¼ S.; right extreme of island to the south-eastward S. ¾ E.; left extreme of island to south-westward S.W. ¾ S.

Vessels from the south-eastward, after passing Norway Islands, steer about N.W., until a remarkable high nipple-shaped rock bears East, thence N.E. for a cone-shaped peak which stands on the point at the East side of the entrance. The West entrance point consists of low rugged black rocks which will appear overlapping the East entrance point as it is approached on a north-easterly course.

There is another entrance to Apowan Harbour from the south-eastward by which the *Egeria* entered, having from 9 to 6 fathoms water, and passing between some high precipitous islets about 150 yards apart. This entrance, however, is unsafe, as there are said to be sunken rocks in the neighbourhood. There are 12 hours ebb and 12 hours flood at Apowan. The greatest rise is from 12 to 13 ft., the least about 7 ft.

About 3 miles to the northward of Apowan is the eastern entrance to a channel which leads across the peninsula to the westward. Its western entrance is about 2 miles northward of Ounong.

Chay-le-pi, an extensive group of rocks, some of which are always covered, lie E. ¼ N. 19¾ miles from the Ninepin Rock. At 4 or 5 miles to the S.W. of them is a small group of islands, the Norway Islands of the charts.

Between the Chay and Ninepin Rocks is the entrance of the remarkable bay, called *Fietze-loong*, extending northward, and filled with islets and rocks of limestone formation.

The *North Coast* of the Gulf of Tong King, as far as the strait of Hainan, appears to be little known. It may be said to be bounded by banks and rocks which extend a long distance off shore; some large islands only have been visited by the *Columbine*, *Fury*, and *Phlegethon*, when in pursuit of pirates.

GOW-TOW ISLAND.—There are several islands between the Chay Rocks and Gow-tow Island to the N.E. The *Columbine* passed to the southward of Wuntaun Island and found a good passage 1½ mile broad. There is good anchorage near Fungung, 4 or 5 miles West of Wuntaun.

Gow-tow, or Pirate Island, consists of a group of islands of which Chung-

lan and Gow-tow are the largest; the former is about 4 miles long and 1 to 2 miles broad, in a N.E. and S.W. direction.

A ridge of hills with an average height of about 500 ft., and sloping down to the sea on both sides, occupies the centre of the island and terminates in two or three abrupt precipitous cliffs of a red color, about 200 or 300 feet high. Gow-tow Island is level and much lower, having only one high conical shaped hill near its North end. Its South end has several precipitous cliffs similar to those on Chung-lan, but not more than 100 ft. high.

There is a safe and spacious anchorage for vessels of moderate draught between these two islands, sheltered by Chung-lan to the eastward, by Gow-tow to the westward, and by three or four smaller islands to the northward. The *Egeria* entered it by a channel half a mile wide, which separates the South point of Chung-lan from Gow-tow Island. From the eastward Chung-lan was coasted along about 2 miles distant in 15 and 13 fathoms water, and when the passage between the two islands was well open, a N.N.W. course was steered through it, avoiding the South point of Chung-lan, where a sunken reef on which the sea was breaking extends in a south-westerly direction. The soundings varied from 10 to $7\frac{1}{2}$ fathoms in mid-channel, decreasing to 6 fathoms as the vessel proceeded. The deepest water in this harbour is close along the Chung-lan shore, towards Gow-tow, and to the north-westward, towards a smaller island in that direction, the water shoals to $2\frac{1}{2}$ fathoms fully a mile and a half from the beaches.

The *Egeria* anchored off Chunglan Island, abreast a patch of black rocks on the beach, with a quoin-shaped island bearing N.N.E. $\frac{1}{4}$ E., the North extreme of Gow-tow Island N.W. by W. $\frac{1}{4}$ W., a conical peak on Gow-tow N.W. by W., West side of the entrance S. $\frac{3}{4}$ W., and the East side S. by E. $\frac{1}{4}$ E.; deeper water, however, was found farther to the north-eastward to within 300 or 400 yards of the beach.

There were only a few inhabitants on these islands; pirates make periodical raids and destroy the houses and crops. The ground appears fertile, and has been cultivated in patches; the hills are almost denuded of trees, a feature by which this group may be distinguished from the islands to the south-westward, which are all thickly wooded along their summits.

A reef, awash, nearly $1\frac{1}{2}$ cables long, running N.E. and S.W., lies about 3 miles from the N.W. point of Gow-tow Island; this point may be rounded close to. There is a reef bearing West, distant 4 miles from the anchorage in Sha-pak-wan, the bay on the western side of the island. In the centre of this bay, about $1\frac{1}{2}$ mile from the shore, is a cluster of dangerous rocks awash at low water, bearing S.W. by S. from its N.W. point, and a reef, breaking in bad weather, extends for about $2\frac{1}{2}$ cables to the S.W. from the south-western point of the bay.

There is a channel with 2 or 3 fathoms at low water between Gow-tow and the island three-quarters of a mile northward of it, but a reef runs

along the N.E. shore of Gow-tow, coming close to the beach on its northern side. The best channel is found by keeping close to this reef.

S.W. of Gow-tow is an archipelago of small grotesquely shaped islands and pyramidal rocks, covered with thick jungle interspersed with patches of lawn; they rise to a height of about 130 ft., and are steep-to; numerous caverns are to be found on their shores, in some cases forming natural arches, having a depth of from 3 to 9 fathoms underneath them. There are some rocks awash bearing S.S.E. about $2\frac{1}{2}$ cables from the southern islands of this group.

The main land recedes from the general run of the coast line in the neighbourhood of these islands, forming the bay before mentioned about 13 miles deep, named Fietze-loong.

Gow-tow or Pirate Island has on its western side an extensive bay, which is apparently without danger. Wood and water may be obtained. There are a few miserable huts on its shore. The anchorage is however considered unsafe in bad weather on account of the heavy sea that enters.

The passage from Ching moy-tow Island to Gow-tow by Ye-moon passage N.W. of Gow-tow, and also to Fietze-loong Bay has been frequently traversed by the *Anlan* drawing 8 ft., and is apparently without danger.

Hat Island, in lat. $21^{\circ} 20' N.$, long. $107^{\circ} 45' E.$, is named from its resemblance to a Chinese hat, when seen from the eastward.

Tidal Streams.—Between Gow-tow and Norway Islands, and Hainan Strait, the currents are reported to run 1 to 2 knots an hour in a north-easterly and south-westerly direction. The *Egeria* experienced in April a set of about 23 miles S.W. $\frac{1}{2}$ W. in a run of 24 hours from the entrance of Hainan Strait to Gow-tow Island; there had been a fresh north-easterly breeze during the passage.

Lowseu Island lies 12 miles N.E. of the North extreme of Chung-lan. Good anchorage in 7 fathoms, mud, will be found off a little sandy bay on the S.W. side of this island.

Echun Island, 5 miles S.E. of Lowseu, is small, and lies about 2 or 3 cables North of Tycham Island, to which it is apparently joined; both islands appeared to be foul all round. Between Tycham Island and Chung-lan, there is a group of small islands, the most conspicuous of which, Chusan, is of a pyramidal shape; it is the eastern island of the group, and lies S.W. $\frac{1}{2}$ S. from Lowseu Island.

CAPE PAHKLUNG is the eastern point of a bay in which are situate the town and harbour of Choukshan. It is in lat. $21^{\circ} 31' N.$, long. $108^{\circ} 17' E.$, or about 8 miles to the eastward of the position assigned to it previous to 1876; it is a bold promontory, behind which rises a range of mountains 5,000 to 7,000 ft. high. The harbour, 12 miles West of Cape Pahklung, is on the boundary between Cochin China and China. It is formed by shoals on the East and a low point on the West, has 5 fathoms water in it; pilots

may be obtained. The *Columbine* and *Fury* anchored off the shoals, with the cape bearing N.E. $\frac{1}{2}$ E., distant 6 miles.

Pahklung Rock (Pak-su-hai), lying S. $\frac{1}{2}$ W. 8 miles from Cape Pahklung, is awash at high water, but being so far off the coast it makes the approach to Choukshan Bay dangerous at night. It is in lat. $21^{\circ} 22' N.$, long. $108^{\circ} 14' E.$, or about 7 miles to the eastward of the position formerly assigned to it on the chart. (H.M.S. *Lily*, 1876.)

Guie Chow Island, bearing about S.E. $\frac{1}{2}$ E. 58 miles from Cape Pahklung, is 7 miles in extent East and West, and 400 ft. high. There is an excellent harbour on its southern side. *Chayung Island*, lying 7 miles E.S.E. of Guie Chow, is 4 or 5 miles in length, about 500 feet high, but affords no anchorage.

BACHT-LONG-VI, or *Nightingale Island*, in lat. $20^{\circ} 8' N.$, long. $107^{\circ} 46\frac{1}{2}' E.$, from its position appears to form a good landmark for vessels bound to the northern part of the gulf. It is 2 to 3 miles in length, N.E. and S.W., high, with a flat summit, and its sides are almost everywhere precipitous, except to the S.E., where there are some huts along the shore. Off its low N.E. point are sunken rocks, and breakers to the distance of half a mile. The sea also breaks some distance from the S.E. point of the island.

3.—COAST OF CHINA AND HAINAN ISLAND.

As before mentioned, the boundary line between Cochin China and China reaches the coast at 12 miles West of Cape Pahklung. Of the small portion of coast described in this chapter very little is known, and Hainan Island is only becoming of interest on account of the new treaty port on its North coast recently opened to commerce.

Between Cape Pahklung and Pakhoi, about 45 miles to the eastward, the northern shore of the Gulf of Tonquin recedes, and is formed of the deltas of several extensive rivers, one of which, the *Loong-moon*, has its mouth 12 miles northward of Cape Pahklung.

The directions for Pakhoi are from those drawn up by Commander Cochrane in H.M.S. *Lily*, in 1876, and by Capt. Cocker, of the Chinese gunboat *Feihoo*.

PAK-HOI, opened to foreign trade in April, 1877, is entered between the outer extremity of the fishing stakes off a sandy point $1\frac{1}{2}$ miles N.E. of Quantow, and a large sand-bank, which protects the anchorage to the northward; this channel is less than a cable broad, and to keep in not less than 15 ft. water, the stakes should be rounded as closely as possible, as the water shoals rapidly to the sand-bank. Tikok village, hereafter mentioned, is in lat. $21^{\circ} 28' N.$, and long. $109^{\circ} 5' 5'' E.$ The anchorage at Pakhoi is good and

safe in any weather. The exposed side faces the West, but it is stated that there is no force in the westerly winds here.

The deepest water in this anchorage, 25 feet at low water, is to be found about 7 cables East of the outer extreme of the stakes, with the sandy point bearing S. W. by W. The holding ground is of stiff mud, and should a vessel remain for any length of time, the anchor should be occasionally lifted.

Supplies may be obtained from Pakhoi at moderate prices.

Directions for approaching Pakhoi from Hainan Strait.—The captain of a vessel starting from Haik'ao (Hoi How), for Pak-hoi, ought, before weighing anchor, to ascertain the condition of the tidal current, which runs East and West, and *vice versa*, with great force in the Hainan Straits, and in his subsequent navigation to make due allowance for its effect. It is the simplest and safest plan to leave in the evening, and to steer from the centre of the Hainan Straits West till Haik'ao is 30 or 35 miles distant, so as to keep absolutely clear of any danger off Cape Cami, and to be certain of avoiding a $3\frac{1}{2}$ -fathoms patch of doubtful position, marked on the charts 13 miles West of Cape Cami.

Having gone thus far, a course N. W. $\frac{3}{4}$ W. for 34 miles, and then a course North for 30 miles further, ought to lead a steamer westward of the extensive banks lying as far as 20 miles off the land, and about daylight to the first land, namely, the small island called on the charts Chayune, but known to Chinese as Ch'ieh Yang. This island, which is high and bold, lies about 34 miles S. S. E. off Quantow Head, in lat. $20^{\circ} 54' N.$, and long. $109^{\circ} 13' E.$ About 7 miles to the N. W. of it is the island of Weichow, called on the charts Guiechow. Though larger in area, the latter island is much less elevated than Ch'ieh Yang. It has a Catholic missionary, is apparently well cultivated, and is foul off the North and East sides for a distance of from 1 to 2 miles, and for about half a mile off the West and S. W. sides. At night, when in the vicinity of Guiechow Island, do not shoal the water less than 10 fathoms. After passing Ch'ieh Yanh (Chayune) about half a mile to the East of it, in 9 or 10 fathoms, and keeping well clear of the reef off Weichow (Guiechow), a course to N. N. W. will lead to Quantow Head, which will make as an island.

There are 5 fathoms of water to within a quarter of a mile of this headland. Between the island of Ch'ieh Yang (Chayune) and Quantow Head innumerable heavy fishing stakes exist which render it a very imprudent thing for a vessel to attempt to navigate this distance after dark.

To the eastward of Quantow Head the land is low, and the water shoal for a long distance off shore, to avoid which, when approaching Pakhoi from the southward, Quantow hills should not be brought to bear North of N. by E.

Quantow Head is a bold headland 390 ft. high, forming the western extremity of a narrow peninsula of which the northern extremity is the pro-

jecting beach on which the village of Tikok, one of the limits of the Pakhoi anchorage, is built. To enter the harbour after having reached about a quarter of a mile to the West of Quantow Head, a vessel should steer for the northern end of the fishing-stakes which will now be seen to the N.E. planted athwart the entrance of the harbour in tiers running N.N.W. from the village of Tikok for a distance of 830 yards, taking care not to get into less water than 3 fathoms, as a sandspit runs out in a N.E. direction from the N.N.W. point of the head; at the same time a vessel must not go too far off, as there is a sand-bank running East and West to the North of the fishing-stakes. The fishing-stakes can be passed close alongside (some in fact occupy the deepest part of the channel), after which a course East by South for a short distance takes a vessel to her anchorage.

There is a detached hill to the East of Quantow Head, 130 feet high, known as Tikok Hill. When this hill bears S.W., and the northern end of the fishing-stakes bears W. $\frac{1}{2}$ N., good anchorage will be found in $4\frac{1}{2}$ fathoms at low water.

The tides at Pakhoi are not regular. There is as a rule only one tide in the 24 hours, which varies in its rise and fall from 8 ft. to 17 ft.

The soundings from Haik'ao to Pakhoi are regular, and by attention to the lead notice of approach to land will be given in ample time to avoid accident.

CAPE CAMI, the N.W. entrance point of Haïnan Strait, is a low sandy point backed by sand hills with patches of scrub. *Hoosheak Hill*, at 25 miles from the cape, will be easily recognised from its isolated position. Black rocks extend from the cape for some distance. Strong tide ripples and patches of discoloured water are met with in this vicinity.

The spit of shoal water is reported to extend off the cape in a south-westerly direction for a distance of 2 miles; but there appears to be no danger off the point, outside of the sand-spit. Good shelter from N.W. winds may be found in 7 fathoms, sand and mud, with Cape Cami bearing N.W. $\frac{1}{2}$ W. distant about 4 miles.

About 12 miles West of Cape Cami there is a sand-bank, upon which as little as $3\frac{1}{2}$ fathoms are said to exist, it is apparently a ridge extending North and South for several miles with 13 fathoms on each side of it.

A shoal of 6 fathoms is reported 8 miles W.S.W. from the cape; of 7 to 9 fathoms distant, 15 miles in a W.N.W. direction; and 26 miles W. $\frac{3}{4}$ S. from the cape, is an extensive sand-bank with depths of 5 to 6 fathoms.

Haïan Bay, 15 miles eastward of Cape Cami, may be easily recognised by a white fort (96 ft. above high water), erected on the West entrance point, opposite the village of Haïan. The anchorage is in 5 fathoms, $1\frac{1}{4}$ mile South of this fort, whence the water shoals rapidly to the shore. Sheumen Pagoda, another conspicuous land-mark, lies N.W. from Haïan Fort, distant about

5½ miles. The anchorage is protected from all winds from East round through North to West; the bottom is mud, and affords good holding ground. The greater part of the sugar exported from Hoihow is brought over in junks from Haian.

Baksha Village is situated at the head of a white sandy bay, about 2 miles East of Hian: there is anchorage for junks about a quarter of a mile from the village. Numerous fishing-stakes extend off the East point of Haian Bay, and a reef of rocks stretches off the same point, in a south-easterly direction, for some distance.

4.—HAINAN ISLAND.

Hainan Island, bounding the Gulf of Tong King to the eastward, is about 155 miles in extent, N. E. and S. W., and about 90 miles in breadth. It is in most parts very high uneven land when viewed from seaward, but in the interior there are many level districts, cultivated with rice, sugar-cane, areka or betel-nut trees, and tobacco. These cultivated plains are separated from each other by lofty mountains, covered with impenetrable forests, through which the natives have cut narrow passes in the most accessible parts, to enable them to go from one district to the other. The island forms part of the province of Quang-tong, and is subject to the Chinese, who hold all the places of profit or of consequence, keeping the inoffensive aborigines in a state of abject poverty. Kien-chew or Kiung-chau, the capital of Hainan, is situated at the North side of the island and a few miles from it. Hoi-How, a treaty port, stands on the banks of a river on the North coast of the island.

The N. W. coast of this island is little known to Europeans.

The South and S. E. coasts* are bold to approach, with soundings generally from 25 to 35 fathoms very near or close to the headlands, deepening to 65 or 70 fathoms about 15 miles off; and in some places these soundings extend 18 or 20 miles off shore.

The S. E. coast is indented with several fine bays, affording good anchorage and shelter from the N. E. monsoon. Each of these bays may be considered a safe harbour during that monsoon, but they are partly open to southerly winds.

* The survey of the S. E. coast of Hainan was made by Captain Daniel Ross, I. N., on board the surveying ships *Discovery* and *Investigator*, in 1817. It commenced at Gaalong and Yulinkan Bays, where base lines were measured on the shore; after which a chain of triangles was carried on from the East Brother Island to False Tinhosa Island, and in that space three spaces were measured by sound, and every care taken to render the survey correct. The other coasts of the island are incorrectly delineated, and not to be relied on.

Winds.—*Typhoons or hurricanes*, as some writers term them, have been singularly destructive in Hainan. As at Hongkong, they usually take place between June and October, August and September being the worst months. The Chinese state that the more violent ones give ample notice of their approach, generally occurring every two or three years, though twelve months never elapse without a typhoon visiting the coast. No very heavy storm, however, appears to have happened for about five years (1876), though one of moderate force destroyed a good deal of property last autumn. K'ung-chow is said to have been three times entirely destroyed by typhoons within historic times. The extremely violent typhoons are locally known as *Chü-fung*, the ordinary ones being called *Pao-fung*.

The average *temperature* of Northern Hainan is slightly above that of Hongkong, but the climate is very damp, *fogs* continuously prevailing for long periods. Hr. Taintor describes the spring as dry, but rain fell frequently during my stay of nearly three weeks. The monsoons blow as at Hongkong, viz., the S.W. from April to October, and the N.E. from October to April. Their force is, however, very irregular on the North coast.

Banks at the Eastern Entrance to Hainan Strait.—In the vicinity of Hainan Head there are several dangerous sand-banks, upon which the sea sometimes breaks. There are deep-water channels between them, which, when properly surveyed and defined, may be used by vessels proceeding to the eastward, but an attempt to pass between the banks must always be attended by uncertainty and risk, owing to the strong currents which prevail in this neighbourhood, and the distance of the sand-banks from the land. No reliable directions for the passage in or out can be laid down until the locality is better known. In the directions hereafter given for approaching Hoi-how, some remarks are made on the passage through these banks.

HAINAN HEAD, the N.E. point of Hainan is low and rocky, terminating in a reef, awash at high water, extending North half a mile from the shore. The mound, usually called Hainan Head, lies about three-quarters of a mile S.W. $\frac{3}{4}$ W. from the N.E. point, and when bearing S.W. by S., 5 or 6 miles distant, appears as a flat-topped mound about 180 ft. high, between which and Mount Mofou the land is low. Some black rocks above water extend off the mound to the N.E., and at a distance of 3 or 4 miles there are breakers.

Mount Mofou, S. 41° E., 20 miles from Hainan Head, appears at a distance as an island, and has sometimes been mistaken for one of the Taya Islands, which are, however, much smaller. It is high, with a cleft in its centre, and rises to a height of 800 to 1,000 ft.

The coast West of Hainan Head recedes a few miles, and then trends West for about 5 miles, terminating in a sandy point (Poochin Point), from which it trends South, towards Poochin Lagoon.

Poochin Pagoda, a round whitewashed building with red top, 488 ft. above

the sea, stands on the highest of the sand-hills, 6 miles W.S.W. from Hainan Head. *Poochin Lagoon* is used by small vessels, able to cross the bar, of 7 or 8 ft. A patch of rocks, dry at half-tide, lies half a mile West of Poochin Point, and there are numerous fishing stakes hereabout which require caution.

A *shoal*, on which the water is said to break, is reported to lie N.W. by W. from Poochin Pagoda, about 3 miles off shore. This shoal is said to extend 8 miles in an East and West direction.

The coast from Poochin Point to the entrance of the lagoon is faced with rocky patches, and must be approached with caution. There is said to be a well-sheltered and safe anchorage in the N.E. monsoon, in 4 fathoms, about half a mile S.W. from the point. The coast from the entrance of Poochin Lagoon to Hoi-how Point is low, with no conspicuous objects for the first few miles; it forms a deep bay, which is reported by the native fishermen to have several shoal patches. *Kien-Chew-Fou* pagoda forms a good landmark, but is hidden behind trees when bearing to the westward of South. There appeared to be a junk harbour with Kien-chew pagoda bearing South.

Hoi-How or Backsha Point lies West 17 miles from Poochin Pagoda. It is low and sandy, with fishing stakes extending off 2 miles N.N.W. from it. A village lies 2 miles inland. Hoi-how Bay is included between Backsha Point and Inner Point, 9 miles westward of it. Hoi-how is situated at its S.E. corner, between which and Backsha Point are numerous sand and mud banks extending off shore to a distance of 2 miles.

HOI-HOW BAY.—The following is chiefly derived from the pamphlet mentioned on page 462, which is illustrated with plans, and would be of much use to vessels visiting this port, especially as so little is now known of the coast.

Hoi-How, or *Hai-k'ow*,* may be considered at present as the port to *K'ung-chow*, or *Kien Chew*, which is, however, only important as the seat of government, and is situated upon the river, 14 li or nearly 4 English miles S.E. of it. There is, however, no water communication between the places for anything larger than a canoe, and an amusing method is adopted for the carriage of passengers and goods between the two places. Mr. Dennys says: "The means of transit, irrespective of walking, are threefold—by pony, wheelbarrow, or chair. Very few riders are seen, and the wheelbarrow (which is also largely employed for goods) seems to be the popular vehicle. It is ridden astride by both men and women, the feet being placed in stirrups on either side of the wheel. The whole machine is of the clumsiest

* Captain J. S. Cocker, of the Chinese gun-boat *Feihoo*, says that the name Hoi-how, commonly used by foreigners in China, is unknown in Hainan, where the name *Haik'ao* or *Haik'ow* is used.

description. The chairs are remarkably light and small, being anything but comfortable."

Hoi-how lies upon the shores of a shallow bay and still shallower creek or river (it being the former at low water, though it forms a branch mouth to the main river at high tide), both presenting great impediments to easy trade, its appearance is more thriving than one would expect. The principal industries, visible to the casual stranger, are rope-making, dyeing, junk-building, basket-making, &c., with, of course, numerous rice mills, small silversmith's shops, vermicelli and beancake shops, &c., such as may be seen in any Chinese town. The population of Hoi-how numbers about 12,000.

Supplies are plentiful and prices moderate. Water is brought off in water boats, but it is unfit for drinking or cooking purposes, being muddy and brackish. A large trade in sugar, ground nut cake, bean cake, also oil, coins, and Chinese articles is carried on by junks, between Hoi-how, Swatow, Macao, and other northern ports.

There is a British Consulate and a Custom-house. The former stands about a quarter of a mile S.E. of the southern fort at the mouth of the Hoi-how River, and at high water is practically isolated from the surrounding neighbourhood. The building allotted to the staff of the Marine Customs, which is only accessible to cargo-boats at high water, lies East of the British Consulate, and not far from the edge of the western suburb. A foreign settlement may be formed.

The coinage, &c., is described in the Appendix at the end of this volume.

The Anchorage of Hoi-how is essentially shallow, consisting of a sandy and mud-bottomed bay, slightly protected on its N.E. side by sand-spits, but considerably exposed to all winds, except those blowing from the southward. At a radius of about 3 miles from the mouth of the creek upon which Hoi-how is situated, there is a depth of from 5 to 6 fathoms, but this position is entirely open; and this depth rapidly decreases, so that from 10 to 12 feet only are found at low water when about 2 miles distant from the same point. Vessels drawing 15 ft. of water cannot safely anchor under $2\frac{1}{2}$ miles from the shore. H.M.S. *Egeria*, drawing 14 ft., was anchored at this distance. The *Ling-Fêng* and *Sun-Chi*, drawing 8 feet 6 inches and 9 feet respectively, were anchored at a similar distance from the forts, but nearer to the South shore of the bay; nor did soundings taken justify their moving farther in. A glance at the chart, however, will, better than any description, give a clear idea of the anchorage.

Tides.—According to a note upon the survey of Hoi-how anchorage made by Mr. Henderson (Chief Engineer of the Lighthouse Department), and the Captain of the *Fei-hoo*, the tides are very irregular, they themselves observing only one high and one low water a day.

The range of tide is 7 ft. The flood sets into the straits from the eastward, and into the bay from the N.E.

At Hoi-how, during 37 days in May and June, 1876, when the tides were observed by H.M.S. *Egeria*, the greatest range was found to be $11\frac{1}{2}$ ft., the least 2 ft. At the period of the highest tides, which apparently follow the moon's extreme declination, there is only one flood and one ebb in the 24 hours, the flood making for about 16 hours, the ebb about 8 hours; velocity, $1\frac{1}{2}$ or 2 knots an hour. In like manner, the tidal stream through Hainan Strait was observed to set to the westward for 16 hours, to the eastward for about 8 hours; greatest strength 2 to 3 knots an hour. On the Hainan shore the stream is said to turn an hour earlier than in the offing.

Approaching Hoi-how from Hongkong.—Two routes from Hongkong to Hoi-how are open to vessels; one known as the "inshore," and the other as the "direct" route. The dangers of the inshore route (owing to defective surveys) are somewhat great. The difficulties of the navigation from Now-chow to Hoi-how can scarcely be exaggerated. A vessel missing the tide, owing to fog or other causes, is detained for the day, the southern portion of the anchorage being crossed by a sand-bar, which, at high water, has a little under 3 fathoms on its deepest part. Vessels drawing 16 ft. of water cannot safely attempt it, even in smooth weather. H.M.S. *Egeria*, drawing 14 feet 6 inches, nearly touched on crossing it, in company with the S.S. *Anlan*, when conveying H.B.M. Vice-Consul to Hoi-how—there being then a very heavy sea on. After passing the bar, shoals and rocks, some awash and almost all marked by breakers, abound on either hand, until the extremity of the Lien-chow peninsula has been cleared.

Pilots.—Now-chow furnishes an ample supply of more or less competent pilots for the inshore route, some nine boarding the *Ling-Feng* on her entering the anchorage, all of whom possessed certificates from masters of vessels.

The Direct Route, or that through the banks lying N.E. of Hainan Head, has been several times successfully used. The shoals may be identified by the dark yellow water on them, and by the heavy breakers which exist, even in fine weather. The channels between are 4 or 5 miles wide, and have deep water of a light green tint; there is probably a depth of 5 to 12 fathoms. The tides are strong, and heavy overfalls exist in the vicinity of Hainan Head.

The following directions by Captain Cocker, of the Chinese cruiser *Ling Feng*, should be used with caution, until the locality is better known:—Vessels from the eastward should endeavour to make Hainan Head, bearing S.W. by W. $\frac{1}{2}$ W. and keeping it on that bearing, approach within 6 miles; then steering to the north-westward pass 4 miles North of Hainan Head. Bring Poo-chin pagoda to bear S. 40° W., well open of Hainan Head, and pass 3 miles North of the pagoda, then haul out to pass 8 miles North of the low sandy coast which lies between Poo-chin pagoda and Hoi-how, until the Hummocks (p. 476) bear S.S.W., when the vessel may steer to pass outside the fishing stakes and thence for Hoi-how Bay.

H.M.S. *Lily*, in 1876, found a clear channel to Hoi-how, from a position about 7 miles North of the Taya Islands, passing about 4 miles northward of Mo-fou Point, and rounding the reef, stretching off the N.E. point of Hainan, at a distance of a quarter of a mile.

Mr. Anderson, master, S.S. *Conquest*, 1876, reports the existence of a good channel, free from danger. He recommends, when leaving Hoi-how, to bring the sand spit off Baksha Point to bear South, and from thence an E. by N. $\frac{1}{2}$ N. course, leads between the shoals in about 12 fathoms water.

The Coast.—As before stated, the North, West, and East coasts of Hainan are but little known to Europeans. The following brief description of the North coast is by Lieut. W. H. Stephens, R.N., of H.M.S. *Egeria*, 1876, and of the West coast by Lieut. H. C. St. John, R.N., who carried a line of soundings along it in H.M. gun-boat *Opossum* in 1865.

Jinmee Point, as before remarked, forms the western point of Hoi-how Bay. It is composed of barren sand-hills, the point being made remarkable by a cone-shaped mound, situated half a mile from the beach, and by a village on its western side.

About 6 or 7 miles inland a range of hills rises gradually from the eastward, and terminates to the westward, in two extinct craters, named the *Hunmooks*, which bear S.W. by S. from the end of Backsha Sand Spits and S. by E. $\frac{1}{4}$ E. from Jinmee Point. They are visible about 25 miles distant, and form a conspicuous mark. Numerous fishing stakes extend from Jinmee Point for a distance of about a mile.

Between Jinmee Point and *Sad Point*, 15 miles westward from it is a shallow bay, bounded by low land, which, however, rises in its western part and at Sad Point, cliffs of a dark red colour, and 80 ft. high, are formed. A detached piece lying N.E. of the point is very conspicuous in approach from the westward. West of Sad Point is *Manu Harbour*, on the western side of which the coast is again low, and at a distance of 8 miles inland rises the gently sloping mound called *Laam Koo Hill*. It is in lat. $19^{\circ} 55' N.$, long. $109^{\circ} 39' E.$ A reef extends half a mile off the western entrance point of Manu Harbour.

Pingmar, or *Double Hill*, about 40 miles S.W. of Manu Harbour, is conspicuous from all directions; it rises abruptly from low land, and forms a double-headed hill distinctly separate on N.E. and S.W. bearings, but makes like a round-topped single mount when bearing about S.S.E. 25 or 30 miles distant. Between Laamkoo Hill and Pingmar the land appeared low, forming How-sui Bay; about halfway between the two hills, and some distance inland, is a round-topped, isolated, conspicuous hill, named by the pilots *Koong-chin*, and the volcanic mountains before mentioned are sometimes visible beyond.

The N.W. coast of Hainan, from Hoi-how to How-sui, a distance of 45 miles, is flat and uneven, and the country appeared cultivated with sugar-

cane. At How-sui hills first begin to appear. A small vessel could anchor under the different points of land, but there is no good anchorage.

Off How-sui there is an island of sand (*Stumba* in Chinese), which is the only island between Hoi-how and Yait-chew.

Pingmar, on Double-hill Point, forms the western point of How-sui Bay. About a mile from it there is the remarkable double-coned hill, which has the same double appearance when approaching from North or South.

Pillar Point, 8 miles S.W. of Double Hill Point, is very remarkable, having a peculiar pillar rock on it, and a small mandarin hat-shaped islet joined to it at low water. *Flat Point*, 14 miles S.W. of Pillar Point, is remarkable. There is deep water close off it. Between Pillar Point and Flat Point is *Chappoo Bay*, in which is a good anchorage at Heong-po. Sandbanks lie in the mouth of the bay, as shown by the chart.

At 7 miles westward of Flat Point is the entrance to *Hoita Harbour*, a reef of rocks lying off shore between, covered at low water. Two small conical hills lie at the back of Hoita.

Bluff Point, 21 miles S.W. of Flat Point, is rocky, about 300 ft. high, with anchorage on its South side. From here sandbanks and shoals begin to appear, and continue as far as the S.W. point of Hainan. The *Opossum* passed inside of them. They appeared to extend some 10 miles to seaward, and are invisible from the shore. *Pyramid Point* is very remarkable, having a pyramidal rock shooting out of a low, flat, sandy point. North of it is Back-li Bay, so named from a village about 2 miles inland from its head; it lies to the North of Pyramid Point. The anchorage is off the village, but there is a small reef near it (which breaks only at low water), which must be avoided.

From Back-li Bay the *Bouncer* passed about 3 miles from Pyramid Point, and steering 6 miles off the land kept outside all the sands.

Snake Point, in lat $18^{\circ} 24' N.$, long. $108^{\circ} 54' E.$, forms the West entrance point of Yait-chew Bay, and terminates in two sandy hummocks about 100 feet high, lying N.E. by N. and S.W. by S. from each other. *Mud Island* lies South from Snake Point, distant about $1\frac{1}{2}$ mile. *Button Island* lies W. $\frac{1}{2}$ S., distant 1 mile from Mud Island. There is said to be no safe channel either between these islands, or between them and Snake Point. Maddock Rock, which covers at half tide, lies north-westward of the Button, at the distance of about $1\frac{1}{2}$ mile.

Yait-chew Bay affords good anchorage during the N.E. monsoon in $3\frac{1}{2}$ fathoms, about 2 miles from the beach at the head, from which to the shore the water shoals very gradually. A good position for anchoring is with Yait-chew Fort bearing N.N.E., and Mud Island in line with Button Island, bearing W. $\frac{1}{4}$ S.

Great Cape, at the eastern entrance to Yat-chew Bay, may be recognised by a hill surmounted by a pagoda, which lies about 4 miles E.N.E. from it.

S.W. 3 to 4 miles from Great Cape is a dangerous sunken rock. *Toucon Mountain*, 1,200 ft. above high water, is rugged, with several peaks.

Sama, Sanghia or Samoy Bay, 25 or 26 miles eastward from Yait-chew Bay, has several rocks and islets in it, with anchorage inside for small vessels.

Yulinkan Bay is separated from Sama Bay by a long narrow strip of land, which terminates in Soloman Point, and between it and Paumel or Tomb Point is the entrance, 3 miles wide. About a mile to the northward of Paumel Point, and near the eastern shore of the bay is a small island named *Zonby*. The usual anchorage is in 9 or 13 fathoms, on a mud and sand bottom, about three-quarters of a mile north-westward of *Zonby*, sheltered in every direction, except between South and W.S.W. Several ships, driven from the coast of China by typhoons at the beginning of the N.E. monsoon, have been known to take shelter here until the monsoon was over. The bay cannot be a safe anchorage in the S.W. monsoon.

Good fresh water is to be procured close to the beach in a small bay on the East side of Yulinkan Bay, and the natives are ready and willing to assist in procuring both wood and water.

A dangerous sunken rock lies S.W. from 3 to 4 miles from Great Cape, but the sea breaks over it if there is any swell on.

To the north-westward of the anchorage in the bay is a good channel leading into the creek or inner harbour, which is said to be the resort of pirates. The inner harbour is surrounded by hills, and forms the outlet of a fine river which falls into its N.E. part.

Directions.—A ship may warp in if the weather is fine; or if with a southerly or easterly wind she may sail in, by keeping nearest to the eastern shore until nearly abreast Rocky Point, then steer over for Sandy Point, and round it at a short distance. The best time to enter is at low water, the dangers being then more conspicuous, and 5 or $5\frac{1}{2}$ fathoms will be the smallest depth in the fair channel. Having rounded Sandy Point, and shut it in with the land on the East side of the outer bay, anchor in $5\frac{1}{2}$ or 6 fathoms, within a little less than half a mile of the shore near Sandy Point.

It is high water, full and change, in Yulinkan Bay at 9^h 45^m, rise about $2\frac{1}{2}$ ft. There is one tide in 24 hours during springs, two during neaps.

CAPE BASTION, the South extreme of Hainan, is in lat. $18^{\circ} 9\frac{1}{2}'$ N., long. $109^{\circ} 33\frac{1}{2}'$ E. It is the South point of a high peninsula, 4 miles broad, bold, of rocky appearance, and visible 25 or 26 miles off in clear weather.

GAALONG BAY.—At $2\frac{1}{2}$ miles eastward of Cape Bastion is a black rocky point, named *Cape Rhinoceros*, forming the West extreme of Gaalong Bay, which is about 5 miles wide, and 3 miles deep. In the eastern part of the entrance are two round islands, called the Brothers, and one called St. Peter, or Middle Island, near the middle of the northern part of the bay; in the N.W. part there are some rocks above and under water, and the bottom along the western side the bay is generally foul.

The usual anchorage for ships is between Middle Island and the eastern shore of the bay, in 8 fathoms water, over sand and mud. The *Discovery* anchored with the East Brother S.S.E. $\frac{1}{2}$ E., the West Brother S. $\frac{1}{2}$ W. nearly, and the two extremes of the bay S.E. $\frac{1}{4}$ S. and S.W. $\frac{1}{2}$ W., distant about three-quarters of a mile off the eastern shore. In this position much swell was experienced with a S.E. wind, from which it would appear to be a very unpleasant anchorage during the S.W. monsoon.

Water.—Northward from the usual anchorage there is a white sandy beach, and a rocky part of the shore separates it from the small bay to the eastward. On the N.W. side of these rocks fresh water can be procured from a small run, that terminates in a pool close to the beach. The tide rises here about 4 or 5 ft.

Directions.—The depth of water close outside the Brothers varies from 25 to 21 fathoms, and within them from 15 to 12 fathoms, decreasing gradually to 6 or 8 at the anchorage. With a leading wind the bay may be entered by one of the three channels; that between the East Brother and eastern shore has from 15 to 18 fathoms, coarse sandy bottom; but as a reef projects from the N.E. end of the Brother, it will be prudent to keep in mid-channel, or rather nearest to the main. The channel between the Brothers is safe, but the western channel is the most convenient with a working wind, being nearly 3 miles wide.

LEONG-SOY BAY.—Leong-soy Point, bearing N.E. by E. $\frac{1}{4}$ E. $23\frac{1}{2}$ miles from the East Brother, is formed by several high hummocks, having a sandy plain to the northward, and when seen at 16 or 17 miles distance, it appears like an island. At 2 miles westward of Leong-soy is another conspicuous point, with a hill of a sugarloaf shape; and about 2 miles farther to the N.W. are several dry rocks, steep-to, which extend three-quarters of a mile from another point. At $1\frac{1}{2}$ mile N. by W. of this latter point is a narrow and very shoal passage, which leads between two sandy points into an extensive salt-water lake. The anchorage off the bar is much exposed; the city is 7 miles from the anchorage. Farther to the westward is another considerable town, named Tong-kin.

TIEN-FUNG, or *Sail Rock*, in lat. $18^{\circ} 26\frac{1}{4}'$ N., long. $110^{\circ} 7'$ E., and bearing N.E. by E. from Leong-soy Point, is one of a cluster of large rocks above water, which, from its being higher and whiter than the others, has acquired the name of Sail Rock.

The Coast between Leong-soy Point and Tinhosa Island, about 29 miles to the N.E., forms a large bay, in which may be seen many sandy beaches, and very high land near the shores, but it affords no safe anchorage during the southerly monsoon. On the eastern shore of the bay stands the town of Munchow; and in the vicinity of the coast, near the middle part of the bay, are three prominent peaks of an elevated range of mountains, the centre one being the most pointed, and a little higher than the others; this lies near

the sea, and, at a considerable distance, is sometimes mistaken for Tinhosa Island. Capt. Ross made it in lat. $18^{\circ} 38' N.$, long. $110^{\circ} 7' 15'' E.$, which is about 2 miles inshore, and may be seen 35 or 40 miles off; when it bears W. by N. $\frac{3}{4}$ N. it is over Saddle Island. Farther inland, in about lat. $18^{\circ} 56' N.$, there is another mountain of similar appearance to the former, but more elevated. It was seen bearing W.S.W. nearly 90 miles distant, then forming in three peaks or sugar-loaves.

TINHOSA ISLAND is $2\frac{1}{2}$ miles in extent, in a North and South direction, and is formed by two high hills, united by a narrow sandy isthmus, which covers at high-water spring tides. The southern hill, the highest, is 600 ft. high, and its summit is in lat. $18^{\circ} 39' 45'' N.$, long. $110^{\circ} 27' E.$, determined by angles from the East Brother. The island is just discernible, from the poop of a large ship, at a distance of 33 miles.

False Tinhosa, in lat. $11^{\circ} 49' N.$, long. $110^{\circ} 32' E.$, and 9 miles N.E. from Tinhosa, is an island of small extent and middling height, and when viewed from the southward has a rock like a pillar at its eastern extremity. The island may be seen, in clear weather, from a distance of 23 or 24 miles.* A pagoda stands about 24 miles North of False Tinhosa Island.

The Coast from False Point, abreast of False Tinhosa, extends N. by E. and N.N.E. about 54 miles, to a point under which is shelter in the N.E. monsoon, and close to which, in about lat. $19^{\circ} 37' N.$, long. $111^{\circ} 5' E.$, is a high mountain named *Tongeon* by the Chinese, which may be seen 40 or 45 miles off; and from there being no other high land in its vicinity, may be taken for an island. The point on which the mountain stands is in lat. $19^{\circ} 37' N.$, long. $111^{\circ} 7\frac{1}{2}' E.$, and the depth of water was from 18 to 20 fathoms about $2\frac{1}{2}$ miles off it.

Chun-lan, in lat. $19^{\circ} 29' N.$, is reported to be a good harbour for vessels that can cross the bar. Wood, water, and provisions can be obtained.

The Hainan shore to the northward of Tongeon Point is very low and sandy, without cultivation. To the northward of this low land the coast becomes again high, and safe to approach; the high land projects a little to the eastward, and from lat. $19^{\circ} 43' N.$ stretches northward, forming Hainan Head, the N.E. extremity of the island, in lat. $20^{\circ} 0' N.$, long. $110^{\circ} 54' E.$

The **TAYA ISLANDS**, separated from the high land of Hainan Head by a safe channel about 12 miles wide, consist of two groups of high barren islands, six or seven in number, with some rocks, which may be seen about 12 or 15 miles off. The pilots say there is a safe passage 3 miles wide between the two groups. They extend N.E. by N. and S.W. by S. about 15 miles, the northernmost island being in lat. $20^{\circ} 2' N.$, long. $111^{\circ} 22' E.$ The southernmost island, in lat. $19^{\circ} 52' N.$, long. $111^{\circ} 12\frac{1}{4}' E.$, seems one of the largest, and from it a high sand-bank stretches to the N.N.E., having regular soundings, 20 and 21 fathoms about 3 miles from it on the East side.

CHAPTER XII.

NORTH-WEST COAST OF BORNEO.

TANJONG API is a low spit, forming the north-western extremity of Borneo. It has been referred to on page 287 ante, and the coast of Borneo to the southward of it has been there described. The term *Api*, fire is applied to this point, owing to its having been the principal pirate rendezvous,* where the visitors, upon going away, were accustomed to leave a log burning near the stream for signal to their friends.†

The point may be distinguished from the northward or southward, if showing in profile, by its abrupt termination formed by the stems of large trees, differing from mangrove, as well as by a small hummock within. The beach, also, is remarkable, being composed of very white sand, studded with black basaltic rocks, which project to seaward, showing reefs.

There is an extensive off-lying reef filled in by a sand-bank, which encircles the point, leaving an entrance to the northward. The soundings decrease rapidly from 12, 7, to 2 fathoms. Good anchorage may be found in 14 fathoms W N.W. of *Api Rock*.

Poon, palo-maria, and woods resembling cedar and ebony, adapted for spars and boat planks, were obtained here.

The entire range of *Datu*, presenting a detached mass, clear of the in-

* The active operations undertaken and steadily pursued in the four years, 1843 to 1846, had thoroughly destroyed all the pirate holds whence fleets of rovers had so long spread terror on the coasts of Borneo and many other countries, and the moral influence and example of regular government supplied by the colony of Labuan and the *Rajahship of Sarawak* have completed what was then so well begun, and although on rare occasions acts of violence are still committed, no professional pirate fleet or vessel has sailed along the coast for many years. Shipwrecked crews are treated with kindness, and the smallest trading prahu traverse in safety a coast line extending over more than 700 miles.—*Official Report*, 1875.

† The general observations on the coasts of Borneo are chiefly by Captain Sir Edward Belcher, C.B.

Mr. Logan, commanding the *Rob Roy*, bound from Labuan to Singapore, reported having seen off *Tanjong Api*, the wreck of a vessel ashore on a reef, lying with *Marundum Island* bearing N.E. $\frac{1}{2}$ N., *Haycock Island* N. by W. $\frac{1}{2}$ W., and *St. Pierre Island* W. $\frac{1}{4}$ S.

There is good reason to conclude that Mr. Logan was mistaken in supposing the wreck to be on a reef, as it was fallen in with afterwards by other vessels, drifting about, and ultimately went on shore a short distance southward of *Api Point*, where she was visited by the authorities of *Sarawak*. This danger is now removed from the charts.

Insertion.

intermediate mangroves, will lead to the northward of the dangers near Api Point.

Water.—As this is the only spot where good water can be conveniently obtained in this neighbourhood, it will be necessary to follow these very precise instructions for landing and procuring it with safety.

Tanjong Api is a low, rocky formation, on which the sea forces up the sand by its great exposure to westerly swells, and closes the mouth of a small river which would otherwise flow to the sea. The main stream, thus dammed up by the sand, forms a deep dark-coloured pool of a reddish tint. But nature has again, with a view to purify her supply of this invaluable article, interposed a reservoir, by forming a small strip or pond, running parallel to the beach, and containing about 100 tons of pure water, which is filtered through the barrier of sand, and thus furnishes to the passing traveller this inestimable gift.

Between the rocks there is a safe admission for boats, but due caution is necessary.

The best landing will be found 60 yards to the southward of the great rock on the North, where the beach is clear. Immediately within the beach line will be found the pond before alluded to, into which the engine suction hose may be placed. This supply is of such importance to mankind at large that parties visiting Tanjong Api should be warned from trying any wanton experiments, such as cutting a channel to the sea, by which it might be destroyed.

Tides.—The tide at Tanjong Api was found to rise about 7 ft., the direction of the flood, in 15 fathoms at 2 miles off shore, being E.N.E., and of the ebb S.S.W.

From a position off Tanjong Api to a similar position off Tanjong Datu, the course is E.N.E., and the distance $22\frac{1}{2}$ miles. The dangers within the line between these points have not been satisfactorily examined, and there is some reason to apprehend, from the sudden changes in the soundings, attended with suspicious eddies, that undiscovered rocks lie near the surface.

TANJONG DATU.—Great caution should be observed in approaching this point. The tides are rapid, and the reef which encircles it, at a radius of 2 miles, is studded with rocks, several of which are frequently awash.

There is no inducement of any kind to bring a vessel within 3 miles, therefore no excuse for risking its dangers within a depth of 19 fathoms, where a vessel may securely anchor to await the change of tide.

The entire western coast of this mountainous range is studded with rocks, and the landing is difficult and dangerous. On the eastern side the coast runs suddenly to the southward steep-to, and offers two sandy bays. A coral bank, with detached rocks, being a continuation from the point, extends about 3 miles to the southward, but there is deep water within.

Tides—The flood stream off shore sets East, the ebb nearly West; rate 2 to $2\frac{1}{2}$ knots.

NIGER BANK, discovered in 1858 by H.M.S. *Niger*, and surveyed in 1862 by H.M.S. *Rifleman*, is composed of hard clay, $4\frac{1}{2}$ miles long East and West, and $1\frac{1}{2}$ mile broad. The outer edge of the centre part of the band is about North, distant 5 miles from Tanjong Datu. The bank has 5 to 9 fathoms on it, and is very convenient to anchor upon to await tide; the 5-fathom spots are towards the East and S.E. ends.

Caution.—In the event of detached boats, or a very small vessel, seeking shelter, it may be found at 7 miles southward of Tanjong Datu, in Sleepy Bay (Pirate Bay), but caution is necessary, as rocks near the surface are abundant. Fresh water was not found. The whole space included between a line from Tanjong Datu to Talan Island is very dangerous.

The Coast.—E.S.E. 43 miles from Tanjong Datu is Tanjong Sipang, at the extremity of a high peninsula, the coast between forming an extensive bay, within which are the rivers *Siru*, *Samatan*, and *Lundu*; *Sampadien* and some minor estuaries also discharge their waters, and in the eastern extreme of the bay the Sarawak presents its western embouchure. There are several small islands, the entire spaces between which are safe up to 6 fathoms, but within that depth great caution is necessary.

The Talan or Turtle Islands lie S.E. by S. 13 miles from Tanjong Datu, and deserve notice as affording a rendezvous or shelter under their lee for boats. The northern island is remarkable for the resort of turtle to a small sandy delta on its southern side. *Turtle Rock*, lying S.S.W. about three-quarters of a mile from Little Talan Island, is uncovered at low water, and dangerous by night.

TANJONG SIPANG may always be distinguished from the eastward or westward by two remarkable thumbs or sugarloaf cones, which show out clear next its northern extremity. The southern crest of the range (*Santubong Peak*) 2,712 ft. above the level of the sea, can be seen clearly at a distance of 40 miles.

Samarang or Cruizer Rock, with a $3\frac{1}{2}$ -fathom patch about a quarter of a mile S.W. of it, lies 3 miles North of Tanjong Sipang, and covers at half ebb. It is surrounded by deep water, having 6 or 7 fathoms close to, and is difficult to find. Mantang Peak in line with the western side of Tanjong Sipang, clears it on the East, and the eastern points of Tanjong Sipang in line clears it on the West; the thumb of the point end on leads on it. Probably it is a continuation of the range, this being another outlying sugarloaf.

Sailing vessels navigating this coast must always be prepared to drop a light anchor should calm attend an opposing tide, and particularly between Tanjong Api and Tanjong Sirik. In the depth of 14 fathoms no danger may be apprehended. The flood does not run more than four hours, and the strength of the ebb prevails eight; and where calms are frequent, and steam is not available, no advance can be made without great attention to this subject.

The Santubong Entrance to the Sarawak River was surveyed by Sir Edward Belcher in 1844.

Navigating-Lieutenant H. V. Russell, of H. M. S. *Reynard*, in 1863, remarks "that the Santubong entrance is not navigable in the N. E. monsoon; even the small trading steamer uses the Moratabas entrance when going to Singapore during this season. But at any time the Moratabas is the best channel for a stranger to take. Pilots are not to be found at the mouths of the river, but by sending to the Rajah of Sarawak the assistance of the Europeans in charge of the gun boats may be obtained."

Tides.—It is high water, full and change, at the Santubong entrance, at 4^h, springs rise 10 ft., neaps 6 ft.; at the Sarawak junction at 5^h, at Sarawak city at 5^h 20^m, and springs rise 15 to 18 ft., neaps 9 ft.; and at the Moratabas entrance at 4^h, springs rise 9 ft., neaps 5½ ft.

Lieut. Russell remarks that the highest tides occur at the change of the monsoons, viz., March, April, and November. In the N. E. monsoon the new moon gives the highest tide, and those of the day are more regular, and exceed in height those of the night; while during the S. W. monsoon the contrary takes place, and the higher tides are then at full moon.

Directions.—Making the land from the N. W. or N. E., the position, as regards the two entrances to the Sarawak, may immediately be determined by the inland or coast ranges in connection. Thus Matang Peak, seen clear to the westward of Santubong crest can leave no doubt as to the lead to the western mouth. The thumbs will also show on the left of the profile of Sipang. Another feature is exhibited, which is not visible farther to the eastward; this is the topsail-shaped detached elevation on the right of Matang.

Approaching from the N. E., Matang, seen eastward of Santubong Peak, will afford a satisfactory guide either for Tanjong Sipang, or for finding Tanjong Po, the mark for the Moratabas entrance to the Sarawak, for which latter it is unerring, bearing S. W. by W. ½ W. from a distance.

Matang, when seen to the eastward of Santubong, shields Topsail Peak from view, and the very steep character of Santubong affords on this view a safe leading mark, even as far as the mouth of the Sarebas River.

To ascend this branch of the Sarawak it will be expedient to obtain a good local pilot, or to have boats sounding in advance, as well as immediately under the bowsprit, as there are several dangerous patches of rock, one of which is in mid-channel. A *red buoy*, the position of which, however, is not to be depended on, lies off the entrance of the river N. W. by W. from Mount Santubong. The channel thence extends about S. S. E. 4¼ miles to Royalist Rock beacon, just westward of the entrance point of the river, and on the South side of the channel. There was but 2¾ fathoms on the bar at high water in 1864.

Moratabas Entrance to Sarawak.—From Tanjong Sipang, *Laki*, or *Peile Island*, lying off the northern extremity of Po Point peninsula, bears E. by S. $\frac{1}{2}$ S. $10\frac{1}{2}$ miles; and this course may be safely steered by day or night, if the land can be distinguished, hauling northerly if the depth decreases to less than 5 fathoms; but in bad weather or fogs a depth of not less than 12 fathoms should be risked.

Po Point Lighthouse, of a bright yellow colour, stands on the summit of the point; since the year 1873 a *fixed bright light* has been shown from it, at an elevation of 490 ft. above the sea, and visible 15 miles off. The river is stated to be *buoyed* on its left bank from Moratabas Point, fronting the fishing village, to the village of Sinjinkat.

The entire face of Moratabas sea range to the N.E. is steep-to, and may safely be approached into 8 fathoms; and if intending to enter the Moratabas Channel, this shore should be hugged, passing within half a mile of a white rock or islet off Po Point. The Moratabas Channel begins at this white rock, within half a mile of which is the deep part.

Navigating-Lieutenant Moss, of H.M.S. *Scout*, in March, 1863, surveyed the Moratabas entrance, and found that the banks forming the channel had altered considerably since Sir Edward Belcher's survey, rendering the directions for navigating it given by that officer no longer applicable. Navigating-Lieutenant Russel, of H.M.S. *Reynard*, shortly afterwards made a track survey of the river from Moratabas Point to Sarawak, which is sufficient to enable vessels to proceed up safely. The *Rifleman* twice entered the river, and steamed up to Sarawak, guided by these surveys, finding the soundings correct, and experiencing no difficulty.

The channel of this entrance of the river is bounded on either side by banks, composed generally of sand, with mud in places. The western bank takes from Po Point a direction about S. $\frac{3}{4}$ E. for a distance of nearly 3 miles, when it rounds away S.S.W. $\frac{3}{4}$ W. for a mile, and then S.W. by W. for $1\frac{1}{2}$ mile, where it forms a slight projection; from thence it trends West to Moratabas Point, distant half a mile.

A conical *buoy* painted *red* is (or was) placed off the spit of the Si Jalore Shoal, or western bank, in $3\frac{1}{2}$ fathoms, low water spring tides. Vessels should not attempt to pass to the westward of this buoy, but should pass a quarter of a mile to the eastward of it.

The outer edge of the eastern bank, marked by the 3-fathom line, appears to lie about N.E. by N., distant $3\frac{1}{2}$ miles from Po Point; from thence it takes a southerly direction for 5 miles, and then curves up gradually to Brooke Point, opposite Moratabas Point. But the outline of the eastern bank is somewhat irregular, and a detached knoll of sand, with only 14 ft. water over it, called *Scout Shoal*, from H.M.S. *Scout* having touched upon it, lies with Po Point bearing N.W. by N., and Moratabas Point S.W. southerly.

The deepest water over the bar is between this knoll and the western bank, the distance between them being about a mile. The depths at low water spring tides are $3\frac{3}{4}$ and 4 fathoms, and the bottom is composed of hard sand.

Otter Rock.—The barque *Otter*, on her way down from Quop anchorage, struck and remained some hours on a pinnacle rock, with only 3 ft. on it at low water springs, and deep water all round. The rock lies nearly in the middle of the river, $1\frac{3}{4}$ mile within the entrance points, and E.N.E. about 9 cables from the Belcher Rock. The pilots and small steamers navigating the river always pass to the southward of the rock.

Directions.—Proceeding from abreast Po Point, keep the islet half its breadth open of the point, and steer S. by E. $\frac{1}{4}$ E. until Po Point is distant about 3 miles, and Mount Santubong (2,712 ft. high), distant 13 miles, bears W. by N. $\frac{1}{4}$ N., and is seen in the centre of a break in the hills. The above course will leave Scout Shoal, two-thirds of a mile distant, on the port side, and bring you to a position half a mile E.N.E. of the red buoy. From this position steer S.S.W. $\frac{1}{2}$ W. towards a clump of trees on the South entrance point of the river until Tree Point, the first point northward of Moratabas Point, is in line with the S.W. Sharp Peak, bearing W. by N. $\frac{1}{2}$ N., when steer W.S.W. $\frac{2}{3}$ W. into the river midway between the points. Otter Rock, within the points, has been above described.

Caution.—With strong northerly winds a heavy swell is experienced when about halfway between Po Point and Sarawak River entrance. H.M.S. *Juno*, drawing 18 ft., slightly touched when in mid-channel at half-tide, with 28 ft. soundings, in February, 1877.

Water.—To the eastward of Peile Island is a water-stained cliff, with a minute cascade delivering itself most invitingly into the sea. The ascent to the cliff, about 30 ft. above the sea, is easy. On the summit will be found a series of natural reservoirs of transparent water.

Vessels drawing more than 15 ft. water, or of greater length than 200 ft., cannot go above the Quop without incurring considerable risk; and almost every man-of-war that has gone up has met with some accident.

THE SARAWAK RIVER.—The delta of this river is formed by the several streams which have been briefly described. They unite at the Quop, or Lintang Junction, about 8 or 9 miles above the bar of the Moratabas entrance. Elaborate directions have been given for their navigation, but as it is manifest that in addition to the changes which necessarily occur in the channels, much local knowledge would be required to pass safely up or down, they are not here repeated. Some direction boards have been nailed to the trees at the more important points, and their warnings or guidance should be attended to.

TOWN of SARAWAK or KUCHING.—The principal part of the town is on the South side of the river, where there is a good bazaar and market. The church and bishop's residence are also on this side of the river; and

close to the building, half fort and half house, which stands on Crookshank Point, are the post-office, treasury, and other government offices.

The Rajah's house is prettily situated on a small elevation above the new fort, with one or two bungalows near it for the use of his staff.

In 1871, the total value of exports was £169,826; of imports £172,331. In this year twenty-three vessels entered from Great Britain and her colonies, carrying considerably more than half (in value) of the imports and exports.

Beef and fowls, with sweet potatoes and other vegetables, can be obtained without difficulty.

Directions to pass outside the Moratabas.—Owing to the shifting of the banks at the Moratabas entrance, the exterior line of danger, in 3 fathoms at low water springs, is no longer represented by a line E. by S. $\frac{1}{2}$ S. from Po Point to Curong Island. Unless intending to enter the river, Sipang Thumbs should not be brought to the northward of West, until well past the Moratabas entrance.

LUPAR RIVER, or Batang Lupar, is known also as the Sakarran from the Sakarran tribe of Dyaks inhabiting it. To enter this river, bring Burong Island to bear S.S.E., or equidistant between West Peak and Bliong Hill, passing Burong Island at a safe distance. The mud flat has pretty nearly equal water over it, but it was found to be apparently deeper, and the bottom softer, close to the southern coast line (even with the starboard oars touching the mud).

For boats or vessels of light draught, the Lupar River may be approached from the northward, but it is necessary to be guided by the direction as well as time of tide, particularly as the ebb tide sets westerly on Burong Island.

The young flood brings in a *bore*, which may be avoided by anchoring in 6 fathoms within the Linga entrance, or in 4 fathoms eastward of Aboi Point, until after the first quarter flood.

Sarebas River is 12 or 13 miles to the north-eastward of the Lupar. Its entrance has not been surveyed, but Commander Miall, who, in 1858, in H.M.S. *Mohawk*, proceeded some distance up this river, remarks as follows:—The Sarebas is a larger river than the Rajang. In charge of a pilot, an Englishman in the employ of the Rajah of Sarawak, we proceeded 40 miles, though at night. The soundings are regular and deep. The only necessary precaution is to take the bends of the river (which are numerous), avoiding the spits which run out from the points.

It is high water, full and change, at Burong Island, at 4^h 45^m, and the rise of tide 7 ft. The flood tide off the island sets S.E., 2 $\frac{1}{2}$ knots an hour, and the ebb, N.W. by N., at the same rate; the ordinary rise is 6 ft.

RAJANG RIVER.—In this neighbourhood the land is very low, and a large river, the Rajang, falls into the sea by two mouths, the larger of which

is about 45 miles north-eastward of Tanjong Po, and 40 miles southward of Tanjong Sirik. This river is likely to become of some commercial importance, and it will, under very careful pilotage, admit vessels of 20 ft. or more draught, the following are deduced from what the original chart by Lieut. Gordon warrants.

His anchorage is marked just to the southward of Tanjong Jerri, the North point of entrance, and the leading mark given by him is the Lalang branch of the river open, with the South point of the entrance bearing S.E. $\frac{1}{2}$ E. But it would be preferable to bring Tanjong Jerri to bear East a little northerly, until the inner point, easterly, showed the river open in 5 fathoms. Enter on the first quarter flood with these marks lapping, when the swell of the last drain of ebb will have subsided, and give Tanjong Jerri a fair berth.

Commander Miall, in H.M.S. *Mohawk*, also proceeded up the Rajang. He remarks as follows:—"Steamed up the Rajang to the fort or stockade, a distance of 25 miles. The water is pretty deep, and there are but few dangers; the anchor was let go off the fort in $6\frac{1}{2}$ fathoms. The river at this part is very narrow; we experienced a difficulty in turning under steam on that account, as also from the strength of the tides."

Mr. Consul Ricketts, in his commercial report for 1865, remarks—"From accurate information, I find that there are from $3\frac{1}{2}$ to 4 fathoms over the bar of the Rajang at low water, and at high water probably 6 fathoms. Ships of 1,000 tons and upwards could proceed some few miles up the river and find good anchorage either at the village of Rajang, situated at no great distance from its mouth, or at Mount Sousou, about 12 miles above the village.

Tides.—It is high water, at full and change, at the mouth of the Rajang, at 4^h 45^m; the rise of the day tides is 9 ft., and the night tides 13 ft.; the apparent depth on the bar at low water (at the time of its survey, in 1847,) being 3 fathoms. The tides, both in this river and the Sarebas, are very strong.

Quitting this river, it is advisable to stand to the N.W. into 18 or 20 fathoms before stretching to the northward, to round Tanjong Sirik.

Palo River.—Following the coast line northerly from the Rajang, the Balony River is about 6 miles northward of Tanjong Jerri; it is unimportant, and possibly but an estuary connecting with the Palo River, halfway between the Rajang and Tanjong Sirik. The Palo has a small islet on the sandy tongue of its southern point.

Quitting the Palo River and proceeding northerly, the off-shore soundings, between 12 and 6 fathoms, appear to afford sufficient warning until nearing Tanjong Sirik, which should not be approached under a depth of 12 fathoms.

TANJONG SIRIK, the western point of entrance to the Bruit River, is low and dangerous, and shoals extend from it to the distance of 6 miles.

Vessels should not come nearer this point than 8 miles, nor into less water than 12 fathoms, the soundings decreasing rapidly from that depth to 4 fathoms.

It is high water, full and change, at the entrance of the Bruit River, at 3^h; and springs rise 11 ft. The ebb and flood preserve an E. by N. and W. by S. set off the entrance in 6 fathoms.

The tides in the offing set north-eastward and south-westward, but in-shore follow more closely the direction of the coast, and near Tanjong Sirik they will be found to run North and South with a velocity, according to the prevalence of rain, from 2 to 3 knots an hour. The flood tide will be found to produce a strong indraught into all the rivers, which must be carefully guarded against.

Proceeding northward from the Sarawak, a good off-shore course must be steered, and allowance made for the flood tide, which runs strong to the S.E. on the line between Tanjong Po and Tanjong Sirik, but follows more closely the direction of the coast in shore, setting strong into the mouths of the rivers. It will be well remembered that Matang sharp peak seen over the inner brow of Moratabas Peninsula about W. by S. $\frac{2}{3}$ S., is the danger line for vessels of moderate draught, and Sipang Thumb bearing West, the warning for the off-lying shoals of the Sarawak River.

Shoals extend 6 miles from Tanjong Sirik, the flood tide setting strong upon it with a heavy swell; this point should not, therefore, be neared to a less distance than 8 miles, or under a depth of 12 fathoms, the soundings decreasing suddenly from that depth to 4 fathoms.

The Coast.—From Tanjong Sirik to Tatan Point, a safe course, recommended, is parallel to the chord between these points about E. by N. in 12 fathoms, which will afford an average distance of 10 miles off shore. Proceeding, therefore, on this course in the above depth, if making a passage, or in 6 fathoms if intending to call at the rivers, we first meet with the mouth of the *Ballang River*. The entrance, which appears to be nearly North and South, with the river open, is barred nearly 3 miles off shore. The village of *Oury* is about 2 miles within, on the northern bank.

To the eastward of the Ballang are the rivers *Oyah*, *Panuit*, and *Judah*, but they have not been sufficiently examined to warrant more than the visit by boats. The *Muka* is the next important river in point of trade and population, but as the chart indicates only 3 ft. at low water, it is not likely to be visited by any but boats or native craft. Writing of this region, Lieut. de Crespigny, R.N., remarks, in 1873, that he had been up to Mount Ular Bulu in search of cinnibar, but had found no indication of it or any other metal.

The mouth of the *Neian* appears to have received some attention, off which Lieutenant Gordon anchored in two positions, N.E. and N.W. of its entrance. It is obstructed by a bar, having only 1½ ft. of water. This is succeeded by

the *Tatan River*, nearly 4 miles W.S.W. of Tatan Point. *Mount Tatan* is 1,890 ft. high, and bears S.E. $\frac{3}{4}$ E. distant 10 miles from the entrance of the Tatan River, and S.S.W. distant nearly 20 miles from the entrance of the Bintula River. Farther inland, to the southward of Mount Tatan, is a ridge of hills, the most prominent of which is named *Table Hill*.

The Bintula, also a barren river, was visited by the *Samarang* in 1843. The approach, particularly on the ebb, is dangerous. The cutter grounded about 2 miles off shore, and the swell several times threatened to top. The water deepens suddenly within, and the stream, which was fresh at the last of the ebb, is of a deep reddish hue. The natives, or probably a piratical crew, seen within, did not appear to be well disposed.

The natives' leading mark is a dead tree on Tupak Hill in line with the West point of entrance S.E. by S.

This part of Borneo is now under the Government of the Rajah of Sarawak, by arrangement with the Sultan of Borneo. Trading stations are established both at Bintula and Muka.

It is high water, full and change, at the entrance of the Bintula River, at 5^{*h*} 45^{*m*}, and the rise is 6 ft.

The following notes are from the *Sarawak Gazette*:—Bintula stands on the banks of a river which is easily navigated by vessels of the size generally employed on our coast. During the N.E. monsoon there is generally much less sea at the mouth of the river than at other places on the coast, as it is protected by Kidurong Point. There are 9 or 10 ft. on the bar at the top of the tide, and the entrance is about 60 yards across. The gunboat *Heartsease* and the schooner *Courier* have come in two or three times during the year 1870. From one branch at the head of the Bintula River the upper part of the Rejang can be easily reached by a short journey overland. This route is constantly used by traders during the N.E. monsoon. They find it easier to come from Baloi to Bintula at that season than to descend the dangerous rapids in the Rejang, which must be passed to reach Sibul. Another branch of the upper Bintula River runs in the direction of the Tinga. The journey overland between the streams only consumes a day and a half for loaded men. Tinga traders occasionally bring produce to Bintula by this route. Vessels, as they enter the Bintula River, have to pass the fort, and then reach the bazaar, off which all traders anchor. This bazaar is chiefly built of wood, with bilian ataps, though some of the houses are still roofed and walled with nipa leaves. The Kampong is further up, above the bazaar. New houses are being built here at the edge of the river on bilian posts 9 or 10 ft. high, with plank or bark walls and leaf ataps. These new houses are long buildings with a double row of rooms and a passage between, the people living on either side of this corridor. In front of the house are the platforms on which the raw sago is worked, built on posts or floating on

the river, for the sake of getting the water used in the process of making without difficulty.

The fort, bazaar, and principal part of the Kampong are built on the right bank of the river; there are, however, three smaller kampongs on the opposite bank. The exports in 1870, valued at 172,946 dollars, besides gutta percha and raw sago, consist of camphor, india-rubber, bezoar-stones, and various sorts of canes. The country up the river is laid out in large plantations of the sago palm. There are very few paddy fields, the inhabitants not growing rice enough for their own consumption. Bilian wood grows abundantly on the banks. The greatest obstacle to improvement is the want of population.

The *Acis Patches* were announced in October, 1860:—"Two coral shoals have been discovered off the N.W. coast of Borneo by the brigantine *Acis*. The position of the eastern shoal is given as lat. 3° 45' N., long. 112° 42' E. The other shoal lies on the same parallel, and at a short distance to the westward."

The *Rifeman* anchored near the reported positions of these patches, and searched for them without success. It is possible they may exist somewhere in that locality; but as 9 and 10 fathoms are shown on them in the chart, they were not of sufficient importance to detain her.

Kidurong Bay.—Northerly from the Bintula, at 5 miles distance, is *Kidurong Point*, and about 3 miles S.S.E. from the point is a round hill named Mount Kidurong. To the southward of Kidurong Point is the bay which has been sounded, by Captain G. Heyler, of H.M. gunboat *Heartsease*.

Kidurong Bay is the only place of shelter along 300 miles of coast from Tanjong Sirik to Labuan. In the N.E. monsoon small vessels could run in here, and lie safely at anchor, sheltered from E.N.E. and N.W. gales. The anchorage is good, being soft mud and sand; the soundings vary from 2 to 8½ fathoms; good anchorage could be obtained about a quarter of a mile off the inside point in 3 fathoms of water.

In entering the bay from the northward stand down till the point bears E. $\frac{3}{4}$ N. about one mile distant; then stand in E. $\frac{1}{4}$ N. to 2½ or 3 fathoms of water, and let go about a quarter of a mile from the inside point with the outside point bearing N.W. by N. Entering from the southward or Bintulu side stand out into 5 fathoms, then stand for the point about N.E. by N., but do not come closer than half a mile off the point, then stand in for the anchorage. Good *fresh water* may be obtained here in abundance.

The following are the bearings of the *proposed lighthouse*: Mount Tatu N.N.E., and Kidurong Hill S.S.E.—*China Mail*, 1872.

The coast from Kidurong Point to Breaker Bay and beyond appears to be studded by rocky ledges. Indeed this coast, up to Tanjong Bali, should be avoided within depths of 12 fathoms by day and 30 fathoms by night. The

soundings suddenly decreased from 12 to 6 fathoms, and heavy breakers, with rocks above water, were noticed some distance off-shore.

Lieutenant Gordon observes:—The large bay contained between Sirik and Barram Points, as far as we have examined it, appears to be free from danger. About 30 miles E.N.E.-ward from Sirik Point we found the soundings about 7 miles off shore uneven, varying from 3 to 5 fathom, sand. A rock also exists off Tanjong Bali, about 16 miles southward of Tanjong Barram, but it is only 3 miles off the shore, and inside the 7 fathoms line.

The principal objects along the coasts of this bay are *Mount Tatan*, 1,890 feet; *Mount Silungan*, 1,500 ft.; and *Mount Lambier*, 1,550 ft.

Marabu.—At $2\frac{1}{2}$ miles northward of Tanjong Bali, and 13 miles southward of Tanjong Barram, is the mouth of the *Meri* (or red) River, on the southern bank of which is the village of Marabu, where a considerable trade in bees' wax and camphor is carried on with Borneo and Singapcre. The entrance is barred, and shoals extend some distance from the coast.

TANJONG BARRAM forms an abrupt bend of the coast, and is fringed by a shoal line extending $2\frac{1}{2}$ miles from the shore. Off shore the soundings deepen suddenly, and no dangers seem to threaten; vessels working up may therefore stretch well off this point to the north-westward, so as to make a good beard to the eastward.

The *Barram River* discharges itself into the sea in a W.N.W. direction at the point. The greatest depth over the bar does not exceed 6 ft. at low water, but suddenly deepens within to 4 and 5 fathoms; the stream being fresh nearly at the mouth.

The *Coast* from Barram Point easterly for 45 miles is very low, intersected by numerous creeks, and at 38 miles from the point is the entrance of the *Ampa*, where there appears to be some trade, and whence several prahus were observed to depart.

AMPA PATCH.—N.E. $\frac{3}{4}$ E. 32 miles from Tanjong Barram, and 15 miles off shore, is the centre of a bank termed the Ampa Patch, composed of sand and coral, upon which depths of 5 fathoms was the least water found. It is surrounded by 15 fathoms, and irregular soundings.

SCOUT and VICTORIA PATCHES are two coral shoals lying to the south-westward of the Bruni Patches, the channel between which and the coast of Borneo, heretofore considered quite safe, being thereby rendered very dangerous. Each shoal extends nearly a mile in a North and South, and about half a mile in an East and West direction. These dangers were examined in H.M.S. *Rifleman*, in 1863.

H.M.S. *Scout* passed over the edge of the former patch, in 4 fathoms. The least water found by the *Rifleman* was 2 fathoms, which lies S.S.W. $\frac{1}{2}$ W. $4\frac{3}{4}$ miles from the West Bruni Patch, and W. by S. $\frac{1}{4}$ S. 12 miles from Keti Islet.

The Victoria Patch was discovered by H.M. I.N. steam-vessel *Victoria*, 16th

August, 1860, and the least water obtained upon it was 17 ft. It bears S.S.W. $\frac{1}{2}$ W. 7 miles from the West Bruni Patch; S. by W. $\frac{1}{2}$ W. 2 miles from the Scout Patch, and W. by S. $\frac{3}{4}$ S. 13 miles from Keti Islet.

A $2\frac{1}{2}$ fathom patch, discovered in 1860, lies 2 miles westward of Victoria Patch, and a $4\frac{1}{4}$ fathom patch to the S.W. of it.

The only mark to clear these dangers is a bearing of Keti Islet, which is just visible at a distance of 12 miles.

BRUNI PATCHES.—From the Ampa Patch, steering easterly, the water gradually shoals from 17 to 7 fathoms; when on the parallel of 5° N., and with Bruni Cliffs (above which cleared or bald hills will be noticed), bearing E. by S. nearly 10 miles, a series of coral patches will be found, extending 4 miles East and West, and 2 miles North and South, leaving a channel within of 4 miles free from danger. From these patches, on which 2 fathoms were found, Pisang Mount may be seen bearing East.

Two-Fathoms Rock.—Among the off-shore dangers a single cast of 2 fathoms lies with Bruni white cliffs, bearing S.W. by S. distant 10 miles, and Bruni bluff S.E. by E. $\frac{1}{2}$ E. 7 miles. Woody Peak in line with Bruni white cliffs leads directly on it.

Outlying Shoals.—During the passage of H.M.S. *Iron Duke*, in 1872, from Singapore to Labuan, soundings were obtained in 5 fathoms in lat. $5^{\circ} 5' N.$, long. $114^{\circ} 40' E.$, about $4\frac{1}{2}$ miles N.N.W. of the Bruni Patches, with the eastern extreme of the Bruni cliffs bearing S.E. $\frac{3}{4}$ E.

Colombo Shoal is placed on the chart in lat. $5^{\circ} 13' N.$, long. $114^{\circ} 44' E.$ It has 5 fathoms water over it.

Information was also received from the captain of a vessel trading between Labuan and Singapore, of a similar patch about 16 miles to the N.E. of that found by the *Iron Duke*, reported to be in lat. $5^{\circ} 13' N.$, long. $114^{\circ} 53' E.$ This position was determined from cross bearings of Kuraman Island and Mount Pisang.

GUNUNG MALU, in the interior, is the highest mountain noticed in this part of Borneo. It is in lat. $4^{\circ} 5' 20'' N.$, long. $114^{\circ} 55' 8'' E.$, and rises in a conical form, slightly flattened at the apex, to an elevation of 8,000 ft. It can be seen 90 miles, and is visible from Labuan to 20 miles southward of Barram, a range of 100 miles.

BRUNI BLUFF slopes easterly to Pisang Point, where the sea at times breaks heavily. The land rises to 600 ft. at *Mount Pisang*, which derives its name from pisang, plantain in Malay. It is bare on the crown, excepting a small patch of trees on its summit, and it forms the tail of a long range extending about 12 miles towards the city of Bruni, and exhibits traces of coal throughout. Numerous sandstone cliffs show to the northward.

PELONG ROCKS, lying 2 miles North of Bruni Bluff, consist of four

separate rocks stretching to the northward; the water is deep close-to, and the channel between them and the bluff is safe. W. by N. $\frac{1}{4}$ N. distant 6 miles is the 2-fathoms rock before described, having 5 fathoms immediately surrounding it, outside of which there are 10 fathoms.

The main channel leading to the E.N.E. from the Pelong Rocks may be safely worked, even at night, in fine weather. It is about 4 miles in width, and is everywhere safe in 16 fathoms.

Directions.—Between Sirik and Barram Points, steamers or vessels having a fair wind may steer to pass the latter 4 or 5 miles off. There is nothing in that track excepting the coral patches off the Bintula River (page 487), over which there are said to be 9 and 10 fathoms water. Neither are there any known dangers in the offing nearer than the Luconia breakers. Vessels working against the monsoons will find more regular tides in shore, but they must guard against the effects of the indraught of the flood tide into the several rivers.

Between Sirik and Tatan Points they may stand safely into 8 or 7 fathoms, but between Tatan and Barram Points it does not appear to be safe to stand into less than 12 fathoms, the soundings decreasing suddenly from that depth, and the whole line of the coast is said to be studded with sudden dangers from the instant the trees can be discerned.

From Barram Point to Labuan, or to the entrance of the Bruni River, it is proper, as previously remarked, to keep outside all the dangers between Barram Point and Bruni Bluff.

BRUNI RIVER.—The city and Malay state of Bruni have given their name to the largest island in the world, if Australia is reckoned as a continent. The modern name being synonymous with Borneo, as spelt by older authors. It has been visited by European vessels for the coal which exists in great abundance on the N.W. shore of the river. The trade of the port of Bruni is almost exclusively carried on with the British settlements of Singapore and Labuan, steamers running regularly between these places. The trade is much the same as that described at Labuan. In 1875 exports were valued at £36,663; imports at £36,672. The chief export was sago to the value of £17,835, and the chief import cotton clothes, valued at £13,448.

The port of Bruni lies about 15 miles up the river of that name, the navigation of which is easy, but an artificial bar, which was constructed about 300 years ago for purposes of defence, obstructs the free passage near the island of Cherimon. At this spot, however, the river itself keeps a narrow channel clear, sufficiently deep, at all times, for small craft, but large ships can only pass the bar during high water. The town is called by travellers a "water city," the houses being built on piles driven into the mud on either side of the main stream of the river. Its population, chiefly Mahometan, is estimated to number 35,000. The situation is considered healthy.

The river and its approaches were originally surveyed by Captain Drinkwater Bethune, R.N., in 1845, and this chart, with subsequent remarks, forms the basis of the ensuing description. Brief and later directions will be found on page 493.

The mouth of the Bruni River was especially examined by Lieutenant Gordon, in H.M.S. *Royalist*, and he observes:—"There are no good marks for entering, and I do not think there could be better directions than those given by Mr. Kirton in the old chart.—Thus: 'Do not come within $4\frac{1}{2}$ miles of the S.E. point of Moaro Island until it is brought to bear S.W. by W. or W.S.W., then stand right for it, as the Moaro Reef trends nearly N.E. for 3 or 4 miles.'

"*Moaro Reef* is all sand, and has two or three small rocks near the sea; it is only dry near the island at low water, but the whole of it is very shoal; coming near it may always be known by the soundings changing from mud to sand."

This rule of sand is not always a sure guide, as sand will be found on the Sundar Spit, and at night, or after sunset, a vessel obtaining 4 fathoms, sand may be induced to steer easterly, and thus become fixed for a tide on the Sundar Spit.

Some little experience in this locality, and as far up as the city of Bruni, induce the following: The whole region about the entrance to the Bruni abounds in dangers, demanding extreme caution, and the banks appear to have changed their outline since the old chart was constructed. Entering by the Moaro Shoal, endeavour to keep in 10 fathoms, or until reaching a depth of 5 fathoms, having Mount Pisang open of the northern extreme of Moaro Island on the bearing W. by S. $\frac{3}{4}$ S. Or, running down from the northward, bring it on that bearing and steer for Sapo Point, until having passed over 5 fathoms, sand, depths of 6 fathoms or less, mud, are obtained.

If the bearings can be depended on, and the outline of Moaro can be seen (trees northward), this course should lead directly up to the extremity of Moaro Spit.*

Tree Peak in line with Sapo Point bearing about S.W. by W. $\frac{1}{2}$ W. just clears Sundar Spit in 3 fathoms.

Now, at the present day, when every navigator handles his sextant with ease, let him bring Mount Pisang to bear W. by S. $\frac{3}{4}$ S., and steer for it until Mount Say subtends an angle of 18° . He will then know distinctly his position, and from thence he may be enabled practically to reach the anchorage off Moaro securely.

* Sapo Point is low, with a few shrubs, but there are (or were) high trees about 7 cables' lengths westward of it, which are seen 10 or 12 miles. A stranger would not be able to recognise Mount Say without a good description of it, on account of the numerous hills. It is a sharp cone, having an elbow at right angles on one side, and is seen over the hills close to the sea shore.—Navigating-Lieutenant Russell, H.M.S. *Reynard*, 1863.

Having proceeded as directed, steer now direct for Mount Say and watch the angle of Pisang with Mount Say, until it reaches $22^{\circ} 30'$, when the vessel will be in the fair channel in 6 fathoms, mud.

It is important to bear in mind that the course of the ebb is about N.E. $\frac{1}{2}$ E., whereas that of the flood sets about S.E. across Sundar Spit, on the starboard beam of a vessel entering, and *vice versa* departing. Due allowance should be made for this, and the hand-lead allowed to remain at the bottom a few minutes, if in doubt, to determine not only the set of the ship, but also if she overcomes the tide.

As soon as Sapo Point can be distinctly seen, it should be kept a little open of Tree Peak on its proper constant bearing, but if the flood tide be running it must be kept on the starboard bow. There is no fear of danger on that side, and Sapo Point must be hugged closely, to avoid the Tapayan sands, the flood running with considerable force past Sapo Point. The vessel should be rounded *to starboard*, and the anchor let go immediately on rounding the point, which will ensure the best berth.

The ebb tide strikes into the embayed coast line of Moaro, and forces the tide easterly, until it clears the point; precaution should therefore be observed to prevent the tide setting the vessel on to the eastern tongue.

Such instructions have proved a sufficient guide to enter rivers much more intricate than that of Bruni; and where the safety of a vessel is involved, neither the trouble of pilotage from aloft, nor the practice of the more improved modes, by reliable instruments, should induce any seaman to omit making use of the facilities which correct charts thus afford.

Vessels anchoring here should have an anchor well to the eastward, as night squalls frequently drive vessels from their anchors.

Water may be obtained near the beach, but unless driven by necessity, its use should be avoided. It is of a dark colour, strongly impregnated by peat, and probably affected by naphtha springs, or pyrites connected with the underlying coal.*

* A good channel, beacons with a least depth of 18 ft. at high water, leads up to it. The first and last of these beacons on the starboard or northern side are distinguished by a sort of ball on their summits, the space between and also the port side of the channel being marked by branches of trees. Vessels intending to take this channel may, after rounding Sapo Point, steer along the South coast of Moaro or at a discretionary distance, according to the depth of water, which decreases gradually towards the island, taking care not to open Mount Pisang or Bowong Point until clear of the Tapayan shoals, and when approaching Bowong Point keep a good look-out for the beacons on either hand, between which the vessel is to pass. A tolerable mark through between the beacons is a small elbow on the northern part of Mount Pisang, in line with some white cottages below it, bearing W. by N. or W.N.W. Strangers should procure a pilot, as the beacons are liable to be washed away.—Navigating Lieutenant H. S. Ley, H.M.S. *Cormorant*, 1857.

Sapo Point to Bruni.—The course of the river from Sapo Point to Bruni, the capital of Borneo proper, may generally be discerned by the lines of fishing stakes, which, at the period of Lieut. Gordon's visit appeared to terminate by the fishing stage in deep water, and alternately on either bank, Thus, by leaving the first on the left, second on the right, &c., the channel was easily traced by the boats.

Mount Pisang and Bowong Point (the south-western extreme of Moaro) in line clears both the Tapayan Spits; and Mount Say kept open eastward of Jagar Ridge leads up to the bar.

On nearing the islands Churmin and Ingaran (literally, Churmin, bright like a looking-glass, and Areng, coal), the channel between Ingaran and the main may be taken by boats. But the ship canal has been artificially narrowed by stones laid down, continuous with the reef from Ingaran, so as to compel vessels to pass under the guns of the forts on the North end of Churmin. The result has been to cause the current to cut a deep channel round the point of Churmin, and, entering with the flood, it requires very great caution, from the sudden turn from South to N.N.W., to prevent being thrown on the breakwater to starboard, or the Churmin Rocks to port. Fortunately the channel then leads by a moderate curvature to the western shore, after which a course mid-channel, and moderate attention to the chart, will carry safely up to the city, the anchorage being at the opening leading to the palace in 6 fathoms.

“The Barou Islands may be recognised on approach, the southern being high and rounded, the northern low, with two conspicuous clumps of large trees close together. Mount Say be known by taking its bearing on approach; it appears the northern of three hills of similar elevation, and has a steep notched shoulder on the right, which is the leading mark. If not made out before, after passing Sapo Point it will be the right-hand hill seen over River Point.”—Commander Bullock, H.M.S. *Serpent*, 1866.

“To enter: After passing Sapo Point, steer to the westward, and bring Mount Say to bear S.W. $\frac{1}{2}$ W. open East of Jagar Ridge, until Sapo Point bears N.E. by E. $\frac{1}{3}$ E., when alter course to S.W. by W. $\frac{1}{3}$ W., keeping Mount Pisang astern. When Mount Pisang bears N. by E. $\frac{1}{2}$ E., a stake beacon should be seen, which leave about half a cable on the port hand, then steer S. by W. $\frac{1}{2}$ W., keeping Mount Pisang astern. When Mount Say comes just clear of Jagar Ridge, the vessel should be between two stake beacons lying E. by N. and W. by S. from each other. From the beacons alter course to S.S.W., which should lead mid-channel between the beacons on South Bar bank and Barrier beacon.”—Navigating Sub-Lieut. R. H. Wellings, H.M.S. *Lily*, 1876.

H.M.S. *Lily* in crossing the bar at high water by the above-mentioned channel, had not less than 14 ft. water, bottom soft mud. At spring-tides,

2 ft. more water would probably be found. The flood-tide in the channel sets on to the barrier of stones.

In the river above Barrier beacon, considerably less water was found by the *Lily*, in the month of May, than is shown on the chart. The bank which extends from the North shore of the river, 4 miles above Asing Point, has extended farther out than was formerly marked on the chart.

Tides.—By the chart it is high water, full and change, in the Bruni River at 11^h, and springs rise 12 ft.

Commander Bullock remarks:—"From good information from the best Labuan pilot, the ordinary rise at springs is 8 ft., occasionally 9 ft. There is a greater range in November, December, and January. From January to June the high tides occur at night; from July to December in the daytime. The intermediate high water rises only 1½ ft. above the mean level."

Supplies.—Fresh water may be obtained from a spring near the base of the Kianghi, where the natives will be observed filling their bamboos. The entire range of this mountain, terminating at Bruni bluff, is probably composed of coal, which in many positions crops to the surface. The market of Bruni, carried on by numerous canoes, supplies poultry, eggs, deer, fruit, vegetables, &c. The trade is the same as that (described on page 496) of Labuan.

The water buffalo were used for beef; but bullocks of good quality are to be obtained through the Kadyans or Dyak race of this region, the Malays not being a pastoral or farming race.

The **LABUAN GROUP**, a dependency of Great Britain since 1845, comprehends Labuan, Kuraman, Burong (or Bird Island), Rusukan Besar (or Great Rusukun, supposed to be connected with *deer*), Rusukan Kechil (or Little Rusukan), Enöe, Pappan (or Coolin Pappan), and Daat.*

Labuan, the largest of the group, extends about 10 miles in a N.E. by N. and S.W. by S. direction, forming an obtuse-angled triangle on this base, and having about 5 miles width at the vertex, where it would perpendicularly bisect the base. This supposed division into two right-angled triangles would divide the island into nearly equal portions, the northern being the solid land, and the southern marshy, or intersected by streams.

There is good timber on the north-western point of the island, but it was more easily obtained on the southern portion at the watering place about 1

* The signification of the word Labuan in the Malay language is anchoring-place. In Marsden's Dictionary it is written Labuh-an; but this has eventually, or by the dropping of the h, fallen into its present use.

Labuan was given to the English in 1845 as a port or trading station; and a right was secured for British subjects to reside or trade in any part of the dominions of the Sultan of Borneo. In recent years it has been proposed to bring the government of Labuan under the administration of the Straits Settlements.

mile from Kiamsan Point, the S.W. point of the island. It was used for boat plank, timbers, and knees, being a rough description of poon, varying much in solidity, from the centre, which was very dense, to the outer coating, which resembled cedar. The watering place is well marked by the termination of a range of casuarina trees at a bright sandy beach at the northern bend of the bay. The supply is abundant, landing easy, on a sandy beach, and boats lie safe within convenient distance for hoses. It is almost in connection with a salt-water pool, which may cause some mistake. At low water large and excellent oysters may be found attached to the rocks, then laid bare.

The North end of Labuan is the highest part of the island, its summit, topped by trees, being elevated 460 ft., and appearing, when seen from the North, as two peaks of equal height. It is surrounded by sandstone cliffs, and an extensive reef stretches off the northern point; a continuation of this belts the island, offering occasional breaks admitting boats. The northern portion is worked for coal, and convenient anchorage for vessels of any draught may be found off Koubong bluff. Steam vessels can approach to a cable's length of the beach.

A reef extending from the point off Koubong Bluff affords a good foundation for a jetty, but a heavy sea occasionally tumbles in upon this coast during the N.E. monsoon; vessels should therefore, in that monsoon, anchor well out in a safe position for getting away, and veer in for coaling.

The best spars can be obtained here, and after rain a stream of reddish water flows over the rocks to the sea.

Fresh dangers are frequently discovered off the northern reef, and great vigilance is necessary, the lead affording no warning; the patches, when the sun is visible, exhibit a light green hue, and a peculiar heave of the sea may be detected by a vigilant observer. A breaking patch lies $2\frac{1}{4}$ miles to the N.N.E. of the point.

COAL.—The coal seams extend the length and breadth of Labuan; the mines are at the North end of the island. The coal produces satisfactory results, and is exported to Hong Kong and elsewhere, but it burns rapidly.

In 1848 the value of the coal exported amounted to £600, and in 1874 to £3,451. The quantity raised fluctuates largely from year to year; in 1866 it was valued at £11,995. Recent endeavours have been made to reach an 11-ft. seam, but great difficulty arises from the badness of the pumping machinery, which is not able to cope with the water in the mine. In December, 1874, a depth of 96 fathoms had been reached, and three separate seams of $6\frac{1}{2}$ ft., 3 ft., and $4\frac{1}{2}$ ft. had been discovered. The price, in 1874, did not exceed 5 dollars 50 cents per ton free on board, 15 dollars per ton being the cost in the neighbouring colonies..

The railroad from the mines to the shipping place at Tanjong Kubong,

including a substantial jetty, was constructed in 1862. A new wharf was commenced in 1874.

The *climate* of Labuan closely resembles that of the warm summer months in the South of Ireland. Temperature ranges between 71° and 90°. Rain falls plentifully, but chiefly in the night.

Supplies.—Fresh beef can be procured in Labuan. Vegetation is luxuriant, and the finest fruit is grown; oranges, pummellos, mangoes, mangosteens, pine-apples, bananas, &c., can be got in abundance.

Fish is plentiful and cheap, and fowls can be purchased, but nearly everything is very dear. The water in Victoria Harbour is bad; it can be procured at high tide.

The long continued prevalence of cholera in 1876, and the previous outbreak of small-pox in 1873, had had a very depressing influence on trade.

Labuan may be considered an outpost to Singapore, as here the produce of the neighbouring coasts and of the Sooloo Islands is collected for re-shipment to Singapore, which is distant 707 miles. The total imports into the colony during the year 1875 were valued by the importers at £119,362; of these there came from Singapore £67,105, and from the coast of Borneo £52,257. The exports were in all £114,332, of which £63,229 went to Singapore; the exports to the coast of Borneo, being taken as of equal value to the imports with which they are purchased, represent a total of £51,103. Copper coinage, in 1875, was replacing on the coast of Borneo the cumbrous forms of metallic currency formerly prevalent there.

Exports in 1874, taking them in order of importance, were as follows:—Sago, £30,109; birds' nests, £4,342; india-rubber, £3,867 (decreasing); coal, bees'-wax, specie, rattans, camphor, tortoise-shell, pearls, hides, dammar, gutta-percha, sharks' fins, &c. The principal articles in use at Labuan and adjacent coasts are—brass, brass dishes, wire and other brassware, boxes, candles, cotton cloth, cotton thread, thread for embroidery, earthenware, gambier, gongs, gunpowder, iron bars, empty jars, muskets, opium, salt, sugar, tobacco, &c., &c., all of which are obtained from Singapore by the Labuan traders. A very good breed of ponies might be procured in considerable numbers on the N.W. coast of Borneo, also at Cagayan Sooloo, and more at Sooloo itself.

Tides.—It is high water, full and change, in Victoria Harbour at 9^h 45^m; springs rise 6 ft., neaps 4½ ft. There are two regular tides in the day, but in the S.W. monsoon the night tide does not rise as high as the day tide, and in the N.E. monsoon the night tide is the highest. In the slack of the monsoon the rise of the tides is equal.

VICTORIA HARBOUR, on the S.E. side of Labuan, is well sheltered in both monsoons. The general depths in it are from 4 to 10 fathoms, over a bottom of stiff mud, decreasing gradually as the head of the harbour is approached. Moor open hawse to the S.E., as strong gusts from South to

East occur, particularly at night. The atmosphere here is oppressive, and unless compelled to remain, it is preferable to anchor South of Pappan Island, where the full strength of land and sea breezes will be experienced.

The shores of the harbour are bordered with sand-banks, which dry at low water. On the West side they extend off nearly 3 cables, and are interspersed with patches of rocks and stones. On the North side the bank does not extend more than a cable from the shore. Each side they are steep-to; at half a cable's length from where the sand dries there is deep water.

Rusukan Kechil, one of the group of islands off the S.W. extremity of Labuan, was selected by Sir E. Belcher for the astronomical position, being convenient for the survey, and solid ground. Its eastern sandy tongue is the point on which the observations were made.

Vessels visiting this group, simply for rating chronometers on Little Rusukan, should give it a clear berth to the southward of 3 miles, hauling up when the western extremes of Great Rusukan and Kuraman are in line, and avoiding the $2\frac{1}{2}$ -fathom patch to the south-eastward of the former, by bringing Little Rusukan on either outline of Kuraman, anchor in 11 fathoms about 1 mile East of Little Rusukan, where good landing may be found on the northern beach.

BARAT BANK has 2 fathoms on it, and its outer extremity lies S.W. $\frac{3}{4}$ W. $3\frac{1}{2}$ miles from Great Rusukan, the soundings decreasing suddenly from 30 to 10 fathoms near it. It is therefore prudent not to haul up for Great Rusukan until it bears N.E., preserving the depth of about 15 fathoms on an E.N.E. course until Great Rusukan is open westerly of Kuraman, when the course to Pappan is free from danger. Preserving a depth of 15 fathoms will keep you clear of a $3\frac{1}{2}$ -fathom patch which lies 1 mile South of Great Rusukan, and 4 cables S.E. of a breaking patch.

Lieutenant Gordon observes:—"Between the S.W. point of Labuan and Kuraman is a passage between reefs, but I do not consider it safe."

Formosa Rock lies in the channel between Kuraman Island and Kiamsan Point, with the latter bearing N.N.E. $\frac{1}{2}$ E., and Burong Island East.

Trident Shoal, lying S.S.W. $\frac{1}{2}$ W., nearly a mile from Enöe Island, is a coral patch 2 cables long, N.N.W. and S.S.E., and one cable broad, with only 1 fathom on it at low water. The North extreme of Daat Island just touching the South end of Pappan clears it to the southward, and the flag-staff on Ramsay Point open East of Enöe clears it to the eastward. There is a passage 2 cables wide, with a depth of 6 fathoms, between it and the shoal running off Enöe.

Enoe Island.—The shoal surrounding this island consists of sand, with occasional patches of rocks and stones. It runs off 7 cables to the north-

ward, $3\frac{1}{2}$ to the southward, and 3 cables to the eastward of the island, and on the West side joins the coral reefs stretching out from Labuan. A *beacon* (consisting of stakes lashed at the top) is placed on its N.E. extreme in 4 fathoms water, with the summit of Enöe bearing S.W. $\frac{1}{2}$ S., distant nearly 7 cables, flagstaff on Ramsay Point N.N.E., 1 mile, and extreme of mangrove on Hamilton Point, West, nearly 8 cables. The shoal is steep-to on all sides; at a cable distant from where it dries are from 6 to 7 fathoms water.

Pappan Island is flat, and covered with trees, the tops of which are 124 ft. above the sea level. It is surrounded by a shoal which extends a cable's distance from the North shore, 2 cables from the West, and 3 cables from the South shores, and to the westward it is only separated by a small passage three-quarters of a cable wide from the reefs running off Daat Island and the main coast of Borneo. A *beacon* is placed on the S.W. extreme of the shoal in 4 fathoms, and from it the S.W. end of Pappan bears N.E. $\frac{1}{2}$ N. $2\frac{3}{4}$ cables, the summit of Enöe W. $\frac{1}{4}$ S. $1\frac{1}{2}$ mile, and the flagstaff on Ramsay Point N.N.W. $\frac{1}{4}$ W., $1\frac{1}{2}$ mile.

Outer Shoal, lying between Pappan and Enöe Island, is a cable in extent, consists of coral, and has only 3 ft. on it at low water. A *beacon* with a *black* ball is placed in $1\frac{1}{2}$ fathom on its East side, close to the shoalest part, and from it the flagstaff on Ramsay Point bears N. $\frac{1}{4}$ W. 12 cables; summit of Enöe Island W. by S. $\frac{3}{4}$ S., nearly a mile; Pappan beacon E. by S. $\frac{3}{4}$ S., two-thirds of a mile; and Enöe beacon N.W. by W. $\frac{3}{4}$ W., half a mile. The passage between the Outer Shoal and Pappan beacon is 6 cables wide, and has depths of 12 to 25 fathoms; the passage between it and Enöe beacon is 4 cables wide, and has 9 to 11 fathoms.

Harbour Shoal, lying between Ramsay Point and Enöe Island, is a small coral patch, half a cable in extent, with $1\frac{1}{2}$ fathom least water on it. A *beacon* with a *white* ball is placed near the centre of the shoal, and from it the flagstaff on Ramsay Point bears N. by E. $\frac{1}{2}$ E., distant 6 cables' lengths; Outer beacon S. by E. $\frac{3}{4}$ E., $6\frac{1}{2}$ cables; and Enöe beacon S.W. by S., $4\frac{1}{2}$ cables. Vessels may pass on either side of this shoal.

Columbine Beacon.*—From Ramsay Point the shoal water extends in an E.S.E. direction for 7 cables, when it turns to the E.N.E., and curves gradually to the northward. The edge of this bank is or was marked by the Columbine and Inner beacons.

* CAUTION.—Mariners are cautioned not to put confidence in the arrangement of the beacons as placed on the charts marking the approaches to Victoria Harbour. Columbine beacon and the three beacons on the West side of the bank to the northward of Daat Island do not exist.—Mercantile Marine Magazine, June, 1871.

The Columbine beacon, surmounted by a *black* ball, is in 3 fathoms water, and from it the flagstaff on Ramsay Point bears W. $\frac{1}{4}$ S., nearly a mile; Collier Head N. $\frac{3}{4}$ W., $9\frac{1}{2}$ cables, and the S.W. point of Pappan Island S. $\frac{1}{2}$ W., $1\frac{1}{4}$ mile.

On an old chart of Labuan a rock was placed just to the north-eastward of the position of this beacon, but although searched for carefully, nothing more than a small patch of coral with $1\frac{1}{2}$ fathom on it was found, just detached from the edge of the 2-fathom line of soundings, but inside the line of 3 fathoms. The centre of this patch is N.E. by N., $1\frac{3}{4}$ cable from the beacon, the 3-fathom line of soundings running in a N.E. by E. direction, $1\frac{1}{4}$ cable from the beacon. In the channel, 1 mile wide, between Columbine beacon and the shoal off Pappan Island, the soundings are irregular, from 9 to 20 fathoms.

The Inner Beacon marks the edge of the shoal water halfway between Columbine beacon and Ramsay Point. It is in 2 fathoms at low water, and from it Columbine beacon bears E. by N. $\frac{1}{2}$ N., distant half a mile; the flagstaff on Ramsay Point W. by N. half a mile; and Collier Head N. by E. $\frac{2}{3}$ E., $1\frac{1}{2}$ mile. Between these two beacons the edge of the shoal curves a cable's length to the southward of a straight line joining them, and between the Inner beacon and the flagstaff off Ramsay Point there is a coral patch of 1 fathom and another of three-quarters of a fathom, detached from the edge of the bank, which extends $1\frac{1}{4}$ cable to the southward of a straight line joining the flagstaff and beacon. Both patches are steep-to, and to avoid them keep Columbine beacon open of the Inner beacon, whilst the flagstaff on Ramsay Point is on a bearing westward of North.

Two beacons, with a *white ball on each*, are placed on the western edge of the reef extending from Daat Island to Lubedan Island. The southern one stands about E.N.E., a little more than 2 miles from Collier Head. The northern one is N.E. $\frac{1}{2}$ N., $3\frac{1}{2}$ miles from the same place, and N. $\frac{3}{4}$ E., nearly 2 miles from the South beacon. (See note, p. 498.)

DIRECTIONS for South Channel.—In working into Victoria Harbour from the S.W., Pappan open to the northward of Daat clears the Trident Shoal on one hand, and Burong open of Kiamsan Point gives fair warning of it on the other. The flood tide runs fast near Pappan Island, and from the prevailing winds it was found advisable to hug its western side, making short boards to the N.E. until a free course into Victoria Harbour offered, grazing the northern dangers. Work up under the South side of Pappan until the vessel can weather Enöe. Tack on the first east in 10 fathoms; if the tide should tend to shut Little Rusukan in with Enöe, keep away, as they must be kept open until near Pappan, which is bold-to on the West. Keep rap full, and go round before the vessel is swept past its northern end, otherwise the eddy may bewilder the steerage. Tack again in 10 fathoms

before Great Rusukan Peak opens inside of Enöe. This will clear the 6-ft. patch, on which Burong Island will be seen clear of Hamilton Point. When the northern bluffs are seen open of Collier Head, the vessel will have a free wind into Victoria Harbour. Keep Burong just shutting with Hamilton Point until the harbour beach opens, when the vessel may safely round the 1-fathom tongue, extending $1\frac{1}{2}$ cable's length to the south-eastward of the flagstaff, by keeping in 6 fathoms.

Vessels wishing to sail in or out of Victoria Harbour should always take advantage of the land and sea breezes, instead of attempting to work in. Arriving in the afternoon or at night, the best way is to anchor about half a mile South of the Outer shoal in 10 to 11 fathoms, weighing at daylight the next morning, and running in with the land breeze; and in leaving the harbour wait for the sea breeze between noon and 1 p.m., which carries a vessel with a fair wind past all danger.

North Channel.—As regards the pilotage of this channel, much diversity of opinion seemed to exist, but, it may be remarked, not by those who made the surveys. No difficulty was at any time experienced in beating through with the object of determining the 5-fathom limit. The following, therefore is the result of practical knowledge.

In leaving Victoria Harbour by this passage enter mid-channel between the shoals of Ramsay Point and Daat Island, with Burong Island open of Hamilton Point, and when the S.E. point of Daat shuts in with its S.W. angle, and Malancassan Island opens off its northern point, a N. $\frac{3}{4}$ E. course may be steered, which, with the tide, and edging easterly on any cast less than 5 fathoms, will carry the vessel out in not less than that depth.*

The westerly soundings are all safe, and dangers dependent on sun's bearing, or before 2 p.m. visible.

In approaching from the northward steer for mid-channel, but withal nearer to Lubedan. Nothing less than $4\frac{1}{2}$ fathoms water on that shore will be found until Lubedan opens from the distant tall trees of the N.E. coast; then proceed direct for Pappan Island, and when Burong opens haul in for the town point, and anchor as before.

Route from Labuan to the Palawan.—Sir Edward Belcher makes the following observations on proceeding to sea from the northern part of Labuan:—

As regards off-shore dangers, the patches to the northward rise suddenly.

Gordon Patches.—North, 12 miles from Bethune Head, is a patch of 4 fathoms, with patches of 5, 6, and 7 fathoms $1\frac{1}{2}$ mile to N.W. of it, and one or two detached 7-fathom patches extending as far as $2\frac{1}{2}$ miles westward of it and a mile eastward of it.

Having passed through the North channel, the safest course for vessels of large draught is to bring the high land of Bethune Head to bear S. by W.,

avoiding the dangers extending 3 miles off the Head, and steer N. by E. until past Gordon Patches; this would make a direct course to the North, nearly on the meridian of the high hills of Labuan, until reaching the latitude of $5^{\circ} 45' N.$, in 20 fathoms, when an easterly course may be shaped to make Pulo Tega. This will avoid the Jahat, Winchester, and Nosong patches, and lead to the channel southward of the Tega group, much more reliable than the narrow opening between the Deluar and Tega Shoals, unless good berth be given at 10 miles from the northern Tega Islet, which, simply for making a passage, should be preferred.

Other duties, or inducements, may lead the navigator along the coast line, off which safe anchorage will generally be found.

At 7 miles N.N.E. from the North extreme of Labuan, deep water (15 or 20 fathoms) will be gained. Hence a N.E. by E. course, in depths from 11 to 14 fathoms may be observed, and the Pine Point shoals avoided by moderate attention to the bearings of the elevations marked on the chart. As a general caution for distance from this coast line and limit of shoals, the base of the trees on the beach should not be distinguished when off Pine Point.

On the other hand, similar precaution is necessary not to render them indistinct (which the distances of 5 and 10 miles would vary), which will keep the wary navigator within the limits of the Jahat dangers. Having touched several of these dangers, we may observe that due caution, now their existence is determined, is given by the lead, and the heave of the sea will always warn an intelligent pilot of shoal water. Independent of this, whenever the sun is abaft either beam, or on the back of the observer, the bright green hue of the shoals is distinctly visible.

The preceding remarks especially apply to vessels of great draught; but to small craft, not exceeding 14 or 15 ft., the inner passage within the shoals may be taken at $1\frac{1}{2}$ mile from the coast line. If proceeding easterly, keep Lubedan Islet barely clear of Toulak Point; or, if westerly, the S.E. extreme of Tega and Nosong barely in contact, apparently opening as the vessel recedes from Tega.

Shoals North of Sahat Point.—A 3-fathom patch lies N.N.W. 5 miles from Sahat Point and 6 miles N.E. of Bethune Head. *Nis Shoal* lies 3 miles N.E. of the preceding; and about a mile N.W. of Nis Shoal is a 5-fathom spot, and 2 miles S.E. of it a 2-fathom spot, South $1\frac{1}{2}$ mile from which, and $4\frac{1}{2}$ miles N.N.E. of Sahat Point, is a 2 and 3 fathoms spot, apparently at the end of a spit extending from the shore.

JAHAT SHOALS.—The Jahat (literally bad, or danger) Bank, was examined closely by Lieut. Gordon, and is thus described by him:—"Jahat Bank, the principal and most dangerous reef, is of coral, and horse-shoe form, bearing N.E. $\frac{3}{4}$ N. from the North point of Labuan, and N. $\frac{1}{2}$ E. from

Lubedan. It has 6 ft. water on its eastern, and only 3 ft. on the south-western part; there is deep water all round except on the North side, where depths of 5 fathoms extend for a considerable distance, and there may be less; and there is a passage through the N.W. or centre part of it."

NOSONG SHOALS.—N.E. $\frac{3}{4}$ N. 9 miles from the Jahat Shoals, and West from the South point of the largest Tega Island, is a coral reef, on which are two small sand patches nearly level with the sea, or awash at high water. From these patches, breaking with any ripple, the reef extends $1\frac{1}{2}$ mile N. by E., and the ground is very uneven on the S.W. The following warning lines circumscribe its dangers, and, as will be seen by the chart, afford a very safe passage to the southward.

The North Tega or Burong Island, which is high and conspicuous, clear of the great Tega Island, will lead to the southward; Tangout Rock shut in with Nosong eastern outline leads to the eastward; and Turtle or the second Tega Island open of the great Tega Island leads to the northward of these shoals.

PULO TEGA GROUP, which is composed of three islands, Tega, Turtle, and Burong (which derive their name from *Tega, three*), extend off Nosong Point, but the best authorities, the natives, with whom friendly intercourse prevailed, termed this point Tanjong Pulo Tega, a matter of importance when communicating with the coast people of the Kimanis.

Between Tega, the largest island, and Nosong Point, the channel is quite safe, and the chart itself affords sufficient warning for clearing the dangers off the point. The wind prevailing off-shore prevents vessels from getting near the S.E. spit.

The group stands on a coral bank, extending about 5 miles N.N.E. and S.S.W., with a danger breadth of 3 miles. The largest island is safe-to, and affords good anchorage under its centre in the southern bay; but a shoal with 2 and $2\frac{1}{2}$ fathoms over it extends from its eastern extreme in a southerly direction for the distance of a mile, close to which are 14 fathoms. A shoal patch, with but 2 fathoms on its outer end, also lies W. by S. from the western extreme of the island, the outer part of which is distant $1\frac{3}{4}$ mile; close to this shoal are 7 to 9 fathoms. Navigating-Lieutenant Russell, of H.M.S. *Reynard*, says that a coral rock, with 6 ft. water over it, lies about half a mile to the westward of the S.E. point of the island, and about the same distance from the shore.

Turtle and Burong Islands occupy a patch of 3 miles in extent, and the channel is only passable in light boats.

The northern island received the name of Bird (Burong) from the quantity of birds' deposit. It is high, and bold-to on its S.E. side, where good anchorage was found in 9 fathoms. The trees are useless.

KIMANIS BAY, so retained in compliment to the name given by Dalrymple, as well as to the commercial importance of the river of the same

name, is an extensive bight, and lies immediately to the eastward of Nosong Point, and free from danger.

Kapala River (or *Kuala-panko*, native), in the S.W. bight of Kimanis Bay, is safe, at high water, for trading craft drawing 12 ft., or it can be entered at all times in smooth water by a draught of 4 ft. The *Lama River* is about 3 miles to the eastward of the Kapala. It is barred by rollers in bad weather, but in smooth water may be entered at high water by boats drawing 5 ft. At low water springs it probably would show dry, or possibly offer a very narrow boat channel. The *Membakut* is an insignificant stream in the depth of Kimanis Bay.

Kimanis River, the entrance to which is in the eastern bend of Kimanis Bay, has shoal water extending a considerable distance off its mouth, which, at low tide, is entirely barred to the smallest boats. At high water, prahus of some size, drawing probably 6 ft. water, enter the river by the southern channel.

The Kimanis River forms the boundary of the territory ceded to Great Britain in 1763, as well as the jurisdiction of the Sultan of Bruni, or Borneo Proper; our relations, therefore, with the people are likely to become more important to commerce, as this river is one of the principal trading connections with the interior, as well as with the city of Bruni, to which it sends seed-pearls, camphor, beeswax, vegetable wax, pepper, &c.

Supplies.—The people were found very difficult to deal with. Goats, ducks, fowls, vegetables, fruit, pepper, beeswax, camphor, parrots, &c., were brought down in quantity, and at very low prices. Watering is inconvenient, as the natives must be relied on to fill and bring the casks to the boats.

Watering Place.—At about 4 miles northward of the Kimanis River will be found a space of 20 acres of cleared land, fringed at the beach by a line of casuarinas, and close to the small river Benoni to the northward. The water will be found in a long canal immediately within the trees and parallel to the beach. It is 200 yards long, 30 yards wide, and in general seasons may afford a mean depth of 5 ft. The water is excellent, and is probably in the course of constant filtration to the sea.

Particular stress has been laid in describing this locality, as we found ourselves frequently deceived in replenishing water at places where positive information of its existence was given.

The *Benoni* is probably connected with the above watering place, and during the freshes, floods the neighbouring flat, before described as cleared land. The *Minani*, about 3 miles northerly of the Benoni, is barred, but, like the latter, can be entered by boats at high water.

To the northward of Kinindukan Bluff, the eastern horn of Kimanis Bay, the coast dangers recommence, but are easily avoided by due attention to the soundings. The inland ranges rise suddenly, attaining heights of 1,500 and

2,000 ft. The rivers are insignificant, and do not offer any inducement for trade or other purposes until reaching Gaya Bay.

Caution.—From a general intercourse with all the tribes, Malay, Bajow, as well as the Dyak or mountain races, it was apparent that by kindness and firmness they are disposed to be friendly. Timidity, or too much suspicion on the part of visitors, naturally renders them cautious. But caution, even under the British pendant, is imperative in all transactions with the Malay race.

Pulo Lyang.—N. $\frac{2}{3}$ W. $3\frac{1}{2}$ miles from Kinindukan Bluff, and 2 miles from the nearest shore, lies the island Lyang of the chart (termed *Llanghangan* by the Bajows and coasters). It is high, bold-to, and may be safely passed at 1 mile off by day or night, at which latter period it may be mistaken for a vessel under sail.

GAYA GROUP and BAY.—*Gaya* is a lofty well-wooded island, $15\frac{1}{2}$ miles N.N.E. $\frac{1}{2}$ E. of Lyang, and nearly connected with the main by an extensive reef. To the southward of *Gaya* lie four small islets; within these there is safe anchorage.

Gaya Bay is formed by the northern point of *Gaya* Island and *Tanjong Kaetan*, which is surmounted by a remarkable peak. To the northward of *Gaya*, and parallel to the chord of the bay, are the islands *Sapangar*, *Udar*, *Udar Kechil*, and *Udar Tega*, which form the land-locked harbour of *Sapangar Bay*, the most secure harbour on this coast.

Between *Sapangar* and *Gaya* the main channel is safe. There are also channels between the other islands, but they are unsafe, by reason of the liability to sudden calms, currents, and gusts. The outer navigation is safe, but beware of making too free with the lee side of *Sapangar*, or the vessel will be becalmed.

Within the bays or port just mentioned are the rivers *Inanam* and *Kabatuan*. The *Inanam* is nearest to *Pulo Gaya*, and its entrance is difficult, even for boats.

Kabatuan River is in sight of the eastern bend near the *Udar Kechil*, not within the northern bight or inner bay, but may be at once distinguished, when abreast of its entrance, by a yellow sandstone bluff on its northern, and the abrupt angle of the coast on the southern, shore.

The main or outer bar appears to be composed of coral knolls, being a continuation of the line of reef extending from the *Inanam*. There are gaps in this through which, at high water, small craft might contrive to enter the river. The mouth is nearly closed by a small sand delta, near the southern edge of which the deepest water was found. Water, however, flows in small drains within the delta, furnishing, by perseverance, about 10 gallons in a quarter of an hour. A few miles within the river the water is fresh.

The *Kabatuan* is the principal trading river of this region. Taking into consideration the security of the harbour, as well as the facility of com-

munication in all weathers, added to the character of its governor, this may be considered as the safest and, at present probably, best trading position on the coast.

The deep bight northward of this river is beset with shoals, and possesses nothing worthy of its exploration.

The outer islands are surrounded by deep water, uninhabited, and possess no interest.

Tanjong Kaetan is the inner bluff, near the islands, surmounted by a peak of the same name. The outer bluff has no name, it therefore was designated *Gaya Head*. It is steep-to, and has no hidden dangers outside of it.

Menkabong Bluff and River.—This bluff, about 5 miles N.E. of Gaya Bluff, is a high crowned peninsula, with a sandy beach connecting it with the river of Menkabong, which is about 2 miles to the S.W. The river can be entered by boats or small traders drawing 7 to 8 ft. The inhabitants are apparently friendly.

Directions.—Before proceeding farther along the coast, the observations of Lieut. Gordon, R.N., on the outer navigation, will be recorded. “Vessels working up must not stand too far off, as there are numerous reefs off the East side of Mangalum, which island is W.N.W. 24 miles from the N.W. point of Gaya Island. Off here, at 7 miles from the shore, during the strength of the N.E. monsoon, a strong current was found setting to the north-eastward.”

MANGALUM ISLAND, the S.W. point of which is in lat. $6^{\circ} 10' 40''$ N., long. $116^{\circ} 35' 20''$ E., is nearly round, 4 miles in circumference, and very low, the highest part of the ground being only a few feet above the level of the sea; the tops of the trees are visible from a sloop's deck about 12 miles. It is surrounded by a coral chain, broken only at the S.E. portion, where vessels may enter and anchor close to the shore.

Wood for fuel and other purposes is abundant; the trees grow quite straight, and there is great variety. Mangalum Island is, or was, a common rendezvous for piratical proas.

Tides.—High water about 11 p.m., and low water at 6.45 a.m., the greatest rise of tide being 5 ft. It may be remarked here that, as in other positions on the North coast of Borneo, the night tides greatly exceed those by day, but are yet regular; that this apparent single tide at night may probably be accounted for by the prevalence of strong sea breezes outside, which, failing at sunset, permit the tide to resume its flow, and that two or three sets of tidal observations at this position would upset this theory, as it did that—so long contended for by successive navigators—at Tahiti.

Bank of Soundings.—H.M.S. *Dwarf*, in August, 1876, struck soundings on a bank which lies between lat. $6^{\circ} 22'$ N. and $6^{\circ} 16' 30''$ N., long. $115^{\circ} 51' 10''$ E. and $115^{\circ} 46' 25''$. The vessel was steering S.W. $\frac{3}{4}$ S., and the first

cast obtained was $9\frac{1}{2}$ fathoms, bottom distinctly visible; the shoalest cast was 6 fathoms, sand; the general appearance of the bottom, coral with rocks interspersed. From the North end of the bank Kaetan Peak bore S.E., North extreme of Mangalum Island S.W. by W., centre of Gaya Island S.S.E. $\frac{1}{4}$ E. From the South end of the bank Kaetan Peak bore S.E. by E. $\frac{3}{4}$ E., North extreme of Mangalum Island S.W. by W. $\frac{3}{4}$ W., centre of Gaya Island S.E. The nearest part of the main land, Gaya Head, was thus distant 20 miles.

Off-lying Shoal.—Commander George Robinson, of H.M.S. *Rinaldo*, also reports, that during the passage from Labuan to Manila, when about 21 miles from the coast of Borneo, the leadsman suddenly got soundings in 7 fathoms, decreasing to 5 fathoms, the bottom being distinctly visible, and discoloured water seen from the masthead to the northward. From this shoal water the West extreme of Gaya Island bore S. $\frac{1}{2}$ E., and the mountain of of Kini Balu S.E. by E. $\frac{1}{2}$ E., the depth of 5 fathoms being in lat. $6^{\circ} 26' N.$, long. $115^{\circ} 56' E.$

Tawalan River.—From Menkabong Bluff, which is belted by a reef, the coast runs pretty straight about 4 miles, when the mouth of the Tawalan throws off an extensive sandy flat. The entrance is guarded by a spit, dry at low water, into which boats can enter, from the South, on the first quarter ebb. Within is rather a large village of huts, inhabited solely, it is asserted, by the Bajow fishermen.

Sulaman River.—Two miles beyond the Tawalan or Kawalan is the mouth of the Sulaman. This appears to be a spacious river, running as far as the eye could trace, in a broad sheet inland. The stream is rapid, and the depth at low water about 6 ft. on the bar. Immediately within, it increases to 3 fathoms, the channel apparently deepening on the southern bank.

The Coast from hence to the South bluff, belonging to the Ambong range, is tolerably bold-to, but totally void of interest. Between this bluff and the entrance to the port of Ambong are several patches of rock, but mostly above water. Vessels should not near to less than 8 fathoms, or they will lose the wind.

AMBONG BAY.—The port of Ambong, approached from the northward, may always be recognized by the peculiar projection of high peaks, as it were, into the sea. On the East will be noticed the island of Usukan, showing as a black bushy cone; the mountains near it on the main, exhibiting at the same time smooth, yellowish-green, rounded summits, their bases easterly, falling into apparently level land. In the depth will be seen the high ranges skirting the bottom of the port of Ambong, and, if sufficiently clear, the blue tinted mountain of *Kini Balu* (Chinese widow), 13,698 ft. in height, crowning all in the distance. On the right the Ambong range, clothed with trees from the base to its summit, will stand in the foreground sloping off gradually

towards the Sulaman River, where the high ranges cease, excepting 10 or 15 miles in the interior.

A shoal patch, a quarter of a mile in extent, with $2\frac{1}{2}$ to 3 fathoms water over it, lies with its outer part bearing N. $\frac{1}{2}$ W., distant $8\frac{1}{2}$ cables from Cape Ambong. At 3 cables north-eastward of this patch is another of nearly the same extent, but having only 2 fathoms water over it in places. From a 2-fathom spot near its outer end Cape Ambong bears S. by W. $\frac{3}{4}$ W., distant nearly a mile, and Perunjuk Point S.E. $\frac{2}{3}$ E., distant over a mile.

Supplies.—Ambong, as a place of trade or for refreshments, affords bullocks, goats, fowls, eggs, &c., at very moderate prices. Beeswax, pepper, camphor, birds' nests, and other Bornean produce, were freely brought down to trade.

There are two positions for watering: one immediately to the northward and opposite to Ambong Town; the other, and the most convenient, if cleared above its run beforehand, is at the beach north-eastward of the anchorage. The quantity depends much on the season.

Directions.—The approach to the port of Ambong is so evident on the chart that but few directions are needed. Nevertheless the navigator may find himself hampered by wind or tide, and a few hints may ease his mind, should he find himself on the verge of danger, and he will undoubtedly be led there by too near an approach to Cape Ambong and the consequent failure of wind under the high land.

If coming down from the northward, with Kini Balu visible, bring it to bear S.E. and steer for it, which will lead to Ambong on the deepest line of soundings.

There is no danger in approaching from the westward with a strong leading wind, or under steam, the actual danger being North of the cape, within 1 cable's length of the shore. But trust not the breeze, steer East, or make good that course, at 2 cables' lengths from the cape, until gaining the depth of 8 fathoms, and having the highest peak of the sea range of the western peninsula over the centre of the sandy bay immediately beneath; observing that the first sight of the sand, clear of the rocks, gives warning of the off-lying patches, and the two inner points in line, of having passed them.

A vessel may then steer for Perunjuk Point, and a berth be taken in 6 fathoms, about 2 cables S.E. of it, with the eastern house of Ambong Beach open of Teluk Point.

Large vessels preferring greater security should adopt the outer course, bearing in mind that Usukan open of Sak Point N.E. $\frac{1}{2}$ N. barely clears the patches off Cape Ambong at a good cable's length. This mark will be distinct at all hours, even towards dark. But when objects can be clearly seen the yellow island, Jaga, brought immediately under the highest outer cone, Mount Robertson, also well seen at dawn or dusk, on the bearing of N.E. by

E. $\frac{1}{2}$ E., may be preferred. On this bearing not less than 11 fathoms will be found until the patches are passed, and Perunjuk Point bears S.E.

Ambong Beach, 3 miles distant, will then be clearly seen, and when its western extreme is about to shut in with Perunjuk Point, shape a course immediately for the latter.

In fine weather, by a careful look-out from aloft, all dangers will be clearly visible.

Sak Point.—Quitting Ambong bound north-easterly, Jaga, a very prominent yellow sandstone cliffy island, may be shaved; but within the depth of 13 fathoms northerly of Soundal Point there is reason to believe that dangerous rocks near the surface are yet undiscovered; one, *awash* at low tides, and surrounded by a coral bank, lies W. $\frac{3}{4}$ S. of Sak Point.

USUKAN BAY, about 3 miles to the northward of Ambong Bay, offers not only safe anchorage, but also an excellent watering-place in its bight, and is, moreover, the only convenient spot for communicating with the River Abai. Directions therefore requisite for anchoring and watering will be given.

Passing the rock *awash* off Sak Point, the clearing marks for which are Jaga Island open of Soundal Point, and the second head on the southern side of Usukan Bay open, steer, or work for Slime Rock, which is safe to approach to a cable's length on the S.W. side, and anchor in 10 fathoms, with the apex of the rock bearing N.W. A vessel will then lie secure from swell, and $1\frac{1}{2}$ mile from the watering place in the depth of the bay.

The **Slime Rock** is connected with Usukan Island by a ridge under water. A rock *awash*, with deep water within, but too near the land for safe navigation, lies off Usukan.

Water.—As the driblets of Ambong afford but little, and the detention of more than two days may be involved, it is important to know that here, in safe anchorage, and not incommoded by natives, watering can be expeditiously accomplished.

Usukan Island, fronting the Abai River entrance, is a prominent feature on the coast, standing out clear from the land, and almost a warning for danger when not shut in. It is high, conical, and well clothed with timber, and, indeed, at times of extreme low tides, may be a peninsula.

ABAI RIVER.—It is by this western channel, at the first quarter flood, that boats should visit the Abai, as the entrance by the North, although deeper, is troubled by rollers.

This was formerly the port of Abai, the principal rendezvous of the Illanon pirates, but since they have selected Tampassuk, as better protected by the Sultan, the importance of Abai has fallen. The natives are peaceable, and will furnish bullocks, vegetables, and refreshments, but not so reasonable as at Ambong.

As Abai Port is open by its eastern entrance to vessels drawing 9 ft. at

low, and 12 to 14 ft. at high water, it is proper to caution those intending to enter, that the bottom within is hard sand, and, unless they pass into the river at once, where 3 and 4 fathoms, mud, will be found, they are endangered by the swell and rollers, which would cause them to strike heavily and bilge. They must not, therefore, calculate on anchoring in the outer harbour.

A Dangerous Patch, on which the sea breaks, lies North, $1\frac{1}{2}$ mile from Usukan Island, and exhibits three cones, or pinnacles, at dead low water springs. The marks for it are the points of Abai Port lapping, or the points westerly of Usukan Bay and peak of Slime Rock in line. Abai Port open of Usukan leads to the eastward. The channel within is safe, and to be preferred.

TAMPASSUK RIVER.—The beach from the Abai River to the entrance of the Tampassuk River, a distance of about 3 miles, is nearly straight, sandy, and from the very shelving nature of the whole extent of coast up to the Ant Islands, constantly subject to heavy rollers, rendering landing dangerous, if not impracticable. The 14-fathom line extends far to seaward, and although only two patches have as yet been discovered by the sea breaking over them, it is necessary to caution vessels, not having business at Tampassuk, to give the coast at least a distance, by the lead, of 14 fathoms, or, as before remarked, do not open Usukan Island of the land westerly.

The entrance to the River Tampassuk is barred by a sand-bank, over which, at high water, there is probably 12 ft., but at low water springs, not more than 6 ft.

Caution.—It is necessary at all times to be on the guard when near the Illanon pirates, which frequent Tampassuk. They are all well armed, inclined to be insolent, and are so sudden in their movements, that they may execute much mischief, even slaughter, and escape before they can be overtaken or punished; wherever they are fallen in with, there may not be proof of piracy, but the utmost caution is requisite.

Three-Foot Rock.—At $4\frac{1}{2}$ miles S.W. by W. $\frac{3}{4}$ W. from the outer Ant Island, close to Kranga Bluff, lies a shoal, marked as a 3-ft. rock, but at times awash, on which the sea breaks. The line of direction for it is, Usukan Island clear of the western land beyond; if the objects overlap, it will lead clear outside.

This danger is surrounded by deep water, and shoals suddenly from 14 to 2 fathoms. In this region the 20-fathom limit should be preserved during night.

Ant Islands lie off Kranga Bluff, at the extremity of the sandy bay, the shore of which trends N.E. $\frac{1}{4}$ E. $9\frac{1}{4}$ miles from the mouth of the Tampassuk River. The bay, as before stated, terminates in a river which did not find a place on former charts.

BISA ISLAND, or **Black Peninsula.**—N.E. $\frac{1}{2}$ N. from a safe position off the Ant Island dangers, will lead clear to a Black Peninsula, Bisa Island,

distant $8\frac{1}{2}$ miles. The entire space within is thickly studded with dangers, which about a mile to the north-eastward of Gasap Point extend a mile from the shore. Landing is very difficult.

Mantanani Islands.—Eighteen miles to the northward of Usukan, and about 12 miles W. by N. from Bisa Island, lies the group called Mantanani, consisting of two low islands, and one tolerably high clump, termed Nob Island, the latter covered almost entirely with a species of *pisonia*, the roots of which embrace, and apparently confine together, the loose structure of stones consisting of calcareous tufa, which appears to have been thrown up (or, one would almost say deposited) in the most unaccountable manner. Bird Island of the Pulo Tega group, is of precisely similar formation, but of larger fragments.

There is no inducement, beyond wooding, for any vessels to touch at this island. It is or was much frequented by the pirates.

OFF-LYING SHOALS.—There is reason to believe that many shoal patches may exist in this neighbourhood, and in bringing a line of soundings from the South Furious Shoals towards Labuan, H.M.S. *Rifleman* came on a bank at night, lying S.W. by W. 17 miles from Nob Island of the Mantanani group.

SOUTH FURIOUS SHOALS, a group of coral patches lying a few miles to the north-westward of the Mantanani Islands, were discovered in August, 1859, by H.M.S. *Furious*, and examined, in 1863, by H.M.S. *Rifleman*, which vessel anchored upon a small coral bank barely half a mile in extent, N.N.W. $\frac{1}{4}$ W. nearly 7 miles from the western extreme of the Mantanani Islands. It is in lat. $6^{\circ} 48\frac{1}{2}'$ N., long. $116^{\circ} 14\frac{3}{4}'$ E., and the least water upon it is 7 fathoms.

About 2 miles S.S.W. of the last-mentioned patch is another of 6 fathoms, about a mile in extent; westward and south-westward of which again, are other and more extensive banks. N.N.W. about 5 miles from the western extreme of the Mantanani Islands is a small patch of 8 fathoms; and N. by W. $\frac{1}{2}$ W., $3\frac{1}{2}$ miles, is another spot of 10 fathoms.

NORTH FURIOUS SHOALS are three coral patches lying about 20 miles northward of the Mantanani Islands. These were also examined in the *Rifleman*, and from the vessel's position at anchor in 11 fathoms among them, in lat. $7^{\circ} 3' 19''$ N., long. $116^{\circ} 18' 15''$ E., Nob Island, of the Mantanani group, bore S. $\frac{2}{3}$ E., and Banguay Peak E. by N. $\frac{3}{4}$ N. These shoals extend N.W. by N. and S.E. by S. nearly 2 miles, and the least water upon them is 7 fathoms. The soundings around about are very irregular.

Barton Rock appeared on former charts as awash in lat. $6^{\circ} 52' N.$, long. $116^{\circ} 19\frac{3}{4}' E.$, $9\frac{1}{2}$ miles North of the Mantanani Islands. The *Rifleman* passed over this position without finding the rock; 28 fathoms being the least water obtained, but circumstances did not allow of a further search.

WHITE ROCKS.—Bisa Island (page 509) forms the southern horn of a

great bay, having two large white islets on its chord, with two smaller in its bight. A reef extending $2\frac{1}{2}$ miles in a N. by E. $\frac{1}{3}$ E. direction, and nearly a mile in breadth, surrounds the White Rocks, which are known only by the native fishermen as *Batu Putih*.

The largest rock is in lat. $6^{\circ} 42' N$, long. $116^{\circ} 35' 52'' E$. Within this reef, guided by the chart, good anchorage will be found, varying from 8 to 12 fathoms.

At $4\frac{1}{2}$ miles North from White Rock, 6 miles S. $\frac{1}{4}$ W. from the outer Batomandé, and $1\frac{3}{4}$ mile W. by S. $\frac{2}{3}$ S. from the nearest rocky bluff, Ganda Head, lies a shoal. The whole of this region is unsafe. It should be avoided by vessels drawing above 12 ft.

BATOMANDE ROCKS.—N. $\frac{1}{8}$ E., $10\frac{1}{2}$ miles from White Rock (and visible from each other), lie the two Batomandé Rocks, so named in the old charts by Dalrymple. They are one of the astronomical positions of this coast, and are situated in lat. $6^{\circ} 52' 42'' N$, long. $116^{\circ} 36' 24'' E$.

These conspicuous rocks are of yellow sandstone, 40 ft. above the sea; they lie W. by N. $\frac{1}{4}$ N., 2 miles from Tanjong Agal, with which they are connected by a dangerous reef, leaving a single opening immediately within the inner high rock.

TANJONG AGAL derives its appellation from a species of fucus known by that name in commerce, and is collected on its rocky ledges by the fishermen for sale, similar to birds' nests and trepang.

In sailing to the northward and eastward, a distance of 3 miles from the shore should be observed, the safe course from 10 fathoms off the Batomandé to the Island of Kalampunian being N.E. $\frac{2}{3}$ N., and the distance 14 miles. The space within this line can only be safely traversed by boats.

An unimportant river, navigable for boats at high water, enters at the sandy beach immediately in front of a white cliff, N.E. by E. $\frac{2}{3}$ E., 3 miles from Tanjong Agal. The next river is about 3 miles northerly from the last, and appears to enter at the southern termination of a line of tall casuarinas.

The bay is terminated by a black rocky promontory, which, from its being composed of a blackish compact basalt, containing in its vesicles masses of zeolite, received the appellation of *Zeolite Bluff* (or *Katiga Point*). This bluff is N.E. $\frac{1}{4}$ E. 8 miles from the Batomandé Rock, and S.S.W. $6\frac{1}{2}$ miles from Kalampunian, but it is not seen from the latter.

One stream flows out immediately to the northward of Zeolite Bluff, but it is barred to boats.

No traces whatever of human beings were observed during several days' examination of this angle of Borneo.

SAMPANMANGIO POINT is readily distinguished by the tall casuarinas which rise from its grassy bluff, and by the Island of Kalampunian off its extremity. It is the western point or cape of the great bay of Maludu; but

as Kalampunian is exterior to this, and is the better leading object, it will deserve especial notice. These terms Sampanmangio and Kalampunian have so long been known as beacons for this part of the world, that it would scarcely be prudent to disturb them, whatever their meaning may imply. They are known by these names since Dalrymple handed them to us.

Water.—It is probable, in favourable seasons, that water may be obtained on the western bay, immediately within Sampanmangio Point, where the sandy beach succeeds the cliff termination and the level or marshy ground commences. This is also the favourite resort of deer, wild hogs, &c. Another spot also promises, at the neck of the Peninsula Islet, where a fair leading wind will be found at full or half tide on its southern side.

KALAMPUNIAN ISLAND lies 1 mile North of Sampanmangio Point, and its summit is in lat. $7^{\circ} 4' 17''$ N., long. $116^{\circ} 44' 51''$ E., the nearest point of which island bears N.E. $\frac{1}{2}$ N., distant $11\frac{1}{2}$ miles. It is a sandstone formation, similar to the nearest bluff of Sampanmangio, and rises abruptly, from a flat bed, to the height of 40 ft.

The *Coast* south-eastward for 7 miles from Kalampunian, has been examined, but not beyond. It is dangerous to approach within 2 miles, in consequence of many off-lying coral patches.

MALUDU BAY.—The great Bay of Maludu was not examined by the *Samarang*; but the main channel North of the entrance, between Borneo and the islands of Balambangan and Banguey, is free from dangers, excepting those expressly mentioned in connection with the reefs off their proper shores.

CHAPTER XIII.

BALABAC STRAIT AND THE ISLANDS NORTH OF BORNEO, INCLUDING PALAWAN.

THE line of shoals which lie on the edge of the bank of soundings off the N.W. coast of Palawan, and which form the S.E. limit of the *Palawan Passage*, will be described in a subsequent chapter, in connection with the other dangers in that channel; what follows is a description of the little visited island of Palawan, and those that lie between it and the North extremity of Borneo.

The following directions, from the North part of Borneo to the South part of Palawan, are from those by Staff Commander J. W. Reed, R.N., and have been compiled from the surveys of that officer whilst in command of H.M. surveying vessel *Riflemen* in 1869.

Between the North part of Borneo and the South part of Palawan are several small islands, of which Balambangan, Banguay, and Mallawallé, lying a few miles from the Borneo coast, with many islets and rocks, form a conspicuous group. Northward of this group is Balabac Strait, which connects the China and Sulu, or Mindoro, seas. The elevated island of Balabac forms the northern limit of the strait, and between that island and Palawan are many smaller ones, of which Mantangoule, Bancalan, Bougsook, Pandannan and others form a group separated from Balabac by North Balabac Strait.

BALAMBANGAN ISLAND, 11 miles N.E. by N. from Sampanmangio Point, the N.W. extreme of Borneo, presents in its southern portion a range of hills, the highest of which is 440 ft.; these elevations are bounded on the western sea margin by abrupt cliffy outlines. The northern portion of the island is flat, but thickly covered with high trees. A spur juts easterly at nearly the mid axis of the island, dividing the two inlets known as the North and South harbours; and on the peninsula head forming the southern

horn of the last of these, observations were obtained by Sir Edward Belcher, as the chief eastern meridian for his survey of the North coast of Borneo.

Both harbours afford good water, but the purest was found at the southern one.

Some islets and rocks lie off the South end of the island, and a detached coral patch, with 3 fathoms water over it, E. by S. $\frac{3}{4}$ S., distant a mile from it. Off the S.W. point of Balambangan is the small, round island of *Kalutan*, 278 ft. high, which a vessel should not near under half a mile, on account of a reef projecting from the West side of it. The whole western coast of Balambangan is fronted by reef, which projects, in places, three-quarters of a mile.

Siagut Shoal, a detached coral bank, $1\frac{1}{2}$ mile in length, with less than a fathom water over some parts of it, lies 2 miles off the N.W. part of the island; by keeping in depths not less than 14 or 13 fathoms, all these dangers will be avoided.

Reefs and shoals extend more than three-quarters of a mile from Siagut Point, at the North end of the island, and a 3-fathom patch lies N.N.W., nearly $1\frac{1}{4}$ mile from it; vessels should, therefore, give it a berth of a couple of miles, or not come under 9 or 8 fathoms when rounding it.

The whole of the East coast of Balambangan is also fronted by coral; $1\frac{1}{2}$ mile south-eastward of Siagut Point, separated from the shore reef by a passage 6 fathoms deep, lies a coral shoal, more than half a mile in diameter, having less than a fathom water over some parts of it; and eastward of this danger, in the channel between it and the extensive reef surrounding Tiga Islet, is a small spot of $3\frac{1}{2}$ and another of $2\frac{1}{2}$ fathoms, which should induce great caution in the event of a vessel having occasion to pass through that channel.

The outlines to the eastward of Observatory Head, and along the entire S.E. coast, will be found fringed with shoals, which are not easily discovered, unless the sun be shining on the back of the observer. These shoals will then exhibit a pale green tint, the deeper water being clearly defined by a deep blue.

Tiga Islet, low and covered with trees, is surrounded by reefs, and must be approached with caution.

To enter *South Harbour* requires close attention to the following directions, as well as the customary warning of "lead and look out:"—First, the Cone, the outer islet off Tanjong Kalutan, open of the islets off Observatory peninsula W.S.W., positively clears danger, and on that bearing, if the anchor be let go at the moment the harbour heads open N.W., the vessel will be in 13 fathoms, sufficiently clear of danger. *Water* will be found at a green patch of grassy land cleared from trees, about a quarter of a mile within Raha Point.

The North Harbour, or *Looc Barabok Barabok* (a Bajow name), offers

greater convenience for anchorage than the South harbour, and is of much easier approach, the shoals being better defined.

To clear the shoals off Tanjong Saparoak, do not lose sight of the southern point of Balambangan, or mask it by the islets off Observatory Point, on which line the *Half-Channel Patch* lies, breaking at times, and having 3 feet at low water.

The Banguey Island shore is safe ; work upon that coast until the trees of Tanjong Battang present a decided outline, or the latter bears about W. by N. Two reefs awash lie on the chord of the bay. Enter the bay on a West course, halfway between the northern reef and Tanjong Battang, looking out to avoid a 9-foot knoll, which is on the line of the western extremity of Pulo Kalankâman on with the trees of Tanjong Battang. A shoal *awash*, which bounds the bay entrance on the North, will then be noticed ; it may be grazed, and a position taken up in 10 fathoms, having its centre in line with the trees of Tanjong Battang. The South reef is also awash, and behind it (with a safe channel out S. by E. grazing the reef) the *Samarang* anchored.

It was on the southern point of North Harbour that the English establishment (finally deserted in 1803) was situated. Two streams flow into the sea, one on each side of the ruins. The westernmost is to be preferred for watering. Fuel may be obtained at any part of these islands, and is similar in quality to the woods of Borneo grown on hard soil.

BANGUEY ISLAND—the nearest part $2\frac{1}{4}$ miles eastward of Balambangan—is twice the size of that island ; it is somewhat rhomboidal in form, about 13 miles in diameter, very irregular, and everywhere fringed with reefs. The South coast is faced by small island, between which are deep-water channels, and behind them large concealed spaces formerly, and even now at times the rendezvous and hiding places for the Llanum pirate prows. They form the northern limit, and are included in the description of Banguey South channel. The West coast is included in the description of Banguey West channel, and the North coast in that of Balabac Strait. Offlying for several miles the N.E. and East coasts of Banguey are numerous islands, islets, and dangers, some of which will be included in the description of Banguey South channel, and others, farther on, under special denominations.

There are several ranges, as also some detached hills on Banguey ; the highest, *Banguey Peak*, elevated 1,876 ft., is at the N.W. end of the island, and shows up as a very conspicuous object for more than 30 miles around.

From the peak a long spur slopes in a south-westerly direction to the West coast, and a range of hills extends to the eastward for a distance of 6 miles, *East Hill*, at the extreme of the range, being elevated 1,076 ft. ; thence some smaller ranges take a northerly direction, and terminate near the coast in North Hill, 742 ft. high.

Banguay West Channel, between Balambangan and Banguay, leading from the China Sea into Balabac Strait, is not so free from danger as it was supposed to be, a rock, with 9 ft. water over it, having been discovered in the fairway, and also other dangers off the N.W. coast of Banguay, during the progress of the survey of Balabac Strait and its vicinity, by Staff Commander Reed, in H.M.S. *Rifleman*.

Molleangan, an island 466 ft. high, and Little Molleangan, about one-third its size, together, with some islets and numerous rocks, lie south-westward of the S.W. point of Banguay, the outer rocks being nearly 4 miles off. Dangers stretch off in westerly and north-westerly directions from Molleangan to the distance of three-quarters of a mile, and others in a northerly direction till they unite with those fronting the S.W. coast of Banguay.

Giving the West coast of Banguay a cautious berth of 1 mile on a N.E. and S.W. line, and not decreasing the water to less than 19 fathoms, the coast is safe. A close examination and survey of the coast failed to detect any river. No fresh water was found, and the reefs were unsafe at low water for light boats.

Manyangit Point, the N.W. extreme of Banguay, can be approached to within a quarter of a mile. The N.W. coast terminates at *Samarang Point*, $6\frac{1}{2}$ miles N.E. by E. from Manyangit Point, three-quarters of a mile W.N.W. of which is the outer edge of a patch of dry coral, with a sand cay upon it, so that this part of Banguay must be neared with caution. Two small coral shoals, the north-eastern one having $2\frac{1}{2}$ fathoms water over it, and the other 3 fathoms, lie $1\frac{1}{4}$ mile off shore, with Banguay Peak bearing S. by W. $\frac{1}{2}$ W. The channel between these shoals and the shore dangers is clear, with depths of 6 and 7 fathoms. *Rifleman Rock*, a small coral patch with $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms water over it, and 5 and 6 fathoms close to, lies in the fairway between the shoals just described and those extending south-eastward from Tiga Islet, distant $1\frac{1}{2}$ mile from the former, and nearly a mile from the latter. From the centre of the patch Manyangit Point bears S.S.W., and the S.W. end of Tiga Islet W. $\frac{3}{4}$ N. Westward of the rock are 6 and 7 fathoms, but eastward of it the soundings are shoaler and more irregular.

Passing through Banguay West channel, Banguay Peak bearing N.N.E., or a depth of 19 fathoms being preserved, will lead you clear to the westward of Molleangan Islands. Manyangit Point to the northward of N. by E. $\frac{1}{4}$ E. will keep vessels clear of the whole of the dangers fronting the West coast of Banguay.

Being to the northward of the Half Channel Patch, haul out a little towards mid-channel, and steer a northerly course until about a mile past Manyangit Point, when bring it to bear S. by W., and carefully keeping it so, guarding against tides, pass between Rifleman Rock and Tiga Islet Reefs. Steering a N. by E. course, and having brought the centre of the highest part of Tiga Islet on the port beam, the rock will be on the starboard

beam, and when past it a vessel of heavy draught may edge more to the eastward, to avoid some 4-fathom patches, the nearest of which lies half a mile north-westward of the rock.

BANGUEY SOUTH CHANNEL, through which vessels may pass from the China Sea into the Sulu Sea, instead of through Balabac Strait, is somewhat intricate, and demands careful navigation, being for the greater part of its length bounded by dangers. The western entrance, about $1\frac{3}{4}$ mile wide, is between Outer Shoal, the westernmost of many dangers which extend off several miles from the N.W. part of Borneo, and the Molleangan Islands off the S.W. part of Banguay. The southern limits of the channel are formed by the dangers off the N.W. and northern parts of Borneo; the South channel dangers; the reefs off the northern part of Mallawallé; and the northern edge of the reefs and shoals extending many miles eastward of that island, and known as Mallawallé eastern dangers. The northern limits comprise the islands which lie close to, and appear to be part of, the southern shore of Banguay; the Carrington Reefs; and by an extensive mass of reefs known as the S.E. Banguay dangers.

Those dangers only will be described which lie outside the mass, limiting the channels proper for vessels to proceed by; the dangers N.W. and North of Borneo will be first described.

Outer Shoal forms the S.W. limit of Banguay South Channel; it is somewhat square shaped, about a mile in extent, with from 1 to 3 fathoms water over the greater part of it, and a patch which dries near its eastern side. The N.W. end is steep, having 13 fathoms close to, and this part forms the southern boundary of the entrance to the channel; from it the apex of Little Molleangan bears N.E. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles; and a small islet close to the N.W. point of Borneo, having upon it a white patch which shows like a boat's sail, bears S.E. $\frac{3}{4}$ S. 5 miles.

A sand cay, on the East side of a coral ledge nearly awash, lies E. by S. $\frac{1}{4}$ S., $2\frac{3}{4}$ miles from the N.E. extreme of Outer Shoal, and S.E. by S. southerly nearly $3\frac{1}{4}$ miles from Little Molleangan.

Between Outer Shoal and the sand cay, but nearer the latter, is a small dangerous coral patch with only 1 fathom water upon it.

Another small sand cay, in the centre of a coral ledge, lies E. $\frac{1}{2}$ N. $1\frac{1}{4}$ mile from that before mentioned, and S.E. $\frac{1}{4}$ E. $3\frac{3}{4}$ miles from Little Molleangan. These cays are very useful as marking the limits of the channel in the direction of Borneo, and being composed of white sand (coral debris) they are very conspicuous.

Nearly 3 miles E.N.E. from the sand cay, last mentioned, is a 2-fathom coral patch, with a couple of ledges which dry a short distance southward of it; from this danger, which is the most northerly of the whole cluster,

Little Molleangan bears W. by N. $\frac{1}{2}$ N., $5\frac{3}{4}$ miles, and the apex of Patanunam N.N.W. $\frac{1}{2}$ W., nearly 4 miles.

About $1\frac{3}{4}$ miles E. $\frac{1}{2}$ S. from the 2-fathom shoal is the outer of two coral ledges lying close together; from it Little Molleangan bears W. by N. $\frac{1}{4}$ N., $7\frac{1}{2}$ miles, Patanunam apex N.W. $\frac{1}{4}$ W. 5 miles, and the highest apex of Mallawallé E. $\frac{1}{2}$ N. 8 miles. A 3-fathom patch lies 3 cables E.S.E., and a ledge of rocks a little over $1\frac{1}{2}$ mile in the same direction from these dangers; this ledge, however, should properly be considered one of the dangers off-lying the N.E. coast, and affecting the navigation of the channel between Borneo and Mallawallé.

South Channel Dangers comprise five coral shoals which lie nearly midway between the Banguay and Borneo coasts, limiting Banguay South channel to the southward, and Mallawallé channel to the northward. It is only necessary to consider these shoals as a dangerous group which the following bearings just clear:—On the North side the apex of Large Molleangan W. $\frac{3}{4}$ S.; on the South side the same object W. $\frac{1}{2}$ N.; on the West side the South apex of Pagassan N. $\frac{1}{4}$ E.; and on the East side, the islet next the Point of Banguay, East of Lampassan, N. $\frac{1}{4}$ W.

Mallawalle Island, 7 miles distant E. by N. from the North extreme of Borneo, is 4 miles long, and about the same distance broad. The island for the most part consists of ranges of hills from 400 to 500 ft. high; but one range, towards the N.W. end, attains the elevation of 562 ft. N.W. islet lies a short distance off the N.W. end; and North Island, low and nearly a mile in length, lies so close to and projects from the North part of the main island in such a manner that it is not easily seen to be detached.

Mallawallé, including the adjoining islands and islets, is encircled by a belt of reef which dries at low water; and at the N.W. point of Mallawallé it curves round and projects a narrow spit more than a mile to the southward, forming a sort of small harbour, with 8 fathoms water in it, where proas, or other small vessels, could easily find anchorage. At the South end of Mallawallé is an inlet about a mile in depth.

Off the North side of Mallawallé, at its western end, the shore reef extends about $1\frac{1}{4}$ mile, and encloses *North Island*, 1 mile long, N.N.E., and S.S.W. A 2-fathom coral patch lies N.N.W. $\frac{1}{4}$ W., nearly 7 cables from North Island, and 5 cables outside the reef encompassing it, and from this patch three narrow strips of reef, dry at low water, extend more than 2 miles to the eastward; the westernmost strip is marked near the middle by a sand cay. Between these dangers and the shore reef is a channel with depths of 10 or 11 fathoms, decreasing to 4 fathoms near the reefs on either side.

Half a mile north-eastward of the snout, projecting from the shore reef at the eastern part of Mallawallé, is a conspicuous sand cay, situated near the West end of a detached reef which extends a mile eastward of the cay; the channel between this danger and the shore reef is blocked by a 2-fathom

coral shoal. About $1\frac{3}{4}$ miles N. by E. from the East end of Mallawallé, and N.N.W., $1\frac{1}{4}$ mile from the cay, is a narrow strip of coral, half a mile in length, which dries; close around it are 12 and 13 fathoms; and S.E. $\frac{1}{2}$ E., $1\frac{1}{4}$ mile from the cay, is another small coral patch, with a spot upon it which dries, and depths of 15 fathoms close to; but these are, in fact, the westernmost of the Mallawallé eastern dangers.

Mallawalle Channel.—Dangers extend off 3 or 4 miles from the N.E. coast of Borneo, and between these and Mallawallé is a safe channel 3 miles broad; but a rock lies in the fairway just outside the southern part, which is the limit of the *Rifleman's* survey in that direction, and, probably, many other dangers will be discovered when the survey is extended.

Mallawalle Eastern Dangers comprise a large number of detached reefs and shoals which extend 10 or 11 miles in directions E.N.E., East, and S.E. from Mallawallé. It is only the northern edge of these dangers, bounding the eastern part of Banguey South Channel to the southward, which require description, for there can be no possible object to induce risking a vessel amongst them, unless it is a gunboat in pursuit of pirates.

About $2\frac{3}{4}$ miles N.E. by E. from the detached cay off the eastern end of Mallawallé Island, is a small coral strip which dries, but surrounded by depths of 14 and 15 fathoms. One-third of a mile southward of this strip is a shoal half a mile in extent, with less than a fathom water over it. A mass of reefs and shoals, occupying a space $1\frac{1}{4}$ mile in extent, with 13 fathoms close to on their northern side, lies a mile eastward of the coral strip, just described; and E. by N. $\frac{1}{2}$ N., $3\frac{1}{2}$ miles from the same danger is a shoal half a mile in length, with only 7 ft. water on its northern end. This last danger, being always covered, is not so readily seen as the others, and it is important to bear this in mind, as the shoal occupies a prominent position, bordering as it does on the deep water of Banguey South Channel.

The Straggler, a small coral islet, with trees 20 ft. high, is a very useful object for guiding strangers into, and assisting them in navigating the eastern part of Banguey South Channel. From it the 7 ft. patch just described lies N.W. by W. $\frac{1}{4}$ W. nearly $1\frac{1}{2}$ miles, whilst westward of the islet are several other dangers. The reef surrounding the islet extends $1\frac{1}{4}$ mile in an E. by N. $\frac{1}{2}$ N. direction. About $1\frac{1}{2}$ mile S.E. from the East extreme of the Straggler Reef, and E. by S. $\frac{3}{4}$ S. from the islet, is the outer edge of a shoal having in some places less than 6 ft. water. This is the north-eastern danger of the Mallawallé group, and half a mile eastward of it is a $3\frac{1}{4}$ fathoms coral patch. Other dangers of the group extend 7 miles further to the southward, which was the limit of the *Rifleman's* survey in a S.E. direction from Banguey.

Fairway Shoal, at the eastern entrance of South Banguey Channel, is a coral shoal, from half to three-quarters of a mile in diameter, having a rock awash near its southern part, and $1\frac{1}{2}$ to 3 fathoms elsewhere; its southern

extreme is N.E. $\frac{1}{4}$ E., $2\frac{1}{2}$ miles from the Straggler, $1\frac{1}{2}$ mile N.N.E. $\frac{1}{2}$ E. from the eastern extreme of its reef, which limits the width of the channel southward of the shoal; the channel between it and S.E. Banguéy dangers is 3 miles wide. From the eastern part of this danger the highest apex of Mallawallé bears W. by S. $\frac{1}{2}$ S., distant 14 miles, and Banguéy Peak W.N.W., westerly, distant $27\frac{1}{4}$ miles.

Islands off the South Coast of Banguéy.—*The Molleangan Islands*, which form the north-western limit of Banguéy South Channel, have already been described (page 516); it is, however, proper to observe here that dangers extend three-quarters of a mile westward and two-thirds of a mile eastward of Little Molleangan; but Molleangan, a high conspicuous island, which points out the entrance of the channel from afar, is free from danger on those sides affecting the navigation of this channel. *Patanunan Island*, three-quarters of a mile eastward of the S.W. point of Banguéy, is 428 ft. high, serves as a useful object for bearings when passing through the channel. *Pagassan Island*, 3 miles eastward of Patanunan, is fringed by a reef which projects 3 cables from the southern part, and a cable farther off lies a rock awash; the island must therefore be neared cautiously. Three-quarters of a mile eastward of Pagassan is *Lampassan*, the southern part of which extends thence $2\frac{3}{4}$ miles in an E.N.E. direction. This island is also high, and from its southern and eastern points some peculiar spits of coral, dry at low water, project nearly three-quarters of a mile. The S.E. extreme of Banguéy is bordered by coral reefs, outside the edges of which, opposite the mouth of an inlet, lie two rather large detached patches, the South end of the outer one being a mile off.

Nearly $2\frac{1}{2}$ miles from the East end of Lampassan is the West end of *Carrington Reefs*, comprising several masses of coral, for the most part dry at low water, extending 4 miles in an E. by N. direction; they are a mile broad, and on the North side, 4 cables from the edge of the mass, is a detached spot of $2\frac{1}{2}$ fathoms. Between this last and the dangers extending from the Banguéy shore is a channel three-quarters of a mile wide, but which, as a matter of ordinary navigation, no vessel would require to use.

The main channel lies between the Carrington Reefs and those off the North part of Mallawalle, and by this channel only should strangers attempt to proceed, taking care not to near the former dangers under a depth of 15 or 13 fathoms; the apex of Pagassan bearing W. $\frac{1}{2}$ N. leads close to the southward, and the East end of Lampassan bearing N. by W. $\frac{1}{4}$ W. leads westward of a $4\frac{1}{2}$ -fathom patch lying 3 cables off the West end of them.

South-East Banguéy Dangers comprise an extensive group of reefs and shoals 10 miles in length, E. by N. $\frac{1}{2}$ N., and W. by S. $\frac{1}{2}$ S., and nearly 5 miles in breadth; they lie south-eastward of Bancawan Island and reefs, being separated from them by Bancawan Channel; the southern part is 9 miles south-eastward, and the eastern part $14\frac{1}{2}$ miles eastward of the S.E.

extreme of Banguey. The West end of the group is defined by two small isolated patches, dry at low water and steep-to; the northern patch lies almost half a mile, and the southern one somewhat more outside the body of the reefs, with depths of 12 fathoms between, so that a sharp look-out is essential when nearing them, and the same precaution will have to be observed when passing through the channel, as the reefs forming the southern edge of the mass are all steep-to. A space, about 2 miles in extent, at the eastern part of these dangers, is studded by a number of coral patches, with $1\frac{3}{4}$ to $3\frac{3}{4}$ fathoms water over them, and from the outer or eastern one the apex of Latoan Island bears N.W. by W. $\frac{3}{8}$ W., $9\frac{1}{2}$ miles; Banguey Peak W. by N. $\frac{1}{4}$ N., 24 miles; and the apex of Mallawallé S.W. by W., 14 miles.

The passage between the S.E. Banguey dangers and Carrington Reefs is nearly 2 miles wide, and perfectly safe.

Bancawan Channel, separating Bancawan Reefs from S.E. Banguey dangers, is three-quarters of a mile wide at its narrowest part, near the middle. The direction of the channel is nearly straight, and a N.E. $\frac{2}{3}$ E. course will lead between the East end of Carrington Reefs and the West end of the S.E. dangers, and through the fairway; but it will be necessary in practice to be guided more by a vigilant look-out for the reefs on each hand bounding the channel than by compass bearings: with proper precautions there will be no difficulty in taking a gun-vessel safely through.

DIRECTIONS FOR BANGUEY SOUTH CHANNEL.—Having rounded Sampanmangio Point, stand over to the eastward for the Molleangan Islands, bringing their apexes in line as they are approached. When arrived within 2 or 3 miles of them open Little Molleangan left of the apex of the larger island, and steer East into the channel; and, in order to keep well clear of Outer Shoal, avoid opening the whole of Patanunan (a black round looking island when viewed from near the entrance of the channel) right of Molleangan, before the apex of Little Molleangan is brought to bear N.N.E. Having passed Little Molleangan steer up more to the north-eastward, keeping a mile or so off Molleangan and Pantanunan; and, being past those islands, bring the apex of the latter to bear W. $\frac{3}{4}$ S. and steer the opposite course through the fairway between the South Channel dangers and the rock off the South end of Pagassan; Molleangan apex bearing W. by S. well clears the former, and Patanunan apex bearing W. by S. $\frac{1}{3}$ S. clears the latter danger.

Continue to steer an E. $\frac{3}{4}$ N. course, by preserving the opposite bearing of Patanunan apex, until the summit of the hill at the southern part of Pagassan bears W. $\frac{3}{4}$ N., when steer East for a mile or so, until the bearing changes to W. $\frac{1}{2}$ N., northerly; when by keeping it so, and steering the opposite course, the dangers off the North part of Mallawallé will be avoided.

When the highest hill of Mallawallé is brought to bear S.W. $\frac{1}{2}$ S., edge away a little to the southward—to give a wider berth to the S.E. Banguéy dangers—until the same peak bears W.S.W., when the opposite course E.N.E., carefully preserving the back bearing, will lead between the outer part of the S.E. Banguéy dangers and Fairway Shoal, and out of the channel into the Sulu Sea.

These directions will serve very usefully to assist in the safe guidance of vessels, but attention to them must be supplemented by a most vigilant and careful look-out from aloft. The best time for proceeding through from the westward is of course afternoon, with the sun astern, when there is seldom much difficulty in making out the various dangers as the vessel advances, which it is almost impossible to do with a glaring sun ahead.

BALABAC STRAIT, leading from the China Sea into the Mindoro or Sulu Sea, is bounded on the South by the islands of Balambangan and Banguéy, and on the North by the island of Balabac. The greater part of the body of the strait is occupied by coral dangers, far too numerous to admit of detailed description. These dangers are delineated upon the chart, the result of the *Rifleman's* survey in 1869.

The high peak of Balabac Island is the most conspicuous object in the vicinity of the strait, and visible from all parts of it. Banguéy and Balabac Peaks lie N. $\frac{1}{2}$ E. and S. $\frac{1}{2}$ W. of each other, $37\frac{1}{2}$ miles apart, and as most of the dangers and channels are to the eastward, and therefore at right angles to that line, these peaks are of the first importance for determining the position of vessels when navigating this dangerous strait.

BALABAC ISLAND, lying off the S.W. extremity of Palawan Island, and about 26 miles northward of Balambangan, is nearly 20 miles in extent North and South, and 9 miles East and West. On the southern half of the island are several ranges of high cliffs, exhibiting great variety in the outline of their summits; only two, however, are of sufficient importance to require particular description. *Steep-fall Range*, the first of these, is about 2 miles from Cape Melvill, the South point of the island; the summits of the several hills composing it form together a semicircular line, convex to seaward, and being of nearly the same elevation, 850 ft., present a somewhat table-like appearance, whence the sides fall in a very precipitous manner; hence the name. These features will enable strangers to readily recognise this range, without confounding it with the small range at the S.W. extreme of the island, the highest part of which is, moreover, but 330 ft. From Steep-fall Range, other hills, less elevated, extend in a north-westerly direction nearly as far as the West extreme of the island; and northward from the same range other ranges, varying in height from 1,200 to 1,300 ft., extend to Dalawan Bay; these last are separated from the still higher ranges of Balabac Peak by a valley which runs in a W.N.W. direction

across the island. *Balabac Peak*, the other object calling for special remark, is a sharp hill near the eastern shore, 5 miles northward of Steep-fall Range, and obtains the greatest elevation on the island, 1,900 ft. Eastward of the peak some ranges slope down to Dalawan Bay and the shore northward of it; and northward of these, separated from them by a valley, other ranges extend along the coast as far as Calandorang Bay; westward of the peak is a range of six or seven sharply marked apexes, running in a N. by E. direction to the inner part of the same bay, and westward of this last are several other ranges, inferior in altitude, which stretch over nearly as far as the West extreme of the island, joining those which extend from Steep-fall Range. On the northern part of the island, joining those which extend from Steep-fall Range. On the northern part of the island, beyond Calandorang Bay, are several detached hills, the highest, 750 ft., being situated near the coast, $1\frac{1}{2}$ mile northward of the bay.

The West Coast of Balabac cannot be closely approached on account of numerous reefs and shoals which extend several miles off. These dangers extend over many miles, and are of two kinds: the first consists of large reefs, most of which begin to uncover at the first of the ebb, the whole of them being dry at low water; whilst the second comprises shoals and shoal banks, none having less than 10 ft. water over them at low tides; these lie outside the reefs which dry, some of them being 7 miles from the shore. Should closer information be required, it will be obtained more readily from the chart than from a written description.

The following is a very brief description of the dangers lying W. and S.W. of Balabac:—

The South extreme of *Gnat Reef*, on which H.M. gunboat of that name was wrecked, lies 2 miles N.W. from the S.W. extreme of Balabac; thence the reef extends $1\frac{1}{2}$ mile to the northward. There is a channel round it with many dangers. N.W., 3 miles from the South end of Gnat Reef, is the South extremity of *Balabac Great Reefs*, which thence extend 8 miles to the northward, and dry to the distance of from 3 to 5 miles from the shore. *S.W. Patches*, a line of shallow water from $3\frac{3}{4}$ to 9 fathoms, lies 2 miles South of the South extreme of Gnat Reef and Balabac Great Reefs. *The Western Shoals*, and numerous detached patches of $2\frac{1}{4}$ to 5 fathoms, extend to a distance of about $3\frac{1}{4}$ miles West from the western side of Balabac Great Reefs. *Ada Reef*, dry at low water, lies off the N.W. side of Balabac Island. It is $2\frac{1}{2}$ miles long E.N.E. and W.S.W., three quarters of a mile broad at its West extreme, and lies a mile outside the shore reef just mentioned, the channel between being full of shoals and patches of reef. From the N.W. extreme of this, the outermost danger off the southern part of Blind Harbour, Balabac Peak bears S.E. by E., $11\frac{3}{4}$ miles, and the apex of the hill over the northern point of Blind Harbour N.E. by E. $\frac{1}{4}$ E. $6\frac{1}{2}$ miles.

Ada Reef is connected by a coral bank, having less than 3 fathoms water,

with the dangers of Blind Harbour, and those extending from the shore thence to Cape Disaster.

North-West Shoal, the last of the Balabac dangers to be noticed, lies about 3 miles north-eastward of Ada Reef, 2 miles distant from the coast northward of Blind Harbour; it is $2\frac{1}{2}$ miles long N.E. by E. and S.W. by W., and half a mile broad. This is a dangerous shoal, having as little as $1\frac{3}{4}$ fathom over some parts, and only $2\frac{1}{2}$ to 3 fathoms over the greater part of its extent: to avoid this danger, the S.W. end of Balabac Peak, must not be brought southward of S.E. $\frac{3}{4}$ S., nor West point South of S. $\frac{1}{4}$ E.; and Cape Disaster, the North point of the island, if not brought to the northward of E. $\frac{1}{2}$ N., will clear the N.E. end.

When standing towards the dangers off-lying the West coast of Balabac in the afternoon, when the sun will be astern, the outer shoals, and also the reefs inside of them, will generally be seen a long way off, but always in sufficient time to avoid them; but if the sun is ahead, more especially if it is low, the outer shoals are sometimes difficult to make out until close to them. The soundings are so variable and uncertain, under depths of 30 fathoms, as to afford little assistance to seamen, and in the daytime a good look-out is of the first importance; but at night the soundings must be carefully attended to if near these dangers, and vessels should not decrease their depths under 40 fathoms off the S.W. and West parts of the island, nor under 50 fathoms off the N.W. part.

Blind Harbour is an opening nearly 2 miles wide on the N.W. side of Balabac, having the appearance of a capacious bay, being $4\frac{1}{2}$ miles in extent. It is, however, blocked up with coral, except near the points at the entrance, where there is a narrow channel between the reefs, with 9 and 10 fathoms water.

From Blind Harbour to Cape Disaster, the North extreme of Balabac, and round the northern extremity of the island, the coast is low, with two small clifty hills a little inland. It is fronted by a reef, which at low water dries from 4 to 5 cables, and off Cape Disaster 7 cables from the shore. Shoal water extends some short distance outside the reef, and near Blind Harbour stretches off more than a mile from the coast.

The Eastern side of Balabac Island is tolerably bold, with deep water close to the shore. From Cape Melville, the South point of the island, the coast to Dalawan Bay trends to the N.E., and is steep-to, except at the cape and the N.E. point of Clarendon Bay, a small inlet near it, off which reefs, dry at low water, extend 2 cables.

The coast northward of Dalawan Bay trends North a little westerly; it is fringed by a reef, which extends from 1 to $1\frac{1}{2}$ cable from the shore, and has three small inlets, the southernmost of which is called Calandorang.

From Candaraman, the northernmost inlet, the coast takes a more westerly

direction for $2\frac{1}{2}$ miles to Encampment Head, a small bushy isthmus nearly a mile to the eastward of Cape Disaster.

From Cape Melvill, the South point of the island, reefs extend off half a mile, and from the S.W. part of the island nearly a mile: some distance outside the shore reefs the ground is foul, with detached shoal spots here and there; from the outermost of these, a 3-fathom patch, the right extreme of the southern part of the island bears N.E. by E. $\frac{1}{2}$ E., $1\frac{3}{4}$ miles, and the S.W. extreme N. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ mile: vessels should not come nearer than 2 miles to the coast between Cape Melvill and the S.W. point of Balabac.

Clarendon Bay is a small inlet, opening into the coast in a north-westerly direction, with depths of $3\frac{1}{2}$ to 5 fathoms, five cables inside the points; from the southern point the shore reef extends off a very short distance, but from the northern point it projects more than 2 cables in a S.E. direction, narrowing the width at the entrance to barely three-quarters of a cable. Clarendon Bay, after being surveyed by Mr. Doorly, navigating midshipman of H.M.S. *Rifleman*, was used as a place of shelter from S.W. gales by H.M. gun-vessel *Avon*, when engaged in recovering guns and stores from the wreck of the *Gnat*.

Dalawan Bay, convenient for wooding and watering, and affording good shelter with south-westerly winds, has its entrance $6\frac{1}{2}$ miles from the South point of Balabac Island, with Balabac Peak bearing N.W. $2\frac{1}{2}$ miles. When off Dalawan Bay, its locality will be readily recognised by the low land running in a W.N.W. direction from the beach across the island, separating the high land about Balabac Peak from the Transept, a smooth table-topped hill on the South side of the bay.

The bay is about a mile wide from shore to shore at the entrance, and about three-quarters of a mile deep. Reefs, which dry at low water, project from both points at the entrance, contracting the channel to a little less than 7 cables; that on the northern side has a rock at its extremity called Buoy Rock, lying South 2 cables from the shore, but rocky ground extends $3\frac{1}{2}$ cables beyond this in a north-easterly direction, having in some parts only 3 fathoms water, with 5 and 7 fathoms close to the edge.

There is a white rock on the shore in the south-western corner of the bay, $1\frac{1}{2}$ cable to the northward of which is the entrance of the river. A reef of rocks one cable in extent, showing only at low water springs, lies to the eastward of the entrance of the river, upwards of 2 cables from the beach.

The shores of the bay are densely wooded, the entrance on either side being fronted with mangrove. The best anchorage is about the centre of the bay in 9 fathoms, mud, nearly half a mile from the beach. South-eastward about a quarter of a mile from the White Rock, where the mangrove joins the foot of the hills in Dalawan Bay, is a rivulet of *good water*; there are also one or two good streams on the northern shore of the bay, but neither of

them was found so eligible for the purpose of watering as the river; in the dry season the water must be obtained some distance up to be good. The river is navigable for boats on ordinary occasions about a mile, where there are a few houses and some cultivated ground occupied by Malays, who by turns, as opportunities offer, act the parts of pirates or husbandmen. Their character is decidedly questionable, and merchant boats' crews should be on their guard.

It is high water, full and change, at Dalawan Bay at 11^h; and the rise of tide is 5 ft.

Calandorang Bay, or *Puerto del Principe Alfonso*, 6 miles northward of Dalawan Bay, is a Spanish settlement, established a few years ago for the purpose of developing the trade of Palawan and other neighbouring islands; it has not yet succeeded, however, in making any progress, for there is absolutely no trade whatever. It is a naval establishment. No supplies of any kind are to be procured; bullocks, and other necessaries for the use of the garrison, being sent periodically from Manila.

The bay is 6 cables wide at its entrance, and 1½ mile deep. The South point of the entrance is formed by a hill, 110 ft. high, named *Almirante Gill*, upon which is a lighthouse; the North point is mangrove, with hills a short distance inside of it: coral and shoal water extend nearly a cable off both points.

The light on *Almirante Gill* is elevated 268 ft. above the mean level of the sea, and in clear weather should be seen from a distance of 10 miles. The tower is square, white with a red base, and surmounted by a red lantern.

On the South shore, a cable or so inside the lighthouse, is a coal store and small jetty, and further on two bluffs, or heads, project from the higher ranges on to the beach; from the first of these coral, dry at low water, and shoal soundings, extend about a cable, and from the last a coral ledge stretches out rather more than half that distance. Beyond the bluffs, about half a mile from the entrance, is a landing pier, the town being built on the shore of the bay westward of it, and terminating at a third bluff, or spur, protruding from the high range of hills behind. The North shore of the bay is all mangrove; from two points, about half a mile from the entrance, coral, dry at low water, extends off about 1½ cable; and from a point opposite the town, a coral reef, with some rocks above water upon it, extends off almost as far.

A 3-fathom patch, with 3¾ fathoms around it, lies off the first bluff westward of the coal store; from it the lighthouse bears E. ¼ S., and the blockhouse S.W. ¼ S.

The anchorage in the bay is good, the bottom being of mud, and during the S.W. monsoon it is perfectly sheltered and secure; a convenient position for a moderate sized ship to anchor in is just outside a line between the lighthouse and the dry rocks, with the former bearing E. by S. ½ S., the bluff

westward of the town S.W. $\frac{1}{2}$ W., and the block-house fort, a white octagonal-shaped building, S.W. by S. : small vessels can go farther in on the line of bearing of the bluff, just mentioned, and anchor where most convenient. The N.E. monsoon occasionally blows into the bay with considerable force, sending in also a nasty chop of a sea, so that it is better, at that season, to anchor more over towards the North shore, taking care to have plenty of room for veering. At Calandorang Bay it is high water, full and change, at 11^h; springs rise 6 ft.

A steamer will find no difficulty whatever in entering Calandorang Bay guided by the chart. It is, however, very difficult and dangerous of access for sailing vessels, on account of the deep water outside, and of the strong tides and currents which sweep along the East coast of Balabac, in the strength of the monsoon. A sailing vessel bound for that port should be provided with a heavy kedge, and stout hemp, or coir, cable, to enable her to bring up in deep water, in case of missing the port, which she should not attempt to make without a commanding breeze. About 3 or 4 cables off the port the depths are 35 and 40 fathoms, and a mile off they are over 100 fathoms. A vessel coming from the southward should make for Dalawan Bay, if the wind should threaten to fail her, and await there a more favourable opportunity for entering Calandorang Bay; for if the wind should die away when she was a mile or so off the port she would be swept in the most helpless manner towards the numerous dangers to the northward: with a commanding breeze, however, no difficulty will be found in entering, as directed for steam-vessels.

It must be borne in mind that, on account of the very deep water along the East coast of Balabac, sailing vessels bound either for Dalawan or Calandorang Bays must hug the shore, which is pretty bold, the fringe of reef extending but a very short distance from it.

NORTH AND N.E. COASTS OF BANGUEY.—Between Samarang Point (page 516) and the North point of Banguey the coast line falls back into a couple of bays. *North Guhuan*, an islet on the western part of a reef three-quarters of a mile in extent, lies nearly a mile off the North point of Banguey, and $5\frac{1}{2}$ miles E. by N. $\frac{3}{8}$ N. from the sand cay off Samarang Point. In this space, westward of Guhuan, there are no offlying dangers.

Off-lying Dangers are numerous, and extend a long way from the N.E. part of Banguey.

A shoal bank extends from the reef surrounding North Guhuan in an E. $\frac{3}{4}$ S. direction, $4\frac{1}{2}$ miles; from the middle of it a tongue projects half a mile to the northward, having a patch of dry reef near the centre, and a spot of 3 fathoms; E. by N., a quarter of a mile from the extreme. Two sand cays, surrounded by reefs, lie at the eastern end of the bank; and between this part of it and the shore dangers, which stretch off about three-quarters of a mile, is a narrow run, with 4 and 5 fathoms depths of water on it.

Louisa Shoal, coral, with $1\frac{1}{2}$ to 3 fathoms water over it, 8 cables in extent N.W. and S.E., and 4 cables broad, lies half a mile outside the bank, just described; from its North extreme North Guhuan bears S. by W. $\frac{1}{4}$ W., distant $1\frac{1}{2}$ mile, and from its West extreme Samarang Point S.W. by W. $\frac{1}{4}$ W. nearly 6 miles. Nanyangit and Samarang Points in line, bearing S.W. $\frac{3}{4}$ W., lead a good half mile outside this danger.

Maggie Reef, a strip of coral a quarter of a mile long, dry at low water, lies on the northern part of a coral shoal, about 3 miles in circumference, situated E. by N. a little over $2\frac{1}{2}$ miles from Louisa Shoal, and having upon it several rocks, just below water. North Guhuan, bearing S.W. by W., will lead half a mile outside, or N.W. of it; East Guhuan bearing S.S.E. $\frac{1}{2}$ E. leads well clear to the eastward.

Between Louisa and Maggie Shoals are several $4\frac{1}{2}$ and 5 fathom patches, and, outside the line of those dangers, two spots of $3\frac{1}{2}$ fathoms, one bearing N.E. $\frac{3}{8}$ N. nearly 3 miles, and the other N.E. $\frac{3}{8}$ E. nearly $3\frac{1}{2}$ miles, from North Guhuan. A small spot of $5\frac{1}{2}$ fathoms lies on the edge of the bank, and close to the northward of it are 12 fathoms: from this spot North Guhuan bears S.W. $\frac{1}{8}$ S.; the right extreme of South Mangsee island N. by E. $\frac{1}{4}$ E.; and East Guhuan S.S.E. $\frac{1}{4}$ E.

East Guhuan, an islet about the same size as North Guhuan, stands on the West side of a coral shoal which extends nearly half a mile north-westward, 3 cables north-eastward, and nearly a mile South and south-eastward from it. About a mile N.N.W. of East Guhuan, a little to the eastward of a line between it and Maggie Shoal, is a 9 ft. patch, about 3 cables in extent.

Banquey Outer N.E. Dangers are a cluster of reefs lying to the north-eastward of those just described, and divided from them by a clear channel three-quarters of a mile to $1\frac{1}{4}$ mile wide, with depths of 7 to 10 fathoms; they extend $3\frac{1}{2}$ miles in a N.W. $\frac{1}{2}$ W. and opposite direction, and a little over a mile in a direction at right angles to their length. A large reef occupies the centre of the mass, and dries within three-fourths of a mile of each end; upon the N.E. extreme of the reef is a sand cay, which is very useful for pointing out the locality of these dangers, they being 6 miles distant from the shore. Shoal water stretches off nearly a mile eastward of the cay, which must not be neared anywhere to within a mile, except at the West side, where the reef extends off only a short distance. Close to the outside edge of these shoals are 11 or 12 fathoms.

The East coast of Banquey is fronted by dangers which extend off several miles; they consist, for the most part, of extensive reefs, dry at low water, separated from each other by narrow channels—impracticable for navigation; it is only the outer ones that require detailed description.

Kahamkamman is the name of a small islet, 2 miles S.E. of East Guhuan: It lies towards the N.W. end of a coral shoal about a mile in extent, the part surrounding the islet drying at low water. South-westward of this

shoal, separated from it by a $5\frac{1}{2}$ -fathom channel, about half a mile wide, is another, about three times as large, having three islets, a sand cay, and several extensive patches of reef. The S.E. islet is named Balundangan, a mile S.W. of which is an island about $1\frac{1}{4}$ mile long, and rather more than half a mile off the coast.

May Williams Shoal, 9 cables long N.W. and S.E., and 4 cables broad, having from $2\frac{1}{2}$ to 3 fathoms water over it, lies half a mile south-eastward of Kahamkamman Shoal; from its S.E. end the islet bears N.W. by N., distant 2 miles, and the apex of Latoan S.S.W. $\frac{1}{2}$ W., distant $3\frac{1}{2}$ miles; around the shoal are depths of 7 to 9 fathoms.

Sampson Patches, three in number, have $3\frac{1}{2}$ to 5 fathoms water on them; from the outer patch, Kahamkamman bears W. $\frac{1}{2}$ N., distant 3 miles, and the apex of Latoan S.W. $\frac{1}{2}$ S., nearly $5\frac{3}{4}$ miles.

Latoan and Bancawan Islands and Reefs comprise four or five islands, several extensive reefs, and many small detached dangers, the whole forming a group 7 miles long North and South, and $5\frac{1}{2}$ miles wide. Only boats can pass between the various reefs composing the group; but, between them and the reef fronting the Banguay shore, there is a deep water channel, through which it is possible for a gun-boat to pass, although, near the West point of Bancawan, it is narrowed to little more than a cable by a small reef in the middle.

Latoan is an oval-shaped island, a mile long N.W. and S.E., the trees upon it rising to a kind of low apex near the centre. *Bancawan*, $1\frac{1}{2}$ mile south-westward of Latoan, is an irregular shaped flat island, $2\frac{1}{4}$ miles long North and South, and $1\frac{3}{4}$ mile broad. *Outer Latoan Patch* is the name given to the eastern one of three isolated patches which lie close to the N.E. edge of the large reef surrounding Latoan. It is about 2 miles in circumference, with 1 to 3 fathoms water over most parts of it; and a rock, a few feet under water, lies near its eastern margin. From this last, Kahamkamman bears N.W. $\frac{1}{4}$ N., distant $4\frac{1}{4}$ miles, and Latoan apex S.W. by W. $\frac{3}{4}$ W., distant $3\frac{3}{4}$ miles. *East Banguay Patches* are two small coral shoals, lying three-quarters of a mile and a mile, respectively, outside the Bancawan Reefs; the inner one has as little as 2 fathoms upon it, but the outer one not less than $2\frac{3}{4}$ fathoms. From the latter, Latoan apex bears W.N.W. $3\frac{3}{4}$ miles, and the left extreme of the round island, south-eastward of Bancawan, S.W. by W. $\frac{1}{4}$ W., $4\frac{3}{4}$ miles.

Mangsee Great Reef, which forms the northern limit of the main channel through Balabac Strait, lies $4\frac{1}{2}$ miles northward of North Guhuan, and a little over 3 miles, in the same direction, from the Louisa Shoal; its distance from the 10-fathom line at the edge of the shore bank is $1\frac{1}{2}$ mile. The reef is 5 miles long E. by N. and W. by S., and $2\frac{3}{4}$ miles broad. It is nearly everywhere covered at high water, but a sand cay upon the eastern part is

generally visible from aloft when near the edge. At low water the reef presents a vast expanse of coral and sand, with lagoons here and there.

From the West end of the reef shoal water, under 10 fathoms, extends about 2 miles in a W.S.W. direction. The soundings over this part are very irregular, and, although the least depth discovered was 4 fathoms, the locality should be avoided. From the outer part of this shoal water Banguay Peak bears S.S.W. $\frac{1}{4}$ W., and the apex of North Mangsee N.E. by E. $\frac{1}{2}$ E.

The **MAIN CHANNEL** through Balabac Strait is limited to the southward by the 10-fathom line defining the edge of the shoal bank which extends from the shore, encompassing the various dangers and shoal patches lying off the North and N.E. coasts of Banguay; and it is limited to the northward by Mangsee Great Reef, the southern part of which is $1\frac{1}{2}$ mile distant from the edge of the bank on the Banguay side. The depths in the channel are not regular, varying from 14 to 23 fathoms, the deepest water being rather nearer the reef than the middle of the channel.

Vessels coming from the south-westward, and bound through Balabac Strait in the N.E. monsoon, will find the Main Channel the most convenient to proceed by, attending to the following:—When making for the entrance of the strait, and nearing the N.W. part of Balambangan, care must be had not to bring Point Buttun to the westward of S.W. $\frac{1}{4}$ S., nor to come into less than 14 or 13 fathoms, in order to keep clear of the dangers extending from the shore, and of the Siagut Shoal. Siagut Point, the North point of the island, must not be approached nearer than 2 miles, nor under a depth of 8 fathoms. North Hill, on the North part of Banguay, if not brought to the eastward of E. by S. $\frac{1}{4}$ S., will lead a good half mile outside all the dangers off Siagut Point, as also those extending North of Tiga Islet, which last should not be neared to a less distance than a mile, or under a depth of 8 or 7 fathoms. From Tiga Islet the Banguay coast may be approached to 9 or 8 fathoms, until North Guhuan is brought to bear about S.S.E., when it will be well, especially for large ships, not to come inside the 10-fathom edge of the bank extending from the Banguay shore, as the sudden variations of the soundings on the bank are very alarming, and no less perplexing, to strangers. The light green colour of the water over the Great Mangsee Reef will, even at high tides, always enable a good look-out aloft to make out the edge sufficiently far off to permit of a vessel being guided past it at a safe distance; and when over on the South side of the channel, the first cast of 10 fathoms, or under, will denote the edge of the bank. Having brought the apex of North Mangsee to bear westward of North, vessels may stand on to the bank if desirable to do so, but seamen must beware of a scant wind, or lee tide, sagging them to leeward towards Banguay Outer N.E. reefs, and be careful to avoid bringing North Hill anything to the westward of S.W. by W. $\frac{1}{2}$ W. until the West extreme of North Mangsee is shut in behind South Mangsee.

Coming from the Sulu Sea, the Mangsee Islands should be made bearing about West, when a course about W.S.W. will lead up to the entrance of the channel. If, however, the channel should be made more from the southward, and, as the apex of North Mangsee begins to shut in behind the southern island, 14 or 13 fathoms may be had, a vessel will be over towards Banguay Outer N.E. reefs, and care must be taken to bring North Hill of Banguay to the southward of S.W. by W. $\frac{1}{2}$ W. before proceeding further to the westward.

Mangsee Danger Bank* includes within its limits the *Mangsee* and *Salingsingan Islands*, together with the extensive dangers adjacent to them, and Loxdale and Jessie Shoals, besides many other smaller ones. Its length E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N. is 10 miles, and its breadth $4\frac{1}{2}$ miles at the eastern end, tapering to a point at the opposite extreme.

South Mangsee Island is somewhat round shaped, about half a mile in diameter; it stands upon a patch of reef which extends from it a mile eastward, 6 cables westward, half a mile south-eastward, and less distances in other directions.

North Mangsee Island is half a mile north-westward of South Mangsee, and, like it, is covered with trees; these rise to a kind of apex near the centre, 130 ft. above the level of the sea. The island is 7 cables long and 3 cables broad, and from its East end reefs and shoals extend—beyond those projecting from South Mangsee—for a distance of $2\frac{1}{4}$ miles, and some patches of 4 to 7 fathoms extend half a mile further in an easterly direction. From the West end a line of reefs and shoals runs off in a W. by N. $\frac{3}{4}$ N. direction, nearly $3\frac{1}{2}$ miles.

Jessie Shoal,† $1\frac{1}{2}$ mile long, E.N.E. and W.S.W., and half a mile broad, lies about 2 to 3 miles E.N.E. of the Mangsees, having as little as 6 ft. over it in places. This danger is situated at the East part of the bank, and some shoal spots run off from it in a south-easterly direction. From 10 fathoms outside these, Salingsingan bears N.W. by W. $\frac{3}{4}$ W., distant $4\frac{1}{4}$ miles, and the left extreme of South Mangsee Island W.S.W., distant $3\frac{1}{2}$ miles.

Salingsingan Island is a mere strip of coral and sand, covered with trees; it is rather more than half a mile long, N.W. by W. $\frac{1}{2}$ W. and S.E. by E. $\frac{1}{2}$ E., and shoals extend 2 miles westward of the island, and three-quarters of a mile eastward.

* The limits of this bank, as is the case with all the other similar banks encumbering Balabac Strait, is defined, on the chart, by a danger line; and as the separate dangers comprising these banks lie too close together for vessels to pass amongst them, they are not described minutely, but only in general terms, and as briefly as possible.

† It must have been on this shoal that the *Black Adder* grounded in November, 1873, as described in a letter to the "Nautical Magazine" of May, 1874.

Lordale Shoal, forming the West end of the Danger Bank, lies $1\frac{1}{4}$ mile westward of the dangers extending from the islands of North Mangsee and Salingsingan, the depths between being from 22 to 34 fathoms. It is a coral shoal, nearly $1\frac{3}{4}$ mile long, E. $\frac{3}{4}$ N. and W. $\frac{3}{4}$ S. From the West end of this danger Banguay Peak bears S.S.W., South Mangsee Island S.E. by E. $\frac{1}{2}$ E., and Salingsingan E. $\frac{1}{4}$ S.

Mangsee Channel, separating Mangsee Great Reef from Mangsee Danger Bank, is a mile wide at its narrowest part, between the shoal water extending half a mile off Great Reef and that stretching off the same distance from South Mangsee; the depths there are irregular, 14 to 17 fathoms near the reef, and 24 to 33 fathoms towards the island, and throughout the channel the depths are greater on the side of the Mangsee Danger Bank.

Ordinary navigators will rarely have occasion to use this channel, but in case of necessity, the following directions may be of assistance:—Coming from the westward, and having sighted the Mangsee Islands, bring the centre of the South one to bear E. by S., and steer for it, carefully preserving the bearing; when the West end of North Mangsee bears N.E. by E. $\frac{3}{4}$ E. steer S.E. by S., passing midway between the islands and Great Reef. With a good compass and a vigilant look-out, no difficulty will be found in following these directions, and passing safely through this channel.

Coming from the eastward, a vessel must be guided by the look-out alone to the entrance of the channel, which, being arrived at, she should pass through the middle, steering a N.W. by N. course; when the West end of North Mangsee bears N.E. by E. $\frac{3}{4}$ E., and the centre of South Mangsee E. by S., steer W. by N. out of the channel.

GREAT DANGER BANK is very extensive, and comprises many shoals, amongst which no vessel should venture. It is 14 miles long in a W.N.W. and opposite direction, and 8 miles broad at its N.W. end, gradually decreasing in breadth towards the opposite extreme; the outline of the entire bank closely resembles the form of a shoulder of mutton.

S.E. Shoals denote several small coral patches situated at that end of the bank; they extend over a space about 3 miles in diameter. From the S.E. extreme of the bank Balabac Peak bears N.W. $\frac{1}{2}$ W., North Mangsee apex S.W. by W. $\frac{3}{4}$ W., and Banguay Peak S.W. $\frac{1}{2}$ W. southerly.

Sand Cay, the only conspicuous object marking any part of the bank, stands at the southern side of it, about 5 miles westward of the S.E. extreme, and $3\frac{1}{2}$ miles northward of the East end of Mangsee Danger Bank. From the centre of the cay the left extreme of South Mangsee bears S.W. $\frac{1}{2}$ S. 6 miles, centre of Salingsingan W. by S. $\frac{3}{4}$ S. 5 miles, and Balabac Peak N.W. $27\frac{1}{2}$ miles.

Middle Shoals are a cluster of coral patches, lying on that part of the bank implied by their name. *North Patches*, two in number, lie along the North edge of the bank, and have nowhere less than $3\frac{1}{2}$ fathoms water over them.

N.W. Shoals lie along the edge of that portion of the bank designated by their name, and near the eastern end of them is a spot with only 9 ft. over it. From the 10-fathom line bounding the north-western extreme of the shoal patches, Banguay Peak bears S. by W. $\frac{3}{4}$ W., Balabac Peak N.W. $\frac{3}{4}$ N., Lumbucan N. $\frac{1}{2}$ W., and Salingsingan S.S.E. $\frac{3}{4}$ E.

MIDDLE CHANNEL, separating Mangsee Danger Bank from Great Danger Bank, is a mile wide at its narrowest part, between the shoals extending nearly three-quarters of a mile eastward of Salingsingan and those extending 3 miles westward of Sand Cay, increasing greatly in width towards both ends.

Middle Channel lies quite out of the ordinary route of ships, but it may be safely made use of, if necessary, by attending to the following directions:— Coming from the westward, shape a course to sight Salingsingan Island between the bearings of E. by S. $\frac{1}{2}$ S. and S.E. The former bearing leads a quarter of a mile northward of Loxdale Patch, and the latter close to 9 fathoms on the edge of Great Danger Bank. Having made out Salingsingan, and being arrived within 4 or 5 miles of it, the fairway course through the channel is E. by S. $\frac{3}{4}$ S., passing a good mile northward of Salingsingan, and bearing in mind that shoal water stretches off nearly a mile in a N.W. by W. direction from that island. Being past Salingsingan the Sand Cay should be seen about three points on the port bow; proceed on the same course, and pass out of the channel, remembering that the centre of Salingsingan bearing W. by N. $\frac{1}{2}$ N. leads close to the Jessie Shoal, and bearing W. $\frac{1}{2}$ S. close to the edge of the Great Danger Bank.

Coming from the eastward, the channel must be approached cautiously, and if near the S.E. part of Great Danger Bank, care must be taken not to bring the apex of North Mangsee to the southward of W. by S. $\frac{3}{4}$ S., and a sharp look-out kept for the Sand Cay and Salingsingan; when the last is sighted, the centre must be brought between the bearings of W. by N. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., and a mid-channel course, W. by N. $\frac{3}{4}$ N., steered through the channel, passing a mile to the northward of Salingsingan; when past that island, its centre must not be brought to the eastward of E. by S. $\frac{1}{2}$ S. till Balabac Peak bears N.N.W. in order to keep clear of Loxdale Patch, nor to the southward of S.E. until Lumbucan bears North in order to avoid Great Danger Bank.

Ray Bank, composed of sand, underneath which there is probably coral, is a mile long E. by N. $\frac{1}{2}$ N. and W. by S. $\frac{1}{2}$ S., and half a mile broad, the least water near the centre being 4 fathoms. It lies about $4\frac{1}{2}$ miles eastward of the N.W. shoals on the Great Danger Bank.

Ellis Shoal, 3 miles north-eastward of Ray Bank, is a coral bank, $2\frac{1}{2}$ miles long in an E. $\frac{3}{4}$ N. and opposite direction, and 6 cables broad. The western half, having 9 to 6 fathoms water over it, is not dangerous, but the eastern half is so, there being but $2\frac{1}{2}$ and 3 fathoms over the greater part of

it. From the West extreme of the shoal part, Balabac Peak bears N.N.W. $\frac{3}{4}$ W., and the centre of Lumbucan N.N.E. $\frac{1}{2}$ E.

Simanahan Reef and Channel.—The reef is about $1\frac{3}{4}$ mile northward of North Patches on the Great Danger Bank, situated near the centre of a coral bank 5 miles long, E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., and three-quarters of a mile wide. The part, dry at low water, has a sand-bank near its centre, which is just below the surface at high water; this serves, even when covered, from the light colour of the water over it, to point out the position of the reef from a considerable distance. From the West extreme of the bank the centre of Lumbucan bears N.N.W. $\frac{3}{4}$ W. $5\frac{3}{4}$ miles, and Steep-fall Range, on Balabac Island, W. by N. $\frac{3}{4}$ N. $15\frac{1}{2}$ miles.

The channel between Great Danger Bank and Simanahan Reef is perfectly free from danger with soundings of 24 to 30 fathoms. All that is necessary for its safe navigation is to pass about three-quarters of a mile to the southward of the reef on an East or West course, but occasion can very seldom arise to render this a convenient channel to proceed by.

Doorly Patches are several small coral banks, the centre of them lying N N.E. $\frac{1}{2}$ E., $3\frac{1}{2}$ miles from the centre of Simanahan Sand-bank. The general depths over them are 7 to 10 fathoms, and no less than $6\frac{1}{2}$ fathoms could be discovered anywhere upon them.

Lumbucan Danger Bank, $5\frac{1}{2}$ miles long N.E. by E. and S.W. by W., and $2\frac{3}{4}$ miles wide, comprises Lumbucan Island, with the dangers extending around it, and also some isolated shoals southward and north-eastward of it.

Lumbucan Island, bearing S.E. by E. $\frac{1}{4}$ E. from Balabac Peak, and 9 miles distant from the shore, is small, low, and wooded, with the trees gradually rising from the centre. It is surrounded by a reef and shoal water. *South Shoal* lies $1\frac{1}{2}$ mile southward of the island. It is half a mile in extent, with $1\frac{3}{4}$ to 3 fathoms water over it, and uneven depths. *N.E. Shoals*, some coral patches, with $1\frac{3}{4}$ to 3 fathoms over them, lie a mile north-eastward of the dangers encompassing Lumbucan.

Lumbucan Channel, limited to the southward by Ellis Shoal and Simanahan Reef, and to the northward by Lumbucan Danger Bank, is 4 to 5 miles wide, and perfectly free from danger. Doorly Patches divide the channel at its eastern end, the passage northward of them being 4 miles, and the one southward of them 2 miles wide.

If bound to the north-eastward, this channel, on account of its capaciousness, is a very good one to use; and to ensure a safe navigation, it will be only necessary to keep a proper look-out for the dangers limiting it, and when near them to pay attention to the bearings (previously given) of the different land objects which point out their extremes.

Comeeran Danger Bank, $2\frac{3}{4}$ miles long E.N.E. and W.S.W., and a mile broad, includes within its limits Domeeran Island and two shoals. Natives

from Balabac frequent the island for the purpose of catching turtle, which at times resort here in great numbers.

Comeeran Island, one-fourth the size of Lumbucan, but similar in character, lies N. $\frac{1}{4}$ E. 5 miles from that island. It is surrounded by a reef, extending from 1 to 2 cables off.

A shoal, nearly half a mile in extent, with 2 to 3 fathoms water over it, lies south-westward of Comeeran, its outer edge being distant nearly $1\frac{1}{4}$ mile; and another shoal, about the same size, having $2\frac{1}{4}$ to 3 fathoms over it, lies a little farther off in an easterly direction. Balabac Peak bearing W. $\frac{3}{4}$ N. leads southward of all the dangers near Comeeran, and bearing W. $\frac{1}{4}$ S. northward of them; Lumbucan bearing S. by E. $\frac{1}{2}$ E. leads westward, and the extreme of the trees on the North point of that island bearing S.S.W. leads eastward of them.

Comeeran Channel is $3\frac{1}{2}$ miles wide between the dangers surrounding Lumbucan and the S.W. shoal off Comeeran. The soundings in it are very irregular, with 6 to 10 fathoms over coral patches in places; and a bank, about a mile in extent, lies near the middle, over the southern part of which are $4\frac{3}{4}$ and 5 fathoms—the least water that could be discovered anywhere in the passage; this lies with Balabac Peak bearing W. by N. $\frac{1}{2}$ N., Comeeran Island N. $\frac{1}{2}$ W. This channel is not to be recommended, but it can be used with safety by attention to the bearings, before given, of the extremes of the dangers bounding it.

Nasubatta Island and Reef.—Nasubatta Island, lying N.N.W. $\frac{1}{2}$ W. $7\frac{1}{4}$ miles from Comeeran, is a low cleft rock of sandstone formation, covered with trees, and appearing like two small bushy islets when seen from the N.W. and S.E. It lies from 2 to 3 cables inside the northern edge of a reef, dry at low water, which extends three-quarters of a mile S.W., $1\frac{1}{2}$ mile S.S.W., and more than a mile S.E. by S. from the larger islet; close to this shoal are depths of 40 to 50 fathoms, and 70 to 75 fathoms 3 or 4 cables off.

Roughton Reef lies to the eastward of Nasubatta Reef, separated by a channel $1\frac{1}{4}$ mile broad, in which the depths are very great. On the N.W. side is a sand cay, upon which some bushes have sprung up. From this, Balabac Peak bears S.W. by W. $\frac{1}{4}$ W., Comeeran Island S. $\frac{3}{4}$ E., and the larger Nasubatta Islet W. $\frac{3}{4}$ N. The reef is steep-to at most parts, and three-quarters of a mile northward of the East point is an isolated spot of $2\frac{1}{4}$ fathoms.

Nasubatta Channel is $4\frac{3}{4}$ miles wide between the edge of the reef surrounding Comeeran and the edge of Roughton Reef. It is necessary, when navigating this channel, to carefully guard against the effects of the strong tides and currents which sweep through it in the direction of North Balabac Strait with great velocity.

The soundings on the East coast of Balabac, inside the islands above described, are very deep, owing to a strong current usually sweeping past; no

bottom being obtained with upwards of 70, and in some places 100 fathoms line, within a mile of the shore.

Candaraman Island lies north-westward of Nasubatta, distant $3\frac{1}{2}$ miles from reef to reef. It is a low, flat island, and the reef, which extends from 3 to 4 cables from the northern and eastern sides of Candaraman, and on the edge of which a few detached rocks generally show, forms the south-eastern limit of North Balabac Strait.

North Channel is $4\frac{1}{2}$ miles wide between the North end of Nasubatta Reef and the S.E. part of that extending from Canabungan, and $5\frac{1}{2}$ miles wide between the shoal water off Roughton Reef and the reefs extending $1\frac{1}{4}$ mile from Byan and Gabung Islands.

The soundings, in a N.W. direction from Nasubatta, are very deep, as will be seen by the chart. The only difficulty likely to arise in the navigation of this channel will be caused by the strong tides and currents which rush through it with great velocity during the strength of the monsoons, requiring a strong favourable breeze to enable a sailing vessel to make headway against them. But no danger is likely to occur from this cause if vessels keep over to the northward of the deep water, where they can always bring up.

NORTH BALABAC STRAIT.—About 26 miles N. by E. $\frac{1}{2}$ E. from Balabac Peak, and nearly 16 miles from Cape Disaster, the northern extremity of Balabac, is Cape Buliluyan, the southern point of Palawan; the intervening space being occupied by a cluster of low wooded islands, almost destitute of feature, the largest and easternmost of which is Bugsuk. These islands admit only of one safe channel between them, called North Balabac Strait, which is formed on the South by Balabac Island and Candaraman, and on the North by Bancalan, Mantangule, and Canabungan Islands.

Secam is a low wooded island, $1\frac{1}{4}$ mile long, and only $1\frac{1}{2}$ cable wide, lying in an E.S.E. and W.N.W. direction, at the western entrance of North Balabac Strait, northward of Cape Disaster, and separated from it by *Bate Channel*, $1\frac{3}{4}$ mile wide, where there is deep water, 20 and 30 fathoms, close to the edge of the reefs. The island is surrounded by a reef which follows the contour of the coast-line, and extends $1\frac{1}{2}$ mile from its north-western extreme; and there is a 4-fathom patch near the extreme, and a similar patch $1\frac{1}{4}$ mile West from the West end of Secam.

Bancalan Island, lying 5 miles north-eastward of Secam, is 3 miles long, N.W. and S.E., and $1\frac{3}{4}$ mile wide, and has a small tree on its western side. The island is half encircled by a reef, contracting the channel between it and Secam to the width of 3 miles.

Mantangule lies 3 miles south-eastward of Bancalan Island, and the space between is rendered dangerous by numerous small patches of shallow water. Mantangule is 5 miles long, E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N., and $1\frac{1}{2}$ mile broad. It is much larger than *Canabungan*, which lies 2 miles to the south-

westward of it, and which is but $1\frac{1}{2}$ mile long, N.E. and S.W., and about a third of a mile broad.

Reefs also extend $1\frac{1}{4}$ mile to the westward of Mantangule and Canabungan, the two islands being connected by a bank of sand and coral.

To the south-westward of Canabungan, between it and Candaraman, is the narrowest part of the channel, $1\frac{3}{4}$ miles wide, where a strong current is usually setting.

A vessel requiring *anchorage* will find tolerable shelter from S.W. winds on the North side of Secam Island, in 19 and 20 fathoms water, sand and coral, about three-quarters of a mile from the shore, with the eastern extreme of the island bearing South; the reef to the westward affording protection from the swell.

In blowing weather, a second anchor should be let go in time, as the squalls, which often succeed each other rapidly, are sometimes most violent; and, once off the bank in deep water, a vessel would be awkwardly situated as there is no other anchorage for which she could run; and taking the channel, the only alternative at night, would be attended with risk.

Tides and Current.—It is high water at Secam Island, full and change, at $10^h 50^m$ a.m., and low water at $6^h 50^m$ p.m.; rise 5 ft. The flood tide sets to the eastward, and the ebb to the westward; maximum velocity observed $2\frac{1}{2}$ knots. There is only a tide and a half-tide in the 24 hours, the latter occurring in the daytime in the month of November.

The strength of the current through Balabac Strait depends greatly on the prevailing winds. In the months of October and November, after a succession of westerly winds, it was found to set constantly to the eastward, slackening only on the ebb tide; while in July, after a continuance of unusually fine weather, with light East and S.E. winds, it set with the same velocity, viz., from three-quarters to $2\frac{1}{2}$ knots in the opposite direction. The mean velocity observed for thirteen consecutive hours was $1\frac{3}{4}$ knot.

Directions.—If coming from the southward or westward, do not attempt to approach Balabac Island nearer than 12 miles, until its peak bears to the southward of S.E. by E. $\frac{1}{2}$ E.; or if obscured, a low cliff hill, near the northern extremity of the island, bearing East, when an E.N.E. course may be steered for Secam Island, which will show like a small cluster of trees with a flattish summit.

Pass nearly mid-channel to the southward of Secam Island, borrowing a little on its shore, to avoid the edge of the reef which extends about three-fourths of a mile from Cape Disaster, but on which the sea generally breaks.

From Secam Island the channel course is S.E. by E. 6 miles, passing between Candaraman and Canabungan, two low islands, appearing nearly equal in size and elevation; the former having a small island between it and

Balabac, and the latter a few casuarina trees detached from its northern extremity.

Approaching from the north-westward, Secam will appear like a small round island; and in passing to the northward of it, care should be taken not to approach too near the reef off the north-western extremity, as rocky ground extends three-fourths of a mile from it, where there may be shoaler water than that marked in the chart; viz. 6 and 8 fathoms.

Having passed Secam Island about 5 miles, Nasubatta will be seen, distant about 7 or 8 miles, through the channel in the offing to the south-eastward, and soon afterwards Comeeran Island nearly in line beyond it.

If bound to Dalawan Bay, and a S.W. wind, haul close round the reef of Candaraman, and beat down between these islands and the Balabac shore, where there is a safe channel with deep water, but no anchorage.

Islets near Bancalan.—*Patawan* is a small wooded islet, encircled by a reef, lying a mile to the north-eastward of the point of Bancalan. *Patongong Islet* lies 3 miles north-eastward of Bancalan. *Canimeran*, lying $1\frac{3}{4}$ mile north-eastward of Patongong, and 3 miles from Cape Buliluyan, is a small sandy island with trees; a reef extends 8 cables to the north-westward.

Pandannan Island, $3\frac{1}{2}$ miles to the north-eastward of Bancalan, is about $6\frac{1}{2}$ miles in length N.E. and S.W., and about $2\frac{1}{2}$ miles wide. Its southern and western shore are fronted with coral, and off the south-western extreme is a sand-bank, dry at low water.

On the North side of Padannan the land rises a little, on which there are two conspicuous trees. The extremity of the island also terminates in small abrupt heads, more especially at the N.E. point, off which there is a small bushy islet, from which a reef extends $5\frac{1}{4}$ miles in a north-easterly direction, parallel with the coast of Palawan, having 20 and 24 fathoms close to its western edge.

There is also an islet on the N.W. face of the island, midway between it and Palawan, and East $2\frac{1}{4}$ miles from Canimeran, from which an extensive reef projects, contracting the channel round the South point of Palawan to three-fourths of a mile, where there are 7 to 9 fathoms, mud.

Fresh water was found in a small opening on the South side of Pandannan Island, about $1\frac{3}{4}$ mile to the eastward of the point; but the supply, besides being scanty, is difficult to obtain, owing to a reef that extends $1\frac{1}{2}$ mile from the shore, parts of which are dry at low water.

Bugsuk Island, or *Bougsook*, 9 miles long, in a North and South direction, and $4\frac{1}{2}$ miles broad, lies close to the East side of Pandannan, but is separated from it by a long channel, only $3\frac{1}{2}$ cables wide, running nearly North and South, in which there are depths of 10 and 18 fathoms. The southern and eastern faces of Bugsuk are fronted by a reef extending in some parts nearly 2 miles from the shore. The only recognizable feature on the island is a clump of trees near the N.E. extreme. *Bowen* is a small island lying off

the North point of Bugsuk, and a reef, partly dry at low water, extends $3\frac{1}{2}$ miles from it in an easterly direction. *Appo, Gubung, and Byan* are small islands lying in an irregular W.S.W. direction from the S.W. point of Bugsuk, with which they are connected by a reef. *Malinsono Island* lies $1\frac{1}{4}$ mile N.N.E. of Mantangule, and is connected with it by a coral spit. It is small, high, and differs from the rest in character and feature. The ground in the vicinity is foul, and studded with rocky patches nearly awash.

Channels.—To the eastward of Bancalan, limited on the North and South by Pandannan and Mantangule, and on the East and S.E. by Bugsuk, and the small islands Appo, Gabung, and Byan, is an expanse of water, 8 miles in an East and West, and $3\frac{1}{2}$ miles in a North and South direction, where in some parts anchorage, sheltered from all winds, may be found in from 7 to 12 fathoms. The channel into it are, however, intricate, and almost impracticable for sailing vessels, being either close along the edges of the reef, or, where it is wide and inviting, between small detached coral patches, for which it is impossible to give any specific directions.

It must be borne in mind, that in navigating these channels, much depends on a good lookout; for the edges of the reef are generally well defined, and any danger likely to bring a ship up, will under ordinary circumstances, be detected beforehand.

PALAWAN * ISLAND, WEST COAST.

Cape Buliluyan, or Booleelooyan, the southern point of Palawan Island, in lat. $8^{\circ} 20' 25''$ N., long. $117^{\circ} 9' 41''$ E., is low, fronted by mangroves, having on its South side depths of 4 to 8 fathoms close to the shore, and on the eastern side from 28 to 30 fathoms. The western side is fronted by a reef, which is dry at low water.

Coral Patches.—At 2 miles to the westward of Cape Buliluyan, and the same distance northward of the small bushy island of *Canimeran*, is a coral patch three-quarters of a mile in extent, with 2 and 4 fathoms on it, the soundings in the neighbourhood being 18 and 20 fathoms. North, a little westerly, 3 miles from the above and $2\frac{3}{4}$ miles from the shore, is another patch with the same depth, half a mile in extent, from the centre of which the body of Capiyas Island, a little open North of S.W. hill, bears N.E. $\frac{3}{4}$ E., and the southern extreme of Palawan S.E. by S. easterly.

Off Welcome Point, $3\frac{2}{3}$ miles to the northward of Cape Buliluyan, rocky ground, with 2 and 3 fathoms on it, extends about $1\frac{3}{4}$ mile from the shore; and if the *Regent's* bearings be correct, it was on this spot that a vessel of that name was wrecked in October, 1822.

* This island is known to the Spaniards as *Paraguas*.

Capyas, a small, low, woody island, lies 6 miles to the northward of Cape Buliluyan, and 1 mile off shore. The South side of the island is steep-to. Rocky ground extends $2\frac{1}{2}$ miles to the westward of Capyas.

ALIMUDEEN POINT, N. by E. $\frac{3}{4}$ E, distant $8\frac{1}{2}$ miles from Capyas, is a small wooded promontory, which forms the southern extremity of Caneepaan Bay. A low range of hills, which begin to rise abreast of Capyas, runs parallel with the coast, about $1\frac{1}{2}$ mile inshore, of which S.W. hill, with a *small triple summit* 900 feet above the sea, is the highest and most conspicuous.

South Regent Shoal, which appears to be the westernmost of the inner dangers, is a patch of sand and coral, upwards of half a mile in extent, North and South, on which, near its northern extreme, there are only 8 ft. water, with 13 and 14 fathoms all around the edge. It lies nearly midway on the bank, $7\frac{1}{2}$ miles from the shore, and $5\frac{1}{2}$ miles South of the North Regent Shoal.

Kamonga Shoal.—On a line with S.W. hill, E. by S. $\frac{3}{4}$ S. $3\frac{3}{4}$ miles from the South Regent Shoal, and midway between it and the shore, is the Kamonga, a 2-fathoms patch 3 cables in extent.

CANE EPAAN BAY.—Cape *Seeacle*, $2\frac{1}{2}$ miles N.N.E. of Alimudeen Point, is a wooded promontory higher than that of Alimudeen, forming the North extremity of Caneepaan Bay, with a small but conspicuous tree on the flat part of its summit. In the centre of a sandy beach to the southward of this, the Caneepaan River disembogues. It is navigable for boats. Northward of Cape Seeacle, and formed on the East side of that promontory, is a small bay, called *Seemagoup*, with reefs drying nearly across the entrance. The eastern shore of Seemagoup Bay is overlooked by *Caneepahan Hill*, 976 ft. above the sea, rather steep and conical, with two summits when seen from the north-westward.

BULANHOW MOUNTAIN.—To the eastward of Caneepaan Hill, and nearly in the centre of the island from shore to shore (which is here about 13 miles across), the high land of Bulanhow rises, attaining an elevation of about 3,500 ft. above the level of the sea. It is of a reddish aspect.

SE PAN-GOW BAY.—N.E. $5\frac{1}{2}$ miles from Cape Seeacle is Se-pan-gow Bay, in which apparently there are two deep inlets, with Cliff Point, a small red cliff to the northward, and two green islets lying close together immediately under steep hill, the shoulder of a coast-range to the southward. There are 8 and 9 fathoms at the entrance of the bay, but when well within the points, the mud dries across it.

Water.—N.E. $3\frac{3}{4}$ miles from Cliff Point is Rock Point, a long bluff head, with a small rock lying off it. To the southward of this point is a sandy bay, the shore of which is lined with casuarina trees, where, at the western extremity, near Pine Point, there is a good flow of fresh water.

PERIGEE BANK.—The coast between Cape Seeacle and Cliff Point is dangerous to approach, as rocky, uneven ground, with many shoal patches, extends in some places $2\frac{1}{2}$ miles from the shore. The largest of these patches is the *Perigee*, with $2\frac{1}{4}$ fathoms over it, on which the sea breaks in blowing weather, lying to the westward of Se-pan-gow Bay, and N.W. by W. $2\frac{1}{4}$ miles from Providence Point.

Coloby Patch.—N.N.E. $3\frac{3}{4}$ miles from the south-western extremity of the Perigee Bank, and N.W. $\frac{1}{4}$ N. $4\frac{1}{2}$ miles from Cliff Point, is the Coloby Patch, 2 cables' lengths in extent, with $2\frac{1}{2}$ fathoms upon it, and 22 and 25 fathoms water in its immediate vicinity.

Antelope Shoal.—W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from the Coloby Patch, and N.E. $\frac{1}{4}$ N. $5\frac{1}{4}$ miles from the Breaker Reef, is the largest of the Antelope cluster. It is a narrow, angular strip of sand and coral, 7 cables in extent in a N.E. and S.W. direction, on which there are only $2\frac{1}{2}$ fathoms water, with 30 and 35 fathoms on either side. It lies 6 miles from the shore, and there are 30 fathoms, green mud, between it and the Coloby Patch. S.W. by W. $\frac{3}{4}$ W. $1\frac{3}{4}$ mile from the centre of this shoal, is a 3-fathom shoal patch; and there is also another with 3 and 4 fathoms, N. by W. $\frac{1}{2}$ W., about $1\frac{1}{2}$ mile from it.

N.E. by E. $\frac{1}{2}$ E. 1 mile from the Antelope, is a bank of sand and coral, 4 cables in extent, with only 2 fathoms water on it.

N.E. Antelope Shoal, the north-easternmost of the Antelope cluster, lies N.E. by E. $\frac{1}{3}$ E. $1\frac{1}{4}$ mile from the latter 2-fathom shoal, and N.E.-easterly, $2\frac{3}{4}$ miles from the Antelope. It is 3 cables in extent, and not less than 3 fathoms were found upon it, and it has 31 fathoms *close* to its outer edge.

The lead does not give the slightest indication when in the proximity of these shoals.

MARASI BAY.—From Rock Point the coast trends to the eastward 4 miles, forming Marasi Bay, off the North point of which, distant 6 cables, is a small bushy islet called Leeta-Leeta, connected with the shore by a reef which also extends the same distance northward of it.

From Rock Point a low ridge extends along the South shore of Marasi Bay, on which is *Balansungain Peak*, 947 ft. in height above the sea. At the back of the above ridge, fronting Bulanhow and running parallel with the coast, is a higher range, called *I-wi-ig*, with a double hill in the centre, 1,814 ft. above the sea.

Balansungain Islands.—In the south-western part of Marasi Bay, a mile from Rock Point, are two islands of sandstone formation, called Balansungain, lying 3 to 5 cables' lengths from the shore; the westernmost (which is flat) being nearly connected with it by a spit which dries at low water.

The distance from Marasi Bay to Rocky Bay on the opposite shore of the island is 10 miles.

PAGODA CLIFFS.—N.E. $\frac{1}{4}$ E. $10\frac{1}{2}$ miles from the summit of Bulanhow, and $5\frac{1}{2}$ miles inland of Marasi Bay, is a remarkable limestone cliff, 2,000 ft.

above the level of the sea, having a table summit with two clefts, which form pinnacles at either extremity; the southern being the sharper, and having a small ninepin rock in the gap, is conspicuous on a N.W. and S.E. bearing. It is called by the natives *Ta-go-ra-ras*, and by the old navigators the *Pagoda Cliff*. It rises immediately above a plain, which here extends in a North and South direction across the island.

MANTALEENGAHAN MOUNTAIN, the summit of which is in lat. $8^{\circ} 49' 22''$ N., long. $117^{\circ} 39' 26''$ E., is the highest on the island of Palawan, attaining an elevation above the sea of 6,843 ft. It is usually of a reddish barren aspect, and when viewed from the westward has a table summit, the North end, where it takes a sudden fall, being the highest part; while a long smooth shoulder, terminating in three small nipples, slopes gradually to the southward.

From Mantaleengahan Mountain a high central range extends in a North easterly direction to the parallel of $9^{\circ} 10'$ N., having on it several remarkable notch saddle peaks with sharp shoulders, the two highest of which are *Lan-dar-gun* (a deep saddle summit), 5,397 ft.: and *Gantung* (a notch peak), 5,868 ft. above the level of the sea. Towards the termination of this range, there is a table hill with a sharp nipple, called *Cal-li-bu-gon*, 1,793 ft.

The Coast from Leeta-Leeta Islet trends to the north-eastward $13\frac{1}{2}$ miles to Pampangduyang Point; it is low, and has small bays, in some of which there are rivulets of fresh water.

Illaan Hill, frequently a useful object on this part of the coast, from the high land being obscured, is a small detached hill, covered with wood, 600 feet above the sea, rising a mile from the coast behind Townsend Point, and S. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from Pampangduyang Point.

A mile and a half southward of Pampangduyang Point, in the bight of a small bay, is a rivulet, from which in favourable weather a supply of *good water* may be obtained.

Five-Fathom Patches.—N. by W. $\frac{2}{3}$ W. 4 miles from Washington Head, and W. $\frac{1}{4}$ N. from Illaan Hill, is a 5-fathom patch, 2 cables in extent, lying $3\frac{1}{4}$ miles from the shore, with a patch which breaks at low water $2\frac{1}{4}$ miles to the south-eastward of it; the latter lying $1\frac{1}{4}$ mile West of Jervis Point.

Caution.—Vessels should not approach this part of the coast within 3 miles. The lead gives no warning when near a reef, and the water is not always sufficiently clear to see the danger.

The Coast from Pampangduyang Point takes a north-easterly direction for $11\frac{1}{2}$ miles to Eran Point, which, as well as the intermediate land, is low, densely wooded, and fronted by reefs drying from 4 to 5, and in some parts 7, cables' lengths from the shore.

Eran Quoin.—At $7\frac{1}{4}$ miles from Pampangduyang Point is low Point, $2\frac{1}{2}$ miles beyond which is Beecher Point, and on the plain between these two

points is a quoin-shaped hill called by the natives *Pa-le-pie-kan*, rising to an elevation of 518 ft. above the level of the sea. It is in lat. $9^{\circ} 3' 25''$ N., long. $117^{\circ} 38' 56''$ E., and from it Eran Point bears N.E. by N. $2\frac{1}{2}$ miles.

ERAN BAY, immediately to the eastward of Eran Point, is the first bay on the coast, coming from the southward, which affords eligible anchorage in S.W. winds, to obtain wood, water, and supplies. Its locality may be readily recognized by the Eran Quoin.

Gantung Mountain and False Sharp peak (the latter likely to be mistaken when first seen for Sharp or Sal-le-kan Peak), 2,814 ft. farther South, overlook this bay, the spurs from which approach very near the coast.

Eran Bay is 4 miles wide at the entrance, 2 miles deep, and open to the northward; the bottom is bisected by a long head called Truce Head. From this islet the reef projects in a northerly direction three-quarters of a mile, with its extremity East 2 miles from Eran Point. S. by E. $1\frac{1}{2}$ mile from this point, in the S.W. corner of the bay, is the entrance of the Eran River, which, under ordinary circumstances, boats can enter, and obtain a supply of good water without going very far up. There are one or two rivulets of fresh water, called by the natives Eetloose, to the eastward of Truce Head.

The population of this and the neighbouring district, at the period of the *Royalist's* visit, was said to be about 750, chiefly Dusuns, or hill people.

The best place to anchor in Eran Bay is eastward of Eran Point, a mile from the shore, in $6\frac{1}{2}$ or 7 fathoms, stiff mud, with the Quoin Hill bearing S.W. $\frac{1}{2}$ W., and Bivouac Islet S.E. by E., midway between it and the reef off Bivouac Islet, or closer up if necessary.

It is high water, full and change, in Eran Bay, at $10^h 10^m$ a.m.; the rise is $6\frac{1}{4}$ ft. There is a tide and half-tide in the 24 hours.

The Coast to the northward of Eran Bay trends N.N.E. about 4 miles to Elizabeth Point; then N.E. by E. $9\frac{3}{4}$ miles to Hummock Point. *Pu-Lute Range*, which is about $7\frac{1}{2}$ miles inshore of this part of the coast, is 3,067 ft. high, with a deep saddle to the southward, and a high and a low sharp Nipple, the former 2,930 ft. in height, on the slope to the northward.

Malapakkun and Marantao Islands.—Three miles W. by S. of Hummock Point, and $1\frac{1}{4}$ mile off the shore, is Malapakkun, a wooded island 340 feet high, with a small double summit. Fringing reefs extend along the neighbouring coast, increasing in distance from the shore towards Hummock Point, and inclosing a small island called Marantao, 247 ft. high, lying off the coast 1 mile to the westward of the point.

Caution.—Vessels approaching the coast immediately to the northward of Eran Bay, should not shut Malapakkun Island in with Elizabeth Point, as the ground is treacherous thereabouts.

TRIPLE-TOP ISLAND, N.E. $\frac{1}{4}$ E. $4\frac{1}{2}$ miles from Marantao, and N.W. nearly 3 miles from Albion Head, is the outermost of several islands lying from 2 to 4 miles to the Eastward of Hummock Point. It is somewhat flat,

with three summits (the highest being 162 ft. above the sea), and a pinnacle rock at its northern extremity. A reef extends 1 cable's length from the S.W. side of Triple-top.

TAY-BAY-U BAY.—Albion Head, bearing E. by N. $4\frac{1}{2}$ miles from Hummock Point, is a bold perpendicular limestone cliff, with stalactite caves, luxuriantly wooded, and having several summits of nearly equal elevation, the highest being 600 ft. above the sea. It is the extremity of a point projecting from the land, in a north-easterly direction, and forming the western shore of Tay-bay-u Bay.

Tay-bay-u Bay affords shelter in either monsoon, being protected on the S.W. by the projecting point, of which Albion Head forms the extremity, and on the North by a low, flat island, surrounded by reefs. It is, however, difficult of access, and ought not to be attempted by vessels without some previous local knowledge.

A long range of hills overlooks the southern part of Tay-bay-u Bay, the highest part of which is 1,630 ft. above the sea, extending to the south-eastward, two-thirds of the way across the island, where it terminates in the conical mound Ma-la-nut, 1,290 ft. above the sea, but not so high in appearance.

The shore of Tay-bay-u Bay is fronted with mangrove, and in the south-eastern part, at the western extremity of a sand-beach, the *Ma-la-nut River* disembogues, where fresh water may be procured with tolerable facility when the river is swollen.

About $1\frac{1}{2}$ mile up this river there is a landing-place on the right bank, which leads into an open tract of country rather extensively cultivated, where there are a few houses, occupied principally by Illanuns, the chief of whom styles himself Sultan of Ma-la-nut, and exercises almost absolute control over a population of about 3,000 souls. They are in communication with the people of Eran and Caneepaan, and also with other Malay establishments on the East coast of the island.

Supplies.—Goats, fowls, yams, and vegetables of various kinds were procured, for which the natives were willing to take cloth, crockery, and other articles in exchange; and they would stack firewood on the beach (but *would not* embark it) at the rate of one dollar for 100 billets, the average size of each being about 2 feet long and 4 inches thick.

Tides.—It is high water, full and change, in Tay-bay-u Bay, at 11^h 15^m a.m.; low water at 5^h 50^m p.m.; rise 6 feet. The current is hardly perceptible.

Unless the navigator has some previous local knowledge of Tay-bay-u Bay, it is almost impossible to give clear sailing directions for it, as no mark will lead direct in.

TREACHEROUS BAY.—Eleven miles from Albion Head is Deep Bay Point, and midway between is Treacherous Bay, separated from the latter

by a group of four islands, and overlooked by two remarkable peaked hills (called by the old navigators *Devil's Cap Peak*), the foot of which breaks through the mangrove and forms a conspicuous yellow-looking cliff on the shore, three-quarters of a mile to the S. W. of which is a stream of fresh water. *Back Cap*, the highest or inshore peak, is 720 ft. above the sea.

It is recommended not to stand into Treacherous Bay, as the reefs to the northward, as well as to the north-westward of Low Flat Island, extend a long way off, and the water is usually so muddy that they cannot be seen.

The Coast between Double Island and Deep Bay Point is low and thickly wooded, and should not be approached nearer than 2 miles, as the edge of the reef dries half a mile from the points, with rocky ground in some places a mile beyond it. From Deep Bay Point to Long Point, a distance of 18 miles, the general trend of the coast is N.E. $\frac{1}{2}$ N.

VICTORIA PEAK, a sharp double peak, the second highest on Palawan Island, attaining an elevation of 5,680 ft. above the sea, occupies a central position on the intermediate range, from which several lower ranges, of not less remarkable feature, extend on either side, forming ravines and deep gorges, thickly clothed with timber.

VALLEY CONE.—From a range immediately in front of Victoria Peak, a spur runs down to the coast to Steep Point, $4\frac{1}{2}$ miles to the north-eastward of Deep Bay Point, forming on the North side a valley, at the head of which is Valley Cone, a remarkable conical hill lying beneath three sharp peaks on the ridge above.

GAP RANGE.—Immediately overlooking these hills is Brow peak or shoulder, 3,840 ft. above the sea, forming the extremity of a ridge which here takes a sudden trend to the eastward, attaining an elevation of about 5,000 ft. at its highest part, and having two gap peaks on it halfway.

The northern face of this range is a steep slope, with deep ravines and some conical hills at the foot, of which latter *Brow Cone*, 1,180 ft. high, over Bluff Point, is conspicuous.

The Coast.—The bay to the northward of Deep Bay Point is bold to approach to half a mile of the shore; but from Steep Point to Bluff Point the coast is fronted by a reef, extending from 3 to 5 cables off.

Peaked Island, 110 ft. high, with a rock 23 ft. out of water, nearly three-quarter of a mile to the westward of it, lies off the entrance of a fresh-water stream which flows into the sea just northward of a mound 280 feet high, called *Cuckold Hill*.

MOORSOM HEAD, $3\frac{1}{2}$ miles beyond Bluff Point, is rather a prominent headland, moderately elevated, with a small rock out of water half a mile to the westward, and a reef awash—lying a mile from the shore, with 7 fathoms inside it— $1\frac{1}{2}$ mile to the northward of it.

Water.—There is a stream of fresh water at the base of Moorsom Head,

in a sandy bay on the North side, and also one at the extremity of the beach, nearly a mile to the north-eastward.

LONG POINT, in lat $9^{\circ} 38' 8''$ N., long. $118^{\circ} 19' 6''$ E., is densely wooded, moderately elevated, and gradually sloping from the centre, terminating in a rocky coast. The point is steep-to.

APPURAWAN.—Five miles to the north-eastward of Moorsom Head and close to the southward of Long Point, is Appurawan roadstead, where a vessel may obtain a few supplies, such as goats, fowls, vegetables, &c., from the natives, who occupy small farms, scattered over a considerable tract of country inland, and which are approached by a small river that disembogues on the South side of Appurawan Head, $1\frac{1}{2}$ mile from Long Point.

Appurawan is the southernmost of the Christian settlements on this side of Palawan, the natives being chiefly Baquit people, and holding no intercourse with the Malays to the southward. They cultivate rice, maize, sweet potatoes, tobacco, cotton, in small quantities.

Anchorage.—The best anchorage is westward of Appurawan Head, in 17 or 18 fathoms, stiff mud and shells, about 2 miles from the shore, with the extremity of Long Point bearing N.E.

ANIPAHAN PEAK.—East of Long Point are two remarkable sharp peaks, of nearly equal elevation (the northernmost, called Anipahan, being the sharper), from which small table spurs project; they are connected with Long Point by a gradual slope in the range, on which are some round-topped hills, usually visible when the more elevated land is capped. There is a deep valley to the northward, overlooked by a sharp shoulder 3,606 feet above the sea, which is the commencement of another central range broken up into summits of various configuration, extending to Ulugan Bay.

MOUNT STAVELY.—The most remarkable of these are Mount Stavely, 3,930 ft. high (a needle peak rising from the centre of a small table summit immediately to the northward of the sharp shoulder), and two dome-shaped mountains farther northward. The latter, the southernmost, called *Thumb Peak* (4,260 ft.) is the highest part of the range, and has a knob on it; the other, *Mount Beaufort*, has a small hollow in the highest part; and in the afternoon, when the sun is out, a conspicuous red slip, assuming the shape of the letter V, will be seen on a slope in front of a peak to the southward of these.

From Mount Beaufort the range gradually falls, and is again almost separated between *Mount Herschel* and *Mount Peel*, a low ridge only connecting them. Between the former there are two sharp peaks, the northern lying more inland, and having a double hill in the hollow of the range between it and Mount Herschel.

Mount Herschel is 2,316 feet above the sea, and has a smooth summit sloping to the south-westward.

NORTH and SOUTH REEFS.—There is a small bay on the North side of Long Point, to the northward of which are two rocks lying parallel with the shore a mile off, and $1\frac{3}{4}$ miles apart, with 17 fathoms between them. South Reef is 20 ft. out of water and bold to approach, the soundings around it being 18 and 20 fathoms; North Reef is awash at high water. The depths in the bay are 12 and 14 fathoms mud, and 20 and 30 fathoms off the entrance.

There are some streams of *fresh water* in the above bay, but where the best flows the shore is fronted with coral, which extends 2 cables' lengths from it, with 3 and 4 fathoms close to the edge.

ANIPAHAH, about 10 miles N.E. of Long Point, is a small settlement of Baquit people, where there are one or two huts, and a little cleared ground. The shore, 2 miles on either side of this point, is fronted by coral.

Hen and Chickens.—Bluff Point, $12\frac{3}{4}$ miles N.E. of Anipahan Point, is formed by a spur from Mount Herschel, and has a bay to the northward of it, halfway between which and Table Point, 6 miles beyond, is a small group of islets and rocks called the Hen and Chickens, lying $1\frac{1}{2}$ mile from the shore, with 19 and 27 fathoms water between them and Sprat Point to the eastward.

Mount Airy, a double-top summit lying at the foot of Mount Peel, overlooks Hen and Chickens Bay, to the southward of which, between it and Mount Herschel, the ridge is very low.

On the shore are numerous small sand bays, free from coral, with streams of fresh water in some of them, the supply depending on the season.

Mount Peel, 3,600 ft. above the sea, rises immediately at the back of this, and has an abrupt fall in the spur extending towards Mount Airy.

N.W. HEAD.—The coast towards Ulugan Bay is of a bold, rocky, barren aspect, with several high cliffs; and about $2\frac{1}{2}$ miles southward of N.W. Head is a remarkable square grayish patch. The whole shore is bold to approach, having 17 and 20 fathoms close to.

ULUGAN BAY (called by the natives *Banog*), on the eastern side of N.W. Head, is 3 miles wide at the entrance between Cordelia Point and Broken Head, and formed by a deep indentation in the land 8 miles in a southerly direction, half severing the island of Palawan. The coast on the northern part of the eastern shore of the bay is bold, cliffy land, and of reddish barren aspect. *Sangbown*, the North peak, 1,816 ft. high, has a small table summit when seen in a south-easterly direction, and two sharp nipples on the brow in front of it. *Bentoan*, immediately to the southward, and separated from it by a low woody valley, which forms the back of the watering bay, rises to an elevation of 1,730 ft., is sharp, when viewed as above, and has a lower range adjoining it to the southward with four distinct summits.

Three-Peaked Island, or Ca-muong-yan, the highest summit of which is

140 ft. above the sea, lies N. $\frac{3}{4}$ E., $1\frac{1}{4}$ miles from N.W. Head, the northern extremity of the peninsula forming the western side of Ulugan Bay.

A rocky ledge, consisting of sand and coral, extends a mile to the southward of Three-Peaked Island, almost across the passage, on which the average depth is 9 and 12 fathoms, with 19 and 25 fathoms at 2 cables' lengths on either side of it. N.N.E. $\frac{1}{2}$ E., distant $1\frac{1}{2}$ cables from the highest peak of Three-Peaked Island, is a rock which generally shows, with one visible only at low water, half a cable's length to the northward of it.

Reeta Island.—The western shore of the bay is undulating high land, with three inlets, and is fronted by Reeta Island, $1\frac{1}{2}$ mile long, North and South, and barely more than a cable wide in any part; it has a detached rocky head at its northern extreme, 45 ft. in height, called Observatory Rock, in lat. $10^{\circ} 6' 11''$ N., long. $118^{\circ} 46' 26''$ E., part of the base of which shows white on entering the bay. Off Observatory Head, rocky ground, with 5 and 7 fathoms on it, extends in a northerly direction about 2 cables' lengths. The eastern shore of the island is steep-to, having 19 and 20 fathoms within a cable's length of the coral, which fringes it. A reef, dry at low water, extends nearly a cable's length off Tide-pole Point, the southern extremity of the island; the edge of the reef is generally well defined by the discolouration of the water.

The channel to the westward of Reeta Island is about 3 cables wide, and has 13 and 17 fathoms in it, but abreast of South inlet it is choked with coral patches, having 9 and 10 fathoms between them. In heavy northerly gales this channel appears to break across.

Magsiapo Reef, having some spots of only 10 and 12 ft. water on it, extends 6 cables westward and north-westward of Reef Islet, lying nearly 2 cables off Marabay Point on the eastern shore, and has its outer edge one mile from the southern part of Reeta Island. S.S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ mile from Reef Islet is the centre of a rocky patch, more than half a mile in extent, upon which the sea generally breaks at low water. The high nipple (1,254 ft.) on the brow of Sangbowen open of Broken Head, bearing N. $\frac{3}{4}$ E., leads on the western edge of this. It is, however, too far up for vessels to approach, as the head of the bay is lined with reefs, which project in some places upwards of half a mile from the shore. The above mark also just clears the Magsiapo Reef, and is a good guide to keep vessels to the westward when working out of the bay until they are past the entrance to Tagnipa Inlet.

Oyster Inlet, the southernmost inlet on the western shore, has its entrance 6 cables to the S.W. of Tide-pole Point, and runs back $1\frac{3}{4}$ miles in a W.N.W. direction, being separated from the coast outside by a low ridge 2 cables wide. Reefs, which project from both points, contract the channel at the entrance to one quarter of a mile in breadth; they also fringe the shore inside to the extent of one cable's length, gradually increasing towards the head of the inlet, where a bank of mud and rocks runs off half a mile, on

which good oysters may be found. There are 19 fathoms at the entrance, which depth gradually decreases over a stiff, muddy bottom to 9 fathoms, close to the reef at the head of the inlet.

The two small inlets to the northward of Oyster Inlet are shoal.

East, distant $3\frac{1}{2}$ cables from Coral Point, on the South side of the entrance to Oyster Inlet, and south-westerly nearly three-quarters of a mile from Tide-pole Point, are some small detached coral patches, nearly awash at low water.

Cai-ho-lo and Ba-he-lee Rivers.—Two small rivers disembogue near the S.W. corner of Ulugan Bay, and in the rainy season have fresh water very near their entrance. Cai-ho-lo River breaks through the mangrove between the high ranges of Car-so-glan and Cai-ho-lo, $1\frac{1}{2}$ mile to the southward of Oyster Inlet. It is navigable for boats about half a mile, where a good stream of water is generally running, but owing to the extensive reefs which line the bottom of the bay, neither this nor the Ba-hé-lee River forms an eligible watering-place. The Ba-hé-lee has a small islet at its entrance, which is S.E. by S. $1\frac{1}{2}$ mile from the mouth of the Cai-ho-lo, and is navigable for boats about $1\frac{1}{4}$ mile. A short distance beyond this is a small farm on some rising ground, occupied by a few natives from Baquit, who collect principally bees'-wax, and cultivate the land in a small way.

Between the two rivers is a small islet called Tara-cai-a-wan, nearly half a mile to the southward of which is a white rock, and though small, this generally forms a conspicuous object after entering the bay.

The *Soundings* in Ulugan Bay are from 30 to 35 fathoms at the entrance, gradually decreasing towards the bottom of the bay to 12 fathoms, green mud, close to the edge of the reef.

The *Anchorage* in Ulugan Bay is at the southern extremity of Reeta Island, off the entrance of Oyster Inlet, in 20 fathoms, stiff mud. No experience was had of the anchorage in the northerly monsoon. During westerly gales the swell sets home to the bottom of the bay, breaking heavily upon the reefs, especially on the eastern shore. In the month of November, during one of these, which shifted to the N.W., H.M.S. *Royalist*, riding with a whole cable at this anchorage, was at times pitching fore-castle under.

Water.—Good water can be obtained in a small bay, with a stony beach, to the southward of Sangbowen, N. by E. $\frac{2}{3}$ E. $4\frac{1}{2}$ miles from Observatory Rock, and E. by N. of Three-Peaked Islet. It is not, however, practicable to land there at all times, for, except in fine weather, a heavy swell usually sets into it. The anchorage also is unsafe, having 30 fathoms as close to the shore as it would be prudent for a vessel to lie, and from which it might be difficult to weigh with a westerly wind.

Caution.—Sailing vessels being compelled to water here, should not anchor nearer than one mile to the shore; and they should be prepared to weigh

on the slightest indication of a westerly wind, as the swell is liable to come in suddenly.

The *Royalist*, while at anchor off this bay in the month of November, was caught in a strong westerly wind which brought in a heavy swell, and with difficulty escaped clear, being obliged to slip her cable.

During the fine season, *i.e.* from April to July or August, fresh S.E. winds usually blow over the low land at the bottom of the bay; and in calm weather swarms of butterflies are constantly crossing the bay from the eastern shore.

Tides.—It is high water, full and change, in Ulugan Bay at 9^h 30^m a.m.; low water at 5^h 30^m p.m.; maximum rise (occurring generally three days after), 5½ ft.

No perceptible current was observed in the bay, except after heavy rains, or when westerly winds have prevailed, when there is a light out-draught.

Directions.—Vessels bound to Ulugan Bay, or any of the harbours of Palawan to the northward, should conform to the directions given for navigating the Palawan Channel, and ought not to attempt, except under favourable circumstances, to cross the bank to the southward of the parallel of 10° N.

If coming from the southward, it is recommended to be near the edge of the bank at daylight, with Mount Peel bearing about E. by S., when Three-peaked Island, at the entrance of Ulugan Bay, will bear E. ½ N., distant about 37 miles. Approaching in this direction, the bay will be readily recognised when a considerable distance off by some high rugged land, and a remarkable dome-shaped hill called St. Paul, just seen over a lower range, forming the North point of the bay. At the back of this a very sharp peak rises, named Cleopatra Needle, being the southernmost and highest of a range extending 5½ miles in a north-easterly direction. To the southward and nearer than the above is Mount Peel, already noticed, comparatively an isolated mountain, sloping gradually from the summit to the base, situated S.W. 4 miles from the bottom of the bay, and S. by W. ½ W. 10 miles from Three-peaked Island.

Approaching from the northward the bay is more readily distinguished, apparently by a complete separation between Mount Peel and the high land to the south-westward of the Cleopatra Range, the low land at the bottom of the bay not being discernible until within a few miles of Cape Sangbownen.

If with a S.W. or westerly wind, pass to the southward of Three-peaked Island, not borrowing too much on the Manabure shore, where the vessel is liable to be baffled under the land. Pass at a discretionary distance to the eastward of Reeta Island, in order to avoid being set towards the Magsiapo Reef, the western edge of which is cleared by keeping the high nipple, on

the brow of Sangbowen, to the westward of Broken Head, and proceed to the anchorage.

ST. PAUL BAY.—Eastward of Cape Sangbowen, the north-western point of Ulugan Bay, and separated from it by a low wooded valley, is *Mount Blomfield*, high table land, upwards of 2,000 ft. above the sea, with several small nipples on the summit, and steep watercourses down the side, terminating in a bold barren-looking coast, immediately to the eastward of which is St. Paul Bay.

Overlooking the bay on the South are some very remarkable dome-shaped hills and perpendicular cliffs of limestone formation, the most conspicuous of which is *St. Paul*, 3,370 ft. above the sea, from which the bay derives its name. To the eastward of this is a range, called by the old navigators the Four Peaks, of which *Cleopatra Needle*, 5,200 ft. in height, is the southernmost and highest.

The second peak from the North is 4,730 ft. above the sea, and has a small slip close to the summit.

Cliff Head, bearing N.E. $\frac{1}{2}$ E., distant $9\frac{1}{4}$ miles from Cape Sangbowen, and forming the northern extremity of St. Paul Bay, is a long wooded promontory, terminating in an abrupt fall, 350 ft. above the level of the sea.

The shore of St Paul Bay is bold to approach, having 7 fathoms near the points, and from 12 to 16 fathoms (fine sand and shells) in the centre.

JIBBOOM BAY, the upper part of which is an indentation in the land running 3 miles in a north-easterly direction lies to the northward of Cliff Head. At the entrance, midway between the latter and Peaked Point, $4\frac{1}{2}$ miles to the N.N.E., is a small group of islands and rocks, the centre and largest of which, Bay Island, has a somewhat flat summit, and is 307 feet above the sea. Opposite this group on the South side is a long point, with deep sandy bays on either side, and a remarkable hill (2,015 ft. high), with a nipple shoulder at the back. The shore of the bay is steep-to.

Shelter from N.E. winds will be found in 15 fathoms about three-quarters of a mile to the southward and eastward of Bay Island group, with Zoe, the easternmost islet, and Peaked Point, the northern extremity of the bay, in line bearing N. $\frac{3}{4}$ E. The channel to the northward of the group is a mile wide, and practicable for vessels.

The *Coast* from Peaked Point (which has a detached rock about 100 feet high close off it, with one smaller, $3\frac{1}{2}$ cables' lengths to the southward), trends N.N.E. $2\frac{1}{2}$ miles to a steep bold point, called *Amalingat*, at the foot of which is a nine-pin rock.

From this point the coast takes a sudden trend to the eastward, and off the first point from it are two islands, called Cacbolo and Cabalas, which form part of the western side of May-day Bay.

MAY-DAY BAY, immediately to the eastward of Cabalas and Cacbolo Islands, affords excellent shelter in the S.W. monsoon, and is by far a more

convenient anchorage for wooding and watering than any of those we have described to the southward on this side of Palawan.

It is $3\frac{1}{2}$ miles wide at the entrance, between Cacbolo and Cacnipa Islands, $5\frac{1}{2}$ miles deep, and is formed on the eastern side by a long irregular-shaped promontory, the continuation of a high range jutting out in a northerly direction from the body of the island, eastward of which lies Port Barton.

Cacnipa or *High Island* lies off the extremity of the above promontory, and is separated from it by a channel 4 cables wide, in which is Passage Reef, about 6 ft. out of water. The island is steep and bold, 1,050 ft. high, and $3\frac{1}{2}$ miles in circumference, with two summits, the southern being the higher. There is a remarkable thumb rock off the south-western point, and a peaked rock lies 3 cables' lengths from the shore on the North face of the island.

In the south-eastern part of May-day Bay is a remarkable conical head, with deep sandy bays on either side. The bay on the North side is irregular in contour, and has 14 to 20 fathoms in it, while that on the South side has 19 and 20 fathoms at the entrance, and a similar but smaller conical head in it, with some streams of fresh water breaking through the beach.

The soundings at the entrance of May-day Bay are 25 and 27 fathoms, sand and mud, gradually decreasing to 19 fathoms close to Conical Head. The points in the bay appear to be steep-to, and there is no known danger in it but what shows.

Water.—The watering place is at the head of a small cove, named Watering Bay, 2 miles S.W. by W. of Conical Head. The best anchorage is in 19 fathoms off the entrance of this bay, almost midway between it and Conical Head, with the tangents of Cabalas and Cacbolo Islands in line. The stream falls from the rocks on the South side of the cove, just before coming to the sand beach, where, at high water, or even at half tide, a boat can go almost under it.

Tides.—It is high water, full and change, in May-day Bay, at 9^h 55^m a.m.; low water at 5^h 55^m p.m.; and the rise (only one observation), is $3\frac{1}{2}$ feet.

BOAYAN, lying N.E. $3\frac{1}{4}$ miles from Cacnipa Island, is an irregular-shaped island nearly 5 miles in extent East and West, and $3\frac{1}{2}$ miles N.N.E. and S.S.W., being in some parts less than half a mile wide. Its north-western extremity terminates in a bold conspicuous head, with a double summit 725 ft. above the sea. The highest part of the island is about 910 feet in height, and near it is a flat double summit, apparently of the same elevation.

Two islands lie from $3\frac{1}{2}$ to 4 cables' lengths off Bluff Point, the south-western extremity of Boayan. Shelter from S.W. winds will be found on the N.E. side of Boayan, in about 15 fathoms.

Royalist Shoal is a coral patch with only $2\frac{1}{2}$ fathoms over it, lying E.S.E.

one mile from Saddle Island, with the summit of Cabalas open of the S.E. side of Cacnipa Island S.W. $\frac{1}{4}$ W.

ALBAGUEN, lying 3 miles nearly eastward of Cacnipa, and nearly $2\frac{1}{2}$ miles South of the S.W. extremity of Boayan, is a leg-of-mutton shaped island, 570 ft. high, and nearly $1\frac{1}{2}$ mile in extent, with a conspicuous red stripe (land slip) on the N.W. side.

PORT BARTON.—Albague Island is the extremity and largest of a group of islands stretching in a north-westerly direction from the eastern shore across the mouth of a deep bay, and which, together with the promontory mentioned on page 551-2 as forming the eastern side of May-day Bay, encloses a spacious sheet of water, to which the name of Port Barton has been given.

The entrance to Port Barton is between Riddle Point, the S.W. extremity of Albague, and Bubon Point, the N.E. extremity of the promontory, which is in lat. $10^{\circ} 29' 19''$ N., long. $119^{\circ} 5' 37''$ E. From the latter point the harbour runs $5\frac{1}{2}$ miles in a southerly direction, and near its head is Endeavour Island, three-quarters of a mile in length North and South, having Wedge Islet lying off its south-eastern face, halfway to the shore. There is however nothing to induce vessels to go beyond Middle Reef, nearly 3 miles within the entrance, the harbour affording no eligible watering place, although there are several streams in the mangroves which border the shore, which is apparently rocky in that direction. The soundings at the entrance of the harbour are about 25 fathoms, mud, decreasing gradually to 5 and 6 fathoms close to the edges of the reefs which fringe the shore at the head of it.

If requiring shelter only in Port Barton, and in the S.W. monsoon, anchor in the northern part of the bay in 20 fathoms, stiff mud. In N.E. winds vessels wishing to seek closer shelter for repairs, &c., will find good anchorage in 12 fathoms mud, farther to the eastward, South of the body of Capsalay Island, care being taken in approaching it to avoid Capsalay Reef.

Tides.—It is high water, full and change, at Port Barton, at $10^{\text{h}} 55^{\text{m}}$ a.m.; low water, $3^{\text{h}} 35^{\text{m}}$ p.m.; and the rise of tide 6 ft.

PAGDANAN POINT is a peninsular head of reddish aspect, nearly $2\frac{1}{2}$ miles to the E.S.E. of the eastern extremity of Boayan Island, and has Confusion Rock, white, and about 40 feet high, lying 3 cables' lengths off it. *Niaporay Island*, 354 ft. above the sea, lies in the channel between Pagdanan Point and Boayan, at half a mile from the latter; and S.E. by E. half a mile from the nearest point of Niaporay is the southernmost of two coral patches, which lie nearly in the centre of the channel. There are only 9 ft. over it at low water. There is also a $2\frac{1}{2}$ -fathoms patch, but not so much in the way as the above, lying E.N.E. half a mile from the summit of Niaporay Island. *Pagdanan Rock*, the northern patch of coral just noticed as lying nearly in

the centre of the channel, has $2\frac{1}{4}$ fathoms on it, with 7 and 10 fathoms close to, and lies N.E. by N. one mile from the Niaporay Patch.

PAGDANAN BAY.—At $2\frac{1}{2}$ miles to the north-eastward of Capsalay Island is Betbet Point, with a conical hill near, and a small islet of the same name off it, from which a coral spit projects nearly two-thirds of a mile in a W.N.W. direction.

At two-thirds of a mile in a north-easterly direction from Betbet Point is Reef Point, between which and Pagdanan Peninsula is Pagdanan Bay, $2\frac{1}{2}$ miles wide at the entrance, and about the same distance deep. Reefs lie off the points in the bay, some to the extent of half a mile.

A *fresh water* rivulet disembogues at the foot of a small green cliff island in the centre of Pagdanan Bay; and there are also two others in the South part near Squall Point.

The soundings to the southward of Boayan Island average about 24 fathoms, mud. At the entrance of Pagdanan Bay there are 10 and 12 fathoms. Vessels not wishing to go into Port Barton will find good shelter from S.W. winds to the northward of Capsalay Island; and from N.E. winds in Pagdanan Bay.

MOUNT CAPOAS, N.E. $\frac{3}{4}$ N. $16\frac{1}{4}$ miles from Bold Head (Boayan Island), and in lat. $10^{\circ} 48' 10''$ N., long. $119^{\circ} 16' 56''$ E., is high table-looking land, 3,350 ft. above the sea, with a high and a low sharp nipple at the western shoulder, and a conspicuous land-slip extending two-thirds of the way from the summit to the base, immediately under it.

IMURUAN BAY has its limits formed by Boayan Island and Pagdanan to the southward, and Emergency Point, under Mount Capoas, to the northward, and is about 12 miles wide at the entrance. Its eastern shore is overlooked by a high range of hills, of which Bay Peak, nearly abreast of Imuruan Island, is the most conspicuous. Farther to the southward over Pagdanan Bay the range is lower and assumes a table ridge. From the low neck of Pagdanan Peninsula the shore of the bay for $8\frac{1}{2}$ miles is almost one continuous sand beach, and throughout the bay is bold to approach, having 3 to 5 fathoms close to the beach. At the entrance the soundings vary from 20 to 30 fathoms, mud.

Shelter from the N.E. winds will be found to the northward of these islands, near the foot of Mount Capoas, in 19 fathoms, mud; where also a tolerably good supply of fish may be obtained with the seine, on the sandy beaches opposite.

CAPE CAPOAS, in lat. $10^{\circ} 51' 38''$ N., long. $119^{\circ} 12' 6''$ E., N. by E. $\frac{1}{2}$ E. $16\frac{1}{2}$ miles from Bold Head, and nearly North of Wedge Island, is a bold projecting headland with two summits, and the extreme western point of the peninsula, on which the table mountain of that name is situated, which bears from it S.E. $\frac{3}{4}$ E. distant $5\frac{3}{4}$ miles.

Confagration Hill.—N.N.W. $\frac{1}{2}$ W. nearly 5 miles from Emergency Point,

and 2 miles to the south-eastward of Cape Capoas, lying off one of the points of the several bays with which the coast is indented, is a remarkable steep conical island. It is named *Conflagration Hill*, from an accident having occurred there, which proved fatal to one man, and nearly so to an officer and part of a boat's crew who were ascending it for the purpose of making observations, in consequence of the long grass having been inadvertently set on fire.

Shelter from N.E. winds may be found in the first bay to the eastward of Conflagration Hill, about West of Low Mount Capoas, a peak rising 1,560 feet above the sea, immediately to the northward of the table Mount Capoas, and, next to it, the highest on the peninsula.

To the northward of Cape Capoas, for 6 miles to Diente Point, the south-western point of the entrance of Malampaya Sound, the coast is deeply indented, the bottom of some of the bays being separated from those corresponding to them on the opposite side of the peninsula and in Malampaya Sound, by very narrow isthmuses.

INLULUTOC, the largest of these bays, $1\frac{3}{4}$ mile wide and $2\frac{1}{4}$ miles deep, lies nearly midway between Cape Capoas and Diente Point, and affords good shelter in the N.E. monsoon. It is overlooked on the North by *Saddle Hill*, 1,000 ft. above the sea, which, together with *Chinongab* to the north-eastward, form conspicuous objects to identify the locality. There are no dangers likely to bring a vessel up in any of these bays but what are visible. Outside, the coast is bold, rocky, and very precipitous in some places, with deep water close to.

Anchorage—Water.—The best place to anchor in Inlulutoc (the only eligible bay for vessels to enter) is on the North shore, $1\frac{1}{4}$ mile to the eastward of Wreck Head, a bold rocky cliff forming the North point of it, between Teodore Point and Anchorage Island, in 15 and 16 fathoms, mud, with Saddle Hill bearing about N. by W., where near the foot of it, at the head of the bay, are two streams of fresh water.

MALAMPAYA SOUND, formed on the north-eastern side of the peninsula of Capoas, is about 19 miles deep in a south-easterly direction, varying in breadth from 2 to upwards of 4 miles in the broadest part. It is one of the finest harbours that can be desired, being almost perfectly free from hidden dangers, and containing along its shores bays and deep recesses, capable of giving close shelter to any class and number of vessels. The entrance is occupied by Tukuran Island, leaving only a narrow channel on either side, and at about 7 miles within the entrance the sound is contracted by long projecting headlands from either shore, forming as it were a second strait, containing several islands, which opens into an expanse of water 9 miles deep and 4 miles wide, called the Inner Sound, in which are the Spanish settlements *Panco* and *Baulao*.

Caution.—Merchant vessels entering Malampaya Sound in the early part

of the S.W. monsoon, particularly in the months of May and June, should be on their guard against pirates, for in Pirate Bay, 4 miles within the entrance, H M.S. *Royalist's* gig was nearly cut off in May, 1851, by a fleet of eight Illañon prahus on their annual marauding expedition.

Diente Point, the northern extremity of Capoas peninsula, is the western limit of the principal channel leading to Malampaya Sound. *Notch Islet*, 176 ft. above the sea, lies immediately off it, and at $1\frac{1}{2}$ cable's length to the northward of the islet is a reef of rocks awash.

Tuluran Island, occupying the entrance of Malampaya Sound, is $4\frac{1}{2}$ miles long, North and South, and $1\frac{1}{2}$ mile wide. Two sharp peaks, attaining a height of 1,272 ft., rise in the body of the island, and there are several others of considerable elevation on it; Tuluran Table, the southernmost, being 1,033 feet above the sea, and not unlike Mount Capoas on a smaller scale. The northern and western shores are bold, rocky, and precipitous in some parts, with conspicuous watercourses here and there.

At the north-western point of the island is a remarkable peaked islet, with two rocks awash a cable's length off it.

BLOCKADE STRAIT, the channel to the southward of Tuluran may be said to have its entrance between Diente Point and Bold Head, a distance of $2\frac{1}{4}$ miles. It takes a south-easterly direction, and at about 2 miles within the above line of entrance is the narrowest part, 6 cables' lengths across. Beyond this the strait is about a mile wide for $1\frac{1}{4}$ mile, when it opens into the outer extensive portion of Malampaya Sound.

Entrance Reef.—N.N.E. $\frac{1}{3}$ E. nearly two-thirds of a mile from Notch Islet, off Diente Point, is a cluster of small rocks, of which one is a pillar rock, called Entrance Reef. *White Round Islet* and *Pyramid Rocks* lie off the western face of Tuluran Island. White Round is small, 80 ft. above the sea, and bears W. by N. nearly $1\frac{1}{4}$ mile from Bold Head, the westernmost point of the island and nearest shore.

The Pyramid Rocks are 50 ft. out of water, and one-quarter of a mile in extent N.E. and S.W. The highest rock lies N.N.E. nearly 2 miles from White Round Islet, and three-quarters of a mile to the westward of Triple Head, the N.W. point of Tuluran.

The passage is safe between White Round Islet and Pyramid Rocks, but between the latter and Peaked Islet there is a coral patch with only 6 ft. water on it, N.E. $\frac{1}{2}$ N. one-quarter of a mile from the highest Pyramid Rock.

Cone Islet and Largon Rocks.—A conical islet, 237 ft. above the sea, lies in front of Bolalo Bay, on the South shore of Blockade Strait, and nearly midway between Notch Islet and Parmidiaran Point, a small conical head with a pillar rock over it and the South point of the narrowest part of Blockade Strait. N. by W. $\frac{1}{2}$ W. one-quarter of a mile from Cone Islet, is a smaller islet called Largon, from which rocks out of water extend one-

third of a mile to the northward, their outward extremity being E. by S. $\frac{3}{4}$ S., nearly a mile from Entrance Reef, with Malapina Island S.E. by E. $\frac{1}{2}$ E., $4\frac{1}{2}$ miles.

BOLALO BAY.—There is a small bay immediately to the eastward of Diente Point, and between its eastern limit and Parmidiaran Point, distant $1\frac{3}{4}$ mile, is the entrance of Bolalo Bay, a deep inlet affording good shelter from S.W. winds. It runs $2\frac{1}{4}$ miles in a southerly direction, the bottom being separated by a narrow isthmus from the North part of Inlulutoc Bay. The width inside is about half a mile.

Chinongab, a very sharp peak, elevated 1,216 ft., with a small table ridge adjoining it, rises at nearly two-thirds of a mile within the eastern shores of this bay, and is the same distance from the shores of the bay to the north-eastward, and Pirate Bay to the eastward.

ENDEAVOUR STRAIT, to the eastward of Tukuran Island, has its southern entrance between Pillar Rock Point and Endeavour Point, rather more than three-quarters of a mile to the E.S.E. The strait runs nearly North and South, and is 6 miles in length, and barely a cable wide at the narrowest part.

Coral fringes the shores on either side of the strait, and nearly in the centre of a bay on the West side, immediately under South Tukuran Peak, is a rock awash at low water, with 10 and 12 fathoms all round.

Endeavour Strait ought not to be used by sailing vessels, as they are sure to be baffled, especially in the Narrows, by the very high land on either side of it.

PIRATE BAY.—Between Blockade Strait and the second or inner entrance, the western shore of the sound has three deep bays, in each of which the ground is quite clear, and excellent shelter is afforded from all winds; but the two southern bays have no watering places.

Pirate Bay, the northernmost of the three bays just mentioned, will be found the most convenient to vessels not bound to Pancol, but merely requiring shelter, or wood, or water.

Water.—The watering place, affording a good supply, is in the bottom of Pirate Bay, almost immediately under Chinongab Peak.

Tenabian Island is 325 ft. above the sea, and nearly two-thirds of a mile long in a N.E. and S.W. direction, the N.E. portion of the island having an extreme breadth of nearly half a mile, and the S.W. portion a regular breadth of about a cable's length. The passage inshore of the island is 2 cables' lengths across, but there is a reef in it which covers.

Malapina Island, fronting the inner part of Blockade Strait, is small, 156 feet above the sea, and lies a mile to the eastward of Tenabian, with the northernmost point of Tacbolo Island S. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles.

Boat Rock.—A small rock of this name lies just within the entrance of

N.E. Bay, E. $\frac{1}{2}$ S. $1\frac{1}{4}$ mile from the highest point of Malapina Island, and South nearly half a mile from the South point of N.E. Bay Island.

TACBOLO ISLAND.—In the inner strait, which is about $2\frac{1}{4}$ miles wide, and $3\frac{1}{2}$ miles long in a south-easterly direction, are several islands, the north-westernmost of which is Tacbolo, 300 feet above the sea, partially cleared, and nearly a mile in length N.W. and S.E. It lies exactly in mid-channel between the heads at the entrance of the strait. Between it and Passage Island on the East and Pugguianan Point, a headland with a triple summit 380 ft. above the sea, on the West, is the principal passage leading into the Inner Sound.

Passage, Eniaran, and Durangan Islands.—Passage Island, the largest in the strait, is 3 miles in circumference, and is separated from the S.E. point of Tacbolo by a channel only 1 cable wide, in which there are 5 fathoms, and from Tuluan Hill, the middle point on the eastern shore, by a boat channel, barely three-quarters of a cable wide.

A small islet, called Eniaran, with a flat rock on the West side, lies close off its western point, and off the western point of a small bay on the South side of the island is a white rock called Balolo. Durangan, a round-backed island 386 ft. above the sea, and rather more than half a mile in length East and West, with two small black rocks at the eastern extremity, occupies the centre of the channel between the S.W. face of Passage Island and Bululu Point, the northern extremity of a chain of hills projecting to the northward from the southern shore of the strait.

The channel between Passage and Durangan Islands is nearly half a mile wide, and contains the only danger (the Cancea Rock) we are aware of that is not visible.

To the southward of Durangan the channel is the same width, and has depths of 9 and 12 fathoms, mud, in it; nearly in the centre is Colohogon, the westernmost of two small islands 4 cables' lengths apart in about an E. by S. and W. by N. direction. Bartoc, the easternmost, has a reef extending half a cable's length from its south-western side.

Cancea Rock, the above-mentioned danger, consists of a coral ledge nearly awash in some parts at low water, fronting the head immediately to the westward of the small bay on the South side of Passage Island, from which it extends nearly 2 cables' lengths with 11 and 12 fathoms close to its edge. From its outer extremity, Flat Rock, off Eniaran Islet, is in line with Chinongab Peak bearing N.W., and the outer black rock off the East end of Durangan Island bears S.S.W. $\frac{1}{2}$ W.

Mallaratone and Ibelbel Islands.—S.E. by E. $\frac{1}{4}$ E. nearly a mile from the East end of Durangan, and two-thirds of a mile southward of Canica Point, the South point of Passage Island, is Mallaratone Island, lying N.E. and S.W., in which direction it is nearly half a mile long, with an average

breadth of about a cable's length. A small white pillar rock lies nearly a cable's length off its S.W. point.

Ibelbel Island, about 2 cables in diameter, partially cleared, and having a quantity of bamboo growing upon it, is on the northern shore of the strait at the entrance of a bay of which Passage Island forms the West side. It lies E. $\frac{1}{2}$ S. three-quarters of a mile from Canica Point, and N.E. $\frac{1}{2}$ E. about the same distance from Mallaratone Island, with clear channels between.

DAMAO, MALLAROIS, and VINALO ISLANDS, on opposite sides and marking the south-eastern limits of the strait, are N.E. and S.W., $1\frac{1}{2}$ mile from each other. Damao, 226 ft. in height above the sea, and nearly three-quarters of a mile in extreme length N.W. and S.E., is on the southern shore S.S.E. $\frac{3}{4}$ E. three-quarters of a mile from Mallaratone Island. A peaked islet, 83 ft. high, lies off its northern extremity, and in the channel a quarter of a mile wide, separating the island from a headland on the South, are some small islets and rocks awash.

Mallarois Island, E. $\frac{1}{2}$ N. nearly $1\frac{1}{2}$ mile from the North point of Mallaratone, and S.E. by E. $\frac{1}{2}$ E. three-quarters of a mile from Ibelbel, is 93 feet above the sea, less than a cable in length, and has a precipitous cliff on the South side, with some rocks detached from the East end.

There is a larger island called Vinalo lying 2 cables to the northward of Mallarois, and the channel between them is safe.

ALLIGATOR BAY is the northernmost of two large bays on the southern side of the strait, and, next to Pirate Bay, the most convenient place in the sound for watering. Durangan and Paleocotan Islands are immediately off the entrance, which is between Green Head and Balulu Point. Alligator Island lies on the opposite side of the bay, South of the watering-place, and to the south-eastward of it is a double cone island.

The soundings at the entrance of the bay are 10 and 12 fathoms, mud, decreasing gradually to 3 and 4 fathoms near the shore.

Water.—In the S.E. corner of the bay the main stream from Mount Capoas discharges itself through some low ground, but the watering-place is on the North shore of the bay, in the first small indentation from Green Head.

MALIPU BAY is separated from Alligator Bay by the chain of hills of which Balulu Point is at the northern extremity, and it has its eastern limit at Damao Island. A remarkable hunch hill (545 ft.) rises on the south-eastern side of the bay, and on the western shore is Chinicaran Island, with an isthmus head on the North face, the passage between which and the shore has only 12 ft. water in the narrowest part.

Mount Capoas and the adjacent high land rise directly behind these bays, and it was from the mouth of a small stream just to the westward of Chinicaran Island that the party who ascended Capoas set out; keeping the course of the main stream, they advanced by a steep granite gorge on the

face of the mountain, which is everywhere conspicuous from the North side of the sound.

The soundings in Malipu Bay average about 8 fathoms in the north-western part, 4 fathoms to the south-eastward, and these depths decrease gradually to 2 fathoms towards the shores of the bottom of the bay.

PANCOL.—The Inner sound of Malampaya opens immediately beyond Damao and Mallarois Islands, and in a bay on the northern side, $1\frac{3}{4}$ mile from the latter, is the Spanish settlement of Pancol, prettily situated under the high land, and fronted by a green isolated hill, 65 ft. high, on which is built a stockade in lat. $10^{\circ} 52' 9''$ N., long. $119^{\circ} 22' 56''$ E. The natives are exceedingly friendly, and for supplies it is certainly the best place on the coast. A stream of fresh water runs on either side of the stockade hill, and water can be procured, but not readily in ships' boats. Fish is plentiful.

Vessels can anchor off Pancol in 3 fathoms, stiff mud, within a quarter of a mile S. by W. of the stockade, or in deeper water farther off, as convenient, the anchorage being perfectly safe in all seasons.

Tides.—It is high water, full and change, at Pancol at $9^h 40^m$, and the rise of tide is 6 ft.

The **MALAMPAYA RIVER** disembogues at the bottom of a shallow bay on the eastern side of the sound 3 miles from Pancol. A high round island called Malootone, with a small conical head at the South end, and an island on either side, lie across the entrance of this bay, leaving a channel into it little more than 2 cables wide, in which there are only 13 ft. water. Off the first point inside these islands is a white rock, and across the entrance of the river is a line of stakes commanded by a small stockade in which a guard is usually kept. At low water the mud dries considerably outside this, nearly abreast of two small islands on the South side of the bay.

The river, which is navigable for boats about 2 miles, runs into the body of the island in a south-easterly direction; near its head is a good foot-path leading to the village of Tai-Tai, on the opposite side of the island, a distance of 2 miles.

BAULAO, a settlement similar to that of Pancol, but smaller, is on the eastern shore near the head of the sound, S.S.E. $\frac{1}{2}$ E. nearly $6\frac{1}{2}$ miles from Pancol. It, however, cannot be approached within 2 miles by a vessel drawing more than 12 ft. water, as the sound shoals gradually from 3 fathoms at 4 miles southward of Pancol to the head, where, at low water, the mud dries out nearly to Bay or Bivouac Islet, a mile from the mangroves.

Immediately to the southward of Baulao, the hills at the head of the sound on either side recede, and are separated by an extensive plain which runs through the body of the island, almost to the opposite coast, some of the water of which is discharged into Malampaya Sound by a river having its outlet through the mangrove, close to Bush Head, nearly 3 miles South of Baulao.

There are several detached ranges on this plain; on the West, those overlooking Imuruan Bay, and in the neighbourhood of Port Barton are recognizable.

The western shore of the sound to the southward of Damao Island is indented by bays, all of which are shoal.

The average depth in the centre of the Inner Sound is $6\frac{1}{2}$ fathoms, mud, from which it shoals gradually on all sides, except towards the entrance, where it deepens to 9 and 10 fathoms.

Alleged Danger.—In an old MS. chart, which was seen at Tai-Tai, there is a rock called Coloma, laid down nearly in the centre of the Inner Sound. The late Captain Bate tried for three consecutive days to find it, without success, and the people of Pancol and Baulao denied having any knowledge of its existence. As near as could be ascertained from the Spanish chart, the position of the rock is about 3 miles S. $\frac{1}{2}$ E. of Pancol stockade.

The northern extremes of Mallarotone and Durangan Islands kept in sight, will prevent a vessel going near this position.

Directions.—In making the entrance of Malampaya Sound from the westward, Notch Islet shows conspicuously off Diente Point, White Round Islet will be seen, and on a closer approach the Entrance and Largon Rocks, which are always above water, become visible. The best course is between these rocks and White Round Islet, the soundings in the neighbourhood of which average about 30 fathoms, and the former may be passed on the North side as near as convenient. With a southerly wind, they should be kept close aboard to enable the vessel to fetch through the narrowest part of Blockade Strait, or she is liable to be set over upon the northern shore by shifts of wind from the high land about Chinongab. Having passed Parmidarian Point, proceed just outside the small white rock in the centre of the next bay, and the reef awash off the point under Lookout Hill, having 13 fathoms *close* to, may be shaved without danger; then haul into Pirate Bay, and anchor as convenient.

Entering the strait with a N.E. wind, pass on either side of White Round Islet, and conform to the same directions as before, only keeping on the Tuluran shore, but not too close, or the vessel is liable to be becalmed, from the high land there rising more abruptly than on the South side.

The passage through the second strait into the Inner Sound is on the S.W. sides of Tacbolo and Passage Islands, and in using it great care must be taken to avoid the Cancea ledge of rocks under water between the latter island and Durangan.

The Coast to the northward of Tuluran Island, at the entrance of Malampaya Sound, trends northward for nearly 5 miles, where, near Custodio Point, the extremity of a promontory which forms the western shore of Bacuit Bay, is a remarkable quoin hill, 466 ft. above the sea. The intermediate coast is

of a bold rocky aspect, with several land-slips appearing as vertical reddish-looking stripes down the face.

Rugged Limestone Group.—From Custodio Point, the extremity of the promontory above mentioned, a remarkable group of rugged islands, of limestone formation, extends $8\frac{1}{2}$ miles in a N.N.W. direction. The sides of these islands present bare perpendicular cliffs of every variety of tint, with numerous stalactite caves, in which the edible bird's nest is sought. The summits terminate in small clusters of needle peaks, and wherever it is possible for vegetation to take root, they are luxuriantly clothed with foliage, of which the pandanus predominates.

Guntao Islands.—North and South Guntao Islands, the south-westernmost of this group, lie North $8\frac{1}{2}$ miles from White Round Islet, at the entrance of Malampaya Sound, and $4\frac{1}{2}$ miles to the westward of Custodio Point.

Vestacado Rocks, showing like two small boats, lie W. by S. $\frac{3}{4}$ S. $1\frac{1}{2}$ mile from the opening between the Guntao Islands, and on this bearing the bold head of Mantinloc appears in the passage.

Tapiutan, the outer island of the Rugged group, having its summit in lat. $11^{\circ} 12' 50''$ N., long. $119^{\circ} 15' 18''$ E., lies 7 miles from the shore, and N. by E. 5 miles from the Guntao Islands. It is nearly $2\frac{1}{2}$ miles long N.N.W. and S.S.E., the highest part, which is round-topped, being 1,415 ft. above the sea.

Matinloc Island.—East of Tapiutan, and separated from it by a channel $1\frac{1}{2}$ mile long, but only 2 cables wide, in which there are 20 fathoms water, is the northern half of Matinloc, an island formed by a very narrow ridge of limestone, nearly $4\frac{2}{3}$ miles in extent, running in a N. $\frac{1}{2}$ W. and S. $\frac{1}{2}$ E. direction, and almost separated in three places by deep gaps.

The *Horn*, 1,250 ft. above the sea, rises nearly in the centre of the island, and when viewed in a northerly or southerly direction, assumes the appearance of its name, forming a most conspicuous and readily recognizable feature on making the coast.

Ynambuyod Island.—Off the N.E. face, lying parallel with and separated from Matinloc by a deep channel 1 mile wide, is another island, called Ynambuyod, similar in feature but smaller, being only $1\frac{1}{4}$ mile long. Two islets, Cliff and Crown, lie respectively $1\frac{1}{2}$ and 9 cables off its northern extremity, with 17 and 20 fathoms between them. There is also a remarkable rock lying one-quarter of a mile off its south-eastern face, called the Mushroom, from its being poised on a narrow stem about one-third the diameter of the whole base.

Miniloc Island lies to the eastward of the southern part of Matinloc, the channel between, in which there are upwards of 25 fathoms, being $1\frac{1}{4}$ mile wide. It is a remarkable high, rugged island, $3\frac{1}{4}$ miles in circumference, with several summits and precipitous crags, the coast nearly all around being broken up into sharp cliffy heads, and, on the South side, exceedingly

picturesque bays. On the N.W. face are two high, rocky islets, the southernmost and largest of which is cleft in two to the water's edge.

Pacluyaban, Entalula, and Pangutasian Islands.—On the southern side of Minoloc Island, nearly connected with it by a smaller island, which occupies the passage, is Pacluyaban, also of limestone formation, and very precipitous. Between the latter island and Custodio Point are two islands; Entalula, similar in character to the above, and Pangutasian, of entirely different feature.

Pangutasian Island has a double summit, and slopes gradually towards the S.E. point, where there is a sandy tongue, from which a reef projects in a south-westerly direction, contracting the channel between the island and the Custodio shore, off which latter is Flat Rock, to 3 cables across. The depth in this channel is 14 and 16 fathoms.

On the eastern face, 3 cables' lengths from Pangutasian, is Popolcan, a limestone islet 310 ft. above the sea.

Guintungauan Island and Jip Rocks.—Guintungauan Island E. $\frac{1}{3}$ S. $2\frac{2}{3}$ miles from the South point of South Guntao, and W. by N. nearly $1\frac{1}{4}$ miles from Custodio Point, is a quarter of a mile long, and appears like a square block when seen in a North and South direction.

The Jip Rocks are a lump of limestone, 95 ft. high, cleft in two, and lie N.E. by N. half a mile from Guintungauan Island, and 1 mile to the westward of Pangutasian.

Water.—A reef, which always shows, extends 1 cable's length from Custodio Point, and in a small bay fronted with coral between it and Flat Rock, is a stream of fresh water.

BACUIT BAY, formed partly on the West by the islands just described, is 9 miles deep, and 3 miles wide at the entrance between Miniloc Island and a limestone peninsula, the highest part of which, called Bacuit Peak, is tolerably sharp, and attains an elevation of 1,500 ft. above the sea. The eastern shore trends nearly North and South, and is overlooked by a high range, extending in a northerly direction. This range, on which there are some curiously shaped peaks, forms part of a great vein of mountain limestone that here traverses the island in a north-easterly and south-westerly direction, commencing on the West side of Palawan at Tapiutan and Cauayan Islands, just embracing both shores of Bacuit Bay, and terminating on the East coast at Old Castle Point and the islands fronting Tai-Tai Bay, altogether a distance of 30 miles. The average breadth of the vein appears to be about 7 miles.

There are several islands in the bay, all of which are precisely similar in feature and character to the group outside.

Ynabuyatan and Malpacao Islands.—Ynabuyatan, the northernmost island facing the eastern shore of the bay, is a very conspicuous object on

entering, being 1,130 ft. above the sea (somewhat resembling the appearance of an elephant on its haunches), and nearly a mile in circumference.

Malpacao, a remarkable ridge of limestone, with a high boulder detached from it, assuming the form of a double island, lies S.S.E. $\frac{3}{4}$ E. nearly a mile from Ynabuyatan, midway between the southern point of this bay and Lagen Island.

Lagen Island, 1,140 ft. above the sea, the southernmost and largest of the three islands on the eastern side, is of irregular form, $1\frac{3}{4}$ mile in length N.W. and S.E., and presents a bold cliffy shore, upwards of 400 ft. in perpendicular height, with several sandy bays.

Comocutuan and Dibuluan Islands lie on the western side of the bay. The former, a small precipitous island rising 298 ft. above the sea, is S.E. by E. $1\frac{1}{2}$ mile from Pangutasian Island, and between it and the shore abreast, distant upwards of a mile, a spit projects 3 cables' lengths from an islet with a white rock close to it. Dibuluan Island is S.S.E. $\frac{1}{2}$ E. 2 miles from Comocutuan, and about midway between it and Lagen are three rocky islets, the easternmost of which shows like a ninepin on entering the bay.

Manlalec is a small village, situated a short distance up a rivulet, half a mile inside the southern point of the small bay, off which is Ynabuyatan Island, on the eastern shore of Bacuit Bay; the approach is commanded by a stockade at the entrance mounting three guns.

The old and now deserted village of Bacuit is in the extreme south-eastern corner of Bacuit Bay, fronted by a mud flat, dry at low water.

Tides.—It is high water, full and change, in Bacuit Bay, at 10^h a.m.; and the rise of tide is about 6 ft. Little or no current has been observed in the bay.

Directions.—The best channel for small vessels proceeding to Bacuit Bay, if coming from the southward, is between Entalula and Pacluyaban Islands. It is 6 cables wide, and has 25 fathoms in it, with 20 fathoms close to the shore on either side.

The best anchorage in the S.W. monsoon is in 17 or 18 fathoms, stiff mud, about a mile to the south-eastward of Comocutuan Island, off the first limestone head; but as neither fresh water nor supplies are to be had readily, there is little inducement, except it be shealer water, for vessels to go farther up.

CADLAO, or *Table Top Island*, 2,000 ft. above the sea, lies immediately to the N.W. of Bacuit peninsula, being separated from it by a channel barely 3 cables wide, in which there are 17 and 19 fathoms close to the points, and it may almost be considered as a continuation of the North side of Bacuit Bay; while Tapiutan and Matinloc are regarded as forming the southern extremity of it.

The island is $3\frac{3}{4}$ miles in length, in a N.N.W. and S.S.E. direction, with an average breadth of about half a mile. Its features are very remarkable,

and it forms the most conspicuous object when making the northern end of Palawan.

The table rises in the centre of the island, to the eastward of which, and separated from it by a deep gorge, are two remarkable peaks, of nearly equal elevation, called East and West Loggerheads. The island, especially on the southern and eastern sides, exhibits all the characteristic features of the contiguous group, some of the cliffs overhanging the perpendicular to a considerable extent.

There is a bay on the North side of the island immediately under the table, with an islet in it called Mitre; and on the S.W. face, 4 cables distant from the shore, is Ymbalaba Island, three-quarters of a mile in extent, North and South, the channel between the two having 11 fathoms in it.

Shelter in N.E. winds may be found to the eastward of this island, South of the table, in 16 or 20 fathoms, stiff blue mud.

CAUAYAN and CAVERN ISLANDS.—North of Cadlao, and separated from it by a channel about half a mile wide, in which is a peaked islet, is Cauayan Island, 827 ft. in height, and $1\frac{1}{2}$ mile in extent about N.W. by N. and S.E. by S. It is of similar formation to the neighbouring islands, but has a more even summit.

On the N.W. face of Cauayan, and distant a quarter of a mile from it, is Cavern, a small island, the extreme of the group. It is 350 ft. high, and when viewed in an East or West direction has a tall pillar rock rent from the North end.

Good shelter from S.W. winds is to be had on the North side of Cadlao, off Mitre Islet, in 17 fathoms, stiff mud.

Tides.—It is high water at Cavern Island, full and change, at 9^h 30^m a.m.; low water at 5^h 30^m p.m.; rise of tide (one observation only), $5\frac{1}{2}$ ft.

BACUIT.—Cadlao and the islands just described form the western side of a deep bay, in the southern extreme of which is the village of Bacuit, called also by the natives Ta-lan-dac, in a sandy bay on the North side of the peninsula forming the northern extremity of Bacuit Bay. In 1851 it contained a population of 200, exclusive of women and children, all Roman Catholics, under the jurisdiction of the Alcalde at Tai-Tai.

The soundings at the entrance of the bay, and off Cavern Island, vary from 20 to 30 fathoms, decreasing gradually to 12 and 14 fathoms to within half a mile of the shore; towards the village of Bacuit it shoals to 3 and 4 fathoms close to the edge of the coral.

Supplies, such as goats, pigs, fowls, vegetables, &c., in a moderate way, may be obtained from the natives, for which, as usual, they ask an exorbitant price; but a more equitable bargain may be made by giving articles of wearing apparel, crockery, hardware, &c., in exchange.

Water may be procured from a stream at the eastern end of the beach, but not with any degree of facility.

The *Coast* trends in a northerly direction from Bacuit for 8 miles to Crawford Point. A central range, the continuation of that over Bacuit Bay, overlooks both shores of Palawan, and in the parallel of Cadlao, where it attains the greatest elevation, is a high table, the north-western and south-eastern shoulders of which are $1\frac{1}{2}$ mile apart, and are respectively 2,055 and 2,230 feet above the sea.

There is a sharp peak, 1,630 ft. in height to the southward, and several hills of less elevation bordering the coast, the features of which are entirely different from those of the limestone formation, and this is nowhere so evident as at the back of Bacuit village, where a sudden transition occurs.

East peak, attaining a height of 1,890 ft. above the sea, rises $4\frac{1}{2}$ miles to the north-eastward of the high table, but it is not generally observable from the West side until some distance off shore. It, however, forms a conspicuous object when to the northward and eastward of the North end of Palawan.

Emmit, a small wooded island, 170 ft. high, with two remarkable pillar rocks at the North extremity, lies 2 cables' lengths off a projecting point, midway between Bacuit and Crawford Point, and eastward of the channel separating Cadlao and Cauayan Islands.

The coast to the northward, on which is a small sugar-loaf hill, is bold to approach, having 6 and 10 fathoms close to the shore; but that to the southward is fronted with coral, and should not be closed nearer than half a mile.

Water.—Rocky ground extends half a mile from the point opposite Emmit Island, and in the first bay to the southward of it was a rivulet of fresh water in May, 1851.

NORTH COAST OF PALAWAN.—Abreast of Crawford Point the island of Palawan is 8 miles wide, and from this, as well as Darcotuan Point, corresponding to it, on the East coast, the island gradually contracts, forming at the northern extremity a promontory $3\frac{1}{2}$ miles long, and $1\frac{1}{2}$ mile wide. Near the termination of this is a hill 493 ft. above the sea, with some table looking land of greater elevation to the southward.

Off the sandy beach, and N. by W. nearly one mile from Crawford Point, are the *Gemeles*, two white looking rock islets; and N. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles from Crawford Point, and separated from the headland above mentioned by a safe channel $1\frac{1}{4}$ mile wide, in which there are 9 and 10 fathoms, sand, is Lulutaya Island, $1\frac{1}{4}$ mile long, 407 ft. above the sea, and, except on the eastern side, where fronting two small sand bays some coral extends 2 cables, is bold to approach.

Diaphila and Calitan Islands.—Base Bay is immediately to the northward of Pasco Inlet, off which, and $2\frac{1}{2}$ miles N.E. by E. of Lulutaya, is Diaphila Island, lying a mile from the shore, with a safe channel inside. Calitan Island, 256 ft. in height above the sea, lies N. by E. $\frac{1}{2}$ E. nearly 2 miles

from the latter, and nearly half a mile westward of the northern extreme point of Palawan. There is a sharp double rock between it and the shore.

On the South side of an indentation on the coast between these islands, is North Hill, 965 ft. high.

Cabuli Island, the highest part of which is in lat. $11^{\circ} 26' 25''$ N., long. $119^{\circ} 29' 46''$ E., lies off the North end of Palawan, and, except when seen in a N.W. or S.E. direction, appears to form part of that island, the channel separating them, in which there are 7 and 9 fathoms, being only 3 cables wide. It is $1\frac{1}{2}$ miles in extent from North to South, 560 ft. in height, and has rather a flat summit, the northern extremity of the island terminating in a small head, with 17 fathoms water almost alongside. It is also bold to approach on all sides, the soundings in the immediate vicinity being about 20 fathoms.

EAST COAST OF PALAWAN ISLAND.

In giving sailing directions, and a description of the East coast of Palawan, it is to be borne in mind, that, although we believe they will be found sufficiently succinct and accurate to meet the ordinary requirements of navigators, they are, nevertheless, but the result of a few observations hurriedly collected in a run down the coast during the summer, and a beat up in the winter months of 1850, taken with a view to ascertaining the practicability of adopting this route to China, in preference of the usual passage on the West side of Palawan, when late in the monsoon. They are not, therefore, implicitly to be relied upon, as resulting from a well-executed survey; nor are they intended in any way to lessen the necessity of keeping that vigilant look-out which the navigation of coral seas, on all occasions, urgently demands.

The adoption of the regular Palawan Passage, in preference to the route on the East side of the island, is recommended as the result of Captain Bates' experience.

In the strength of the N.E. monsoon, vessels *may*, taking the latter route, reach as far as the parallel of 10° N., or the island of Dumarán, without very great difficulty; but to get beyond this they will experience at least considerable delay, even if they succeed at all, for the current in this season sweeps strong to the southward, between Palawan and the Cuyos Islands, the velocity being almost in direct proportion to the strength of the wind. H.M.S. *Royalist*, in the month of December, was delayed 15 days, vainly endeavouring to get round Dumarán against the monsoon, and had, after all to make the passage into the China Sea, *via* Panay and Mindoro.

The currents on the East coast depend chiefly on the prevailing winds.

The flood tide sets along the shore to the southward, and the ebb to the

northward. The maximum velocity observed was $1\frac{1}{2}$ knots, and the rise 7 feet.

The *Coast* to the northward of Bugsuk Island (page 538) has been only partially surveyed; and that part between Rawnsley and Madripore Points, a distance of 5 miles, is merely sketched in, and no soundings have been taken near it. It is low, consisting chiefly of mangrove.

At $2\frac{3}{4}$ miles beyond Madripore Point is *Deception Point*, and at 5 miles farther to the eastward is *Church Point*, having two wooded hills to the N.E., and a reef which dries off $1\frac{1}{2}$ mile to the S.E. In the coast between the latter points are two openings, with 4 and 6 fathoms water in them.

URSULA ISLAND, in lat. $8^{\circ} 20' 42''$ N., long. $117^{\circ} 29' 56''$ E., lies with the North point of Bugsuk bearing East $12\frac{1}{2}$ miles, and Church Point N. by W. $9\frac{1}{2}$ miles. It is one-third of a mile in length, low, covered with wood, and surrounded by sand. The South side is steep-to; but a reef, dry at low water, extends from the northern half of the island, nearly a mile in a N.E. direction.

N.W. by W. $2\frac{1}{2}$ miles from the summit of Ursula Island, is a $2\frac{1}{2}$ -fathoms coral patch; and there is also one with apparently very little water, N. $\frac{3}{4}$ E. $4\frac{3}{4}$ miles from the same, the soundings between varying from 14 to upwards of 40 fathoms. Vessels should keep outside Ursula Island.

Tides.—It is high water, full and change, at Ursula Island, at 11^h , and the rise of tide $7\frac{1}{2}$ ft.

Wright Shoal, discovered by the *Rifleman* in 1868, is a dangerous coral patch, having but $1\frac{3}{4}$ fathom on the shoalest part; it lies E. $\frac{1}{2}$ S. 9 miles from Ursula Island, and is in lat. $8^{\circ} 19' 17''$ N., long. $117^{\circ} 38' 25''$ E.; the shoal water extends, under a depth of 10 fathoms, $1\frac{1}{4}$ miles East and West, and is half a mile broad. This danger lies in the direct track of vessels proceeding between Balabac and Mindora Straits.

Reef Island.—N.W. $\frac{1}{3}$ N. $7\frac{3}{4}$ miles from Ursula Island, similar to it in character, and $3\frac{1}{4}$ miles from the shore, is Reef Island, from which coral projects in every direction; that to the eastward, to the extent of $1\frac{3}{4}$ mile, where a bank dries at low water.

PIRATE ISLAND, less than 2 cables in extent, lies N.E. $\frac{3}{4}$ E. $5\frac{1}{2}$ miles from Church Point, and $1\frac{3}{4}$ mile from the shore. A reef extends nearly three-quarters of a mile from it in an E.S.E. direction; and there is a patch of coral with 3 fathoms over it, lying S.S.W. $\frac{1}{4}$ W., nearly a mile from the island.

ROCKY BAY is immediately under the Panalingahan range, noticed previously, and has its southern limit about $5\frac{1}{2}$ miles N.N.E. of Church Point. Three small rivers disembogue on the western shore of the bay, the northernmost of which has some houses near the entrance, probably a piratical establishment.

Outer Four-Fathoms Patch.—The shoalest and outermost of the coral

patches that has been discovered has 4 fathoms on it, and lies with Pirate Island W. by N 6 miles; Ursula Island S.E. $\frac{2}{3}$ S.; Church Point E. by S.; Wood Hill, the northernmost and highest of the three that overlook the Pirate Island shore, W. by N. $\frac{2}{3}$ N., and Mantaleengahan Mountain, N. $\frac{1}{4}$ E.

Gull and Egg Sands, nearly 2 miles apart, with dry patches on them, lie in the entrance of Rocky Bay; the former N.E. by E. $\frac{1}{2}$ E., $2\frac{1}{4}$ miles, and the latter N.E. $\frac{2}{3}$ E. nearly $4\frac{1}{2}$ miles from Pirate Island. When inside these sands the depths decrease gradually from 22 to $4\frac{1}{2}$ fathoms, stiff mud, towards the head of the bay.

Off the reef that lines the western shore of the bay there are some rocks and dry sand patches, the largest of which, a mile in extent, lies 2 miles North of Pirate Island, and one mile from the shore.

Segyam Islands are two low islands connected with the shore at the N.E. point of the bay, and have reefs near them, the largest patch lying S.S.W. 6 cables' lengths from the westernmost island, with 8 and 10 fathoms close to it.

Caution.—Vessels having no object in coming into Rocky Bay should not close this part of the coast nearer than 6 miles.

The *Coast* from the Segyam Islands trends about E.N.E. for $13\frac{1}{4}$ miles to Sir James Brooke Point, thence about N.E. by E. for $12\frac{3}{4}$ miles to Nose Point, which is low and wooded, with a small hill at the back of it; the intermediate land is a low, densely wooded plain, well populated, with several cultivated spots, and overlooked by the high range of Mantaleengahan. The coast is slightly indented, and bold to approach to half a mile, the soundings when that distance from it being about 6 fathoms. Several streams of fresh water flow into the bays, and some of the points have projecting reefs; that off Nose Point extending the farthest off, a distance of nearly half a mile. Three miles S.W. by W. $\frac{1}{3}$ W. of Nose Point is a reef awash half a mile from the shore.

TAC-BO-LU-BU, in lat. $8^{\circ} 43' 21''$ N., long. $117^{\circ} 44' 26''$ E., and about $7\frac{1}{2}$ miles E.N.E. of the Segyam Islands, is a Malay settlement, and the district over which a Dato presides. It appears to be well populated. Goats, sweet potatoes, and fruit in small quantities may be obtained; and also water from a rivulet in fine weather, when there is no surf on the beach. There is anchorage in the roadstead off the settlement in from 12 to 16 fathoms, stiff mud, about a mile or upwards from the shore, with Mantaleengahan Mountain bearing N.W. by N., and Addison Peak, a remarkable thumb shoulder at the end of a spur, N. by E. Reefs project 3 cables off both the points forming the bay.

There is also another Malay establishment at Prah Point, about 8 miles to the N.E. It was not visited by the *Royalist's* boats.

The soundings, when from 3 to 4 miles off the coast between the Segyam

Islands and Nose Point, vary from 20 to 30 fathoms mud, deepening as the latter point is approached, with patches of 6 and 8 fathoms, coral, occasionally.

EAST ISLAND, the N.W. extreme of which is in lat. $8^{\circ} 53\frac{3}{4}'$ N., long. $18^{\circ} 13' 56''$ E., is a low coral island nearly half a mile in extent, covered with trees, visible about 12 to 15 miles off, and has a reef extending from the eastern side, on the extremity of which is a small bush half a mile from the island. There is no anchorage near it, the depths in the immediate vicinity being upwards of 100 fathoms.

Cumi-Cumi Island.—The *Rifleman* passed within 3 miles of the position ascribed to an island of this name in lat. $8^{\circ} 57'$ N., long. $118^{\circ} 39'$ E., proving what had long been believed by seamen familiar with the navigation of the Mindoro Sea, that no island exists there. East Island, 24 miles W. by S. of the above position, just previously described, was plainly visible at a distance of 20 miles, and is the only off-lying island in the locality.

The *Coast* from Nose Point trends N.N.E. $\frac{3}{4}$ E. about 11 miles to Crawford Cove, which is a mile deep, and has 5 fathoms at the entrance. Davie Hill overlooks the shore at nearly 2 miles to the southward, and on the North side of the cove is a tree hill, the southern extremity of a coast range.

Immediately to the northward of Crawford Cove are several low coral islands fronting the shore, giving rise to the name of Island Bay to this part of the coast.

ISLAND BAY has been only partially sounded; but sufficiently so, however, to ascertain that several shoal patches exist, and that, close in, it is hazardous for vessels to navigate. It corresponds with Tay-bay-u on the opposite side of the island, the distance across being about 9 miles.

The plain intervening is cultivated in many parts, and broken up into several detached hills of conical form, at the back of which the deep saddle hill of Pu-lute, and Step Cliff on the Ma-la-nut range, are conspicuous.

Relief Point, in the N.E. part of the bay, is in lat. $9^{\circ} 9' 45''$ N., long. $118^{\circ} 12' 1''$ E., and from it coral ground, on which there are patches of 3 ft. and 12 ft., extends $1\frac{1}{4}$ mile to the S.W.

Water.—There is a fresh water rivulet at half a mile to the N.W., or within Relief Point.

Gardiner, Bessie, and Reef, three low islands, upwards of a mile from each other, lie in a N.E. direction from Crawford Cove more than a third of the distance across Island Bay. Reef Island, the north-easternmost, has its eastern side surrounded by coral, which dries half a mile from it, and has 14 fathoms very near the edge.

Another group of islands and sand-banks lies in-shore and to the northward of these, fronting the bottom of the bay; the depth of water between and around them is 6 and 7 fathoms.

On the N.E. island of the in-shore group is the ruin of a Mahomedan temple.

Two and a Half Fathoms Patch lies nearly midway between Reef Island and Relief Point, and 3 miles off shore, with the North extreme of Reef Island a little open of Coast Hill, which rises close to the shore at $1\frac{1}{3}$ mile North of Crawford Cove, bearing W. by S. $\frac{3}{4}$ S.; Steep Cliff, on Ma-la-nut range, W. by N. $\frac{2}{3}$ N.; and the Button, a bush islet near the shore, N. $\frac{2}{3}$ W.

The *Coast* from Relief Point trends in a straight line 6 miles in an easterly direction to Bivouac Point, where a good stream of fresh water breaks through the shingle. There is a rock awash nearly midway between the two points at half a mile from the shore.

In front of this part of the coast, at $3\frac{1}{4}$ miles from the shore, is a 3-fathoms coral patch, with depths of 15 and 16 fathoms, mud, inside it, and which lies with Bivouac Point N.E. $\frac{1}{2}$ N., $4\frac{1}{4}$ miles; Relief Point, N.W. $\frac{2}{3}$ W., $4\frac{1}{3}$ miles; Table Shoulder, the southern termination of the Victoria Range on this side of the island, immediately overlooking the coast N. by W. $\frac{2}{3}$ W.; and the North extreme of Relief Island, nearly in line with Coast Hill, W. by S.

The soundings off Island Bay, and between it and East Island, vary from 20 to 40, and upwards of 100 fathoms, with rocky patches here and there of 6, 7, and 12 fathoms.

FLAT ISLAND, lying $6\frac{1}{2}$ miles E.N.E. of Bivouac Point, is 12 miles in extent, North and South, low, and covered with trees. It is separated from a sandy tongue projecting from Casuarina Point on the main, by a channel 4 cables wide, in which there are 8 fathoms. On its N.E. face a coral spit runs off nearly half a mile.

Together with the main land, a small bay is formed on the western side of the island, where good shelter from N.E. winds may be found in 5 and 6 fathoms, mud, with Crawford Point, the S.W. extremity of Flat Island, bearing S.E., and Emmeline Island, the southernmost of some small islands just detached from the opposite shore, S.W. by W.

Emmeline Island is bold to approach, but off Crawford Point the reef, which fronts the South and western shores of Flat Island, extends 4 cables, and has 8 and 9 fathoms close to the edge.

A reef commencing at the sandy tongue, projects 6 cables' lengths to the southward of Casuarina Point, close to which there are 8 fathoms.

Casuarina Point is in lat. $9^{\circ} 15' N.$, long. $118^{\circ} 24' 16'' E.$

Caution is necessary in going into this bay, as it has been only partially sounded. No watering place was found in it.

Tides.—It is high water in this vicinity, full and change, at midnight, and on the following day at $9^h 30^m$ a.m. Rise of tide $6\frac{3}{4}$ ft.

SAND ISLAND lies E. $\frac{1}{2}$ N. 5 miles from Casuarina Point, and $3\frac{1}{4}$ miles from the nearest part of Flat Island. It is one-quarter of a mile in extent,

covered with wood, and surrounded by a reef, dry at low water, which, on the eastern side, extends half a mile from the island, with from 6 to 12 fathoms close to the edge.

The soundings outside Flat and Sand Islands vary from 20 to 40 fathoms, mud; in their immediate vicinity the depths are 10 and 12 fathoms, mud, decreasing gradually to the shore. Shoaler casts, such as 6 and 7 fathoms of sand and coral, here and there, may always be anticipated.

S.W. $\frac{3}{4}$ W., distant $1\frac{1}{2}$ mile from the centre of Sand Island, is a $5\frac{1}{2}$ -fathoms patch of coral, with 14 fathoms, mud, on either side.

30th of June Island, lying N.E. by N. $8\frac{3}{4}$ miles from Sand Island, and $2\frac{1}{2}$ miles off shore, is similar in all respects to Sand Island, the reef on the East side extending only 4 cables' lengths.

Maltby Island, nearly as large, and of the same description as Flat Island, lies 4 miles to the N.N.E. of the 30th of June Island, being separated from the shore by a channel one mile wide, but which has not been sounded.

Two dry sand-banks with reefs lie between these islands, the depth of water in the vicinity being from 4 to 7 fathoms, and there is a reef awash N.W. three-quarters of a mile from 30th of June Island.

A rocky spit also extends 4 cables' lengths from the S.W. point of Maltby Island.

The Coast opposite these islands partakes of the same features as that farther to the southward, being low and thickly wooded. Victoria Peak, 5,680 ft. above the sea (page 545), overlooks it, and the mountain range, which presents some deep gorges and picturesque valleys, is fronted by an extensive and deeply wooded plain, the hills not approaching the sea until near Table Head, which is low, and nearly 12 miles N.E. by N. of Maltby Island. On the North side of Table Head is a small inlet for boats.

Village Bay, in which are a few huts, 2 miles to the northward of Maltby Island, is small, and a coral patch, 6 cables in extent, N.W. and S.E., occupies its centre. Off the South point of the bay are two islets connected with the shore by a reef, and a reef fronts the coast for a mile from the point on the North side.

Water.—There is a good fresh water stream 5 miles to the south-westward of Table Head, and 2 miles to the southward of S.W. hill, near where the range forms part of the coast line.

The *Soundings* off this part of the coast are exceedingly irregular.

East, 6 miles from 30th of June Island, there is a bank of sand and coral upwards of 5 miles in extent, on which the least water that has been discovered is $6\frac{1}{2}$ fathoms; immediately outside there are no soundings with 80 fathoms; the depths inside the bank vary from 12 to 20 fathoms.

Three and a Half Fathoms Patch.—Rocky ground also extends in a northerly direction from this bank, where, at the extremity, is as little as $3\frac{1}{2}$ fathoms, perhaps less. This patch lies East of Village Bay about $2\frac{1}{4}$ miles from the

shore, and from it the south-eastern extreme of Maltby Island bears S.W. $\frac{1}{2}$ S.; the huts in Village Bay, W. $\frac{2}{3}$ N.; Dome, a conspicuous hill on the ridge which connects Table Head with the Victoria range, N.W. by W. $\frac{1}{4}$ W., and Table Head, N. by E. $\frac{3}{4}$ E.

At $1\frac{1}{2}$ mile to the eastward of this patch there is no bottom with 120 fathoms, but at 4 miles to the north-eastward of it there are 105 fathoms water, $2\frac{1}{2}$ miles from the shore, with 30 fathoms immediately inside. The bottom is distinctly visible when on these banks.

PORT ROYALIST has its entrance $4\frac{1}{2}$ miles north-eastward of Table Head; and Tide-pole Point, the inner extreme point of low land on the North side, is in lat. $9^{\circ} 43' 43''$ N., long. $118^{\circ} 43' 11''$ E. It is formed in an extensive densely wooded plain, fronting a high mountain range to the S.W. of Mount Peel, of which Mount Beaufort and Thumb Peak (page 546) are conspicuous. The latter, when seen from the S.E., appears a remarkable steep conical mountain, with a knob on the summit, and it bears N.W. by W. $\frac{1}{2}$ W. from the entrance of the harbour. The entrance is a strait nearly 3 miles long and 2 miles wide, in a W.N.W. direction, being almost at right angles to the prevailing winds in both monsoons.

Coral spits project from both the outer points, which contract the channel at the entrance to 1 mile in width. The South spit extends 7 cables' lengths from the shore; while the North projects only 4 cables, and parts of both dry at low water.

The reefs forming these spits extend along the coast outside, and have 12 and 13 fathoms close to the edge; that on the North has several dry patches.

In the strait the depth is 25 fathoms, mud, which decreases as the head of the harbour is approached to 4 and 5 fathoms close to the reef.

There are two inlets on the South side of the strait; the eastern has a rock at the entrance lying off a red cliff, which when first seen may be easily mistaken for some native huts. The western and largest is upwards of $1\frac{1}{2}$ mile deep, and has a coral spit projecting nearly 4 cables' lengths from Heron Point, its North entrance point.

There is deep water in both these inlets, but their entrances are very much contracted by coral.

From the inner part of the strait the harbour extends 3 miles in a northerly direction, and is 2 miles wide. The North and western shores are chiefly mangrove, the former being broken up into bays and inlets, all of which are shoal and fronted with coral.

E-wi-ig River disembogues on the western side of the harbour, to the northward of apparently a deep mangrove bay, and has a small island at the entrance, W. by N. 2 miles from Tide-pole Point.

This river is navigable for boats about $2\frac{3}{4}$ miles; half a mile farther up is a small village, which in 1850 contained about forty or fifty persons, chiefly

Bysayans, carrying on a small traffic, beeswax, rice, maize, &c, with some of the contiguous settlements. They were quite harmless, and willing to give ships supplies, but unable to do so, being in a wretched state of poverty and filth.

After heavy rains the river is fresh almost at the entrance; but in the dry season boats must go some distance up to get the water good.

Mud dries at low water nearly three-quarters of a mile from the entrance, through which are two boat channels diverging from either side of the island at the mouth of the river.

Harbour Island lies off the largest opening on the North shore of the harbour; and besides being connected with the shore by reefs, has a rocky spit, and some detached coral patches extending nearly a mile from it in a southerly direction, having upon its extremity a rock nearly awash with 6 fathoms close to.

Anchorage.—Between the end of this spit and Buckle Point, three-quarters of a mile N.N.W. of Tide-pole Point, a distance of two-thirds of a mile, is the best place to anchor in the N.E. monsoon. In the other seasons, vessels may lie farther to the southward.

Vessels bound to Port Royalist, and wishing to remain at anchor outside for the night, will find the most convenient place somewhere abreast of Bryson Point, 3 or 4 miles to the northward of the entrance, in 10 or 15 fathoms water, about 2 miles off shore.

Directions.—The soundings off Port Royalist are deep, there being no bottom with upwards of 100 fathoms of line; and it is not until a vessel approaches within a mile of a line joining the points at the entrance that ground is struck, when from 120 fathoms the depths suddenly decrease to 20 and 30 fathoms, sand. This change is sometimes marked by a ripple line on the surface.

The only part of the harbour that is bold to approach is the shore on the northern side of the strait, from about half a mile inside the point to Buckle Point. There is, however, a spit between the latter and Tide-pole Point, extending 2 cables off, the edge of which is generally well defined by the light green water over it.

In proceeding into Port Royalist do not approach either shore near the entrance within a mile, until abreast of the opening.

When Tide-pole Point is seen midway between Thumb Peak and Mount Beaufort, bearing about N.W. by W., the vessel will be in the fairway, and may then be steered direct for it.

Tide-pole Point in line with Thumb Peak, N.W. by W. $\frac{3}{4}$ W., leads *just* clear of the North spit, and the same point in line with Mount Beaufort, bearing N.W. $\frac{1}{2}$ N., clears the South spit.

Having passed the spits, keep the northern side of the strait on board; and when abreast of Tide-pole Point, in 17 or 20 fathoms, haul gradually to

the northward for Buckle Point, keeping upwards of 3 cables' lengths from the shore, and anchor in from 9 to 12 fathoms, mud, about this distance W.N.W. of the latter point.

It is recommended not to go beyond half a mile to the northward of Buckle Point, as the channel between the reefs gets very narrow, and a $1\frac{1}{2}$ -fathom patch lies 6 cables N. by E. $\frac{1}{3}$ E. of it.

Vessels working in or out of Port Royalist should not approach either the South side of the strait or harbour nearer than half a mile.

During easterly winds a heavy swell sets into the strait, which breaks violently on the reefs, and also across the bay to the southward of the river.

DEEP BAY.—From Port Royalist the coast trends a little to the westward of North for 12 miles, and then E.N.E. for 25 miles, to Bold Point, the angle of the bight forming what the old navigators called Deep Bay.

This bay corresponds with Ulugan Bay on the opposite side of the island, the plain intervening, on either side of which Mount Peel and the Cone are conspicuous, being only 5 miles across; and in approachidg Deep Bay from the westward, Mounts Herschel and Airy appear as two islands between Mount Peel and the range to the southward.

Four low coral islands, covered with wood, lie in a direct line N.E. by E. $\frac{1}{3}$ E. and S.W. by W. $\frac{1}{3}$ W. nearly equidistant across the bottom of this bay, and between these and the shore is another group, consisting of four islands and some reefs and dry sand patches, all of which have been but imperfectly delineated and sounded.

Castle Point, on the North shore of Deep Bay, in lat. $9^{\circ} 59' N.$, long. $118^{\circ} 55' 51'' E.$, probably so called from a small rocky protuberance (a characteristic feature of the Cleopatra range) on the brow of the hill over it, is the commencement of a bold range which borders the coast to Green Island Bay. At $2\frac{1}{2}$ miles westward of Castle Point is a small river, navigable for boats, and there is also a stream of fresh water three-quarters of a mile eastward of the point.

E.N.E., 14 miles from Castle Point is Bold Point, with a double hill immediately over it, forming the N.E. extremity of Deep Bay, and is, as regards both the aspect of the land and depth of water near it, quite what the name imports.

Ramesamey and Mackesy Islands.—Ramesamey, the south-westernmost of the former group, mentioned above, lies in a bed on the western side of Deep Bay, a mile from the shore, and $8\frac{1}{2}$ miles to the northward of Port Royalist. It is surrounded by a reef extending off one-quarter of a mile, and there is a small Tuft Island S.E. by S. three-quarters of a mile from it.

Mackesy, the next island to the E.N.E., of similar form, and $3\frac{1}{2}$ miles from Ramesamey Island, is three-quarters of a mile in circumference, and appears to have no reef round it.

Meara and Fraser Islands, both apparently bold to approach, lie inshore

of the above, fronting the opening in the mangrove, on the West of which, near the coast, is a hill range of reddish aspect.

A reef, partly dry at low water, lies half a mile to the S.E. of the North point of the inlet, and a bush islet close to the shore, a mile to the northward of it.

There are depths of 3 and 4 fathoms inside Ramesamey and Meara Islands, and 10 fathoms near the entrance of the Mangrove Inlet.

Reef Island, lying 4 miles to the E.N.E. of Anchorage Island, is, including the reef that surrounds it, upwards of a mile in extent N.N.E. and S.S.W., and the same distance N.W. and S.E., and there is a small sand-bank, dry at low water, at 3 cables' lengths from its S.W. extreme.

A *rocky bank*, nearly dry at low water, $1\frac{3}{4}$ mile in a N.E. and S.W. direction, lies halfway between the two latter islands, to the northward of which, and between Reef Island and the shore, a distance of $3\frac{1}{2}$ miles, are two of the four islands composing the inner group, with a dry sand-patch off the outer extremity of each. The depth of water between the rocky bank and Reef Island is 11 and 12 fathoms.

Anchorage Island, $2\frac{1}{2}$ miles in circumference, the north-easternmost and largest of the group, has a reef fronting the eastern side, which at low water dries off 3 cables' lengths, and a rock awash at nearly three-quarters of a mile from the N.W. point. The channel inside this island is almost blocked up by two reefs, with dry sand-patches on each, and a shoal spit which extends half a mile from Castle Point.

Between the latter and Anchorage Island are depths of 12 and 17 fathoms.

Soundings.—There is a bank off Deep Bay with 5 fathoms on it, upwards of 2 miles in extent, lying nearly in a direct line between Port Royalist and Bold Point, and S.S.E. $6\frac{1}{2}$ miles from the body of Anchorage Island.

Fronting the group of islands, a little to the southward, the soundings vary from 8 to 12 and 23 fathoms.

A bank with 17 and 27 fathoms over it lies $5\frac{1}{2}$ miles S.E. of Bold Point; but within 2 miles of the coast to the westward of the point, there are no soundings with upwards of 170 fathoms; nor is ground obtained at this depth (unless within 3 cables' lengths of the shore, where there are 30 fathoms) all along the coast, until 3 miles S.E. of Anchorage Island, when it changes suddenly to 6, 9, and then 20 fathoms.

Constancia Shoal, the general extent of which is unknown, was discovered by a Spanish vessel of that name. It had $8\frac{1}{2}$ fathoms on it, sand and coral, where first sounded on, but the depth increased to 11 fathoms about 1 mile to the N.W., and again decreased from that depth in a W.S.W. direction. The shoal part lies about E. by S., 15 miles from Bold Point, which places it in lat. $9^{\circ} 58\frac{1}{2}'$ N., long. $119^{\circ} 24\frac{1}{2}'$ E.

Pasig Shoal, of 5 fathoms, is placed in the chart 9 miles S.E. of Constancia Shoal, in lat. $9^{\circ} 50'$ N., long. $119^{\circ} 31'$ E.

GREEN ISLANDS.—From Bold Point the hills forming the coast range take a northerly direction; and at 3 miles to the northward of the double hill over the point, on the same range, is Bold Peak, upwards of 3,000 ft. above the sea.

The sweep of the current, either round this point or from Green Island Bay, appears to have detached a portion of the low land, which now forms North and South Green Islands, together nearly 4 miles in length, and two smaller islands to the northward, fronting the East side of Bold Peak.

Pascoe Channel, the channel inside the Green Islands, through which the current in the month of June was observed running at the rate of $3\frac{1}{2}$ knots an hour to the northward, is from 1 to 3 cables wide. Reefs lie either side of this channel. Off a point on the mainland to the southward of the entrance, the coral extends 4 cables' lengths, and there is a rock awash with 7 and 8 fathoms close to, immediately in the opening to the northward.

The depth of water about a mile outside North Green Island is 27 and 28 fathoms, but there is a 2-fathom patch E. by S. this distance from its North extreme.

GREEN ISLAND BAY, to the N.E. of the Green Islands, has several low coral islands, with extensive reefs and numerous sand patches in it.

At Cliff Point, 11 miles N.N.E. of North Green Island, a ridge of low hills, called the Barbacan Range, joins the coast, and behind these is a higher range in the body of the island, with some double summits and long table spurs or shoulders.

Barbacan.—A small river disembogues at $5\frac{1}{2}$ miles north-eastward of Cliff Point, and it is shoal off the entrance, where the surf breaks heavily at times. On the right bank, at half a mile up, is the small village of Barbacan. From Barbacan the northern shore of Green Island Bay trends about E. by N. for $10\frac{1}{2}$ miles to *High Point*, a bold headland forming the north-eastern limit of the bay. At 2 miles from the river is Barbacan Point, and close to the sea, at 5 miles beyond, is a conical shaped hill called *Bay Peak*, rising to a height of 1,800 ft.

Mount Baring, in lat. $10^{\circ} 24' 55''$ N., long. $119^{\circ} 32' 56''$ E., and N.E. 33 miles from Bold Point, rises directly over High Point to an elevation of 2,100 ft. *Johnson Island*, the outer of the S.W. portion of the group in Green Island Bay, lies N.E. 19 miles from Bold Point, and $4\frac{1}{4}$ miles from the shore. A *bank*, consisting of sand and coral, $1\frac{1}{2}$ mile in extent, East and West, dries at low water $2\frac{1}{4}$ miles S. $\frac{1}{2}$ W. of the island. There is also some rocky ground with 4 fathoms, and 18 and 20 fathoms, mud, close to, with the island bearing N. by W. $\frac{3}{4}$ W. distant $3\frac{1}{2}$ miles.

Howley, Stanlake, Flat, and Shell Islands lie inshore of Johnson Island; *Howley*, the south-western and innermost, is N.N.E. $7\frac{1}{4}$ miles from North Green Island, and $1\frac{1}{2}$ mile from the shore, with a reef between; and there

is a sand-bank S. by W. $\frac{1}{4}$ W. $1\frac{1}{2}$ mile from Howley Island. *Stanlake* and *Flat* islands are the two largest in the bay.

A sand-patch lies $1\frac{1}{2}$ mile to the eastward of Stanlake. *Shell* island is N. $\frac{1}{2}$ E. 3 miles from Johnson Island, and between it and Barbican. It has a shoal extending one-third of a mile from its north-western side, and a sand-patch at 6 cables' lengths to the south-westward. *Green Island*, the outermost of the N.E. portion of the group, lies E. $\frac{3}{4}$ N. $6\frac{1}{4}$ miles from Johnson Island, and S.W. by S. from High Point.

Reef Island, from the East side of which coral projects three-quarters of a mile, lies W.N.W. $2\frac{1}{2}$ miles from Green Island, and N.W. by W. $\frac{1}{2}$ W. $4\frac{1}{4}$ miles from Johnson Island; midway between it and Shell Island is a sand-bank and reef.

Hog Island, lying 3 miles N. by W. $\frac{1}{4}$ W. of Green Island, and the same distance from the shore, is $1\frac{1}{2}$ cable in extent, with a *rock awash*, East, northerly, 1 mile from it.

The Coast beyond High Point takes a N.E. direction for 12 miles to Endeavour Point, which is low and densely wooded. Midway between is *Squall Point*, from which a range runs nearly North to the coast at the same distance on the other side of Endeavour Point, having *Drake Peak*, a sharp hill 1,300 ft. above the sea, on the southern part, and a double peak 1,400 feet high to the northward of it.

Illan.—Two miles to the northward of High Point is a small river, with a village similar to that of Barbacan, called *Illan*, on the right bank, half a mile from the entrance. The river is fresh at the village.

Dry Sand-banks.—Two reefs lie off this part of the coast. The outer, which is a mile in diameter, and has a dry sand-bank in the centre, is $4\frac{1}{2}$ miles from the shore, and E. $\frac{3}{4}$ N. $6\frac{3}{4}$ miles from High Point. The other is $2\frac{3}{4}$ miles inshore of it, and has also a sand-patch, which, as well as that on the outermost reef, shows at all times. Reefs and sand-banks extend nearly 2 miles off the coast to the northward of this.

DUMARAN ISLAND, separated from Endeavour Point by a channel $1\frac{1}{4}$ mile wide, is about 42 miles in circumference, and not more than 600 feet above the sea in any part. It is of irregular form, and has no very remarkable features by which to distinguish it, the hills being apparently nearly of the same elevation, and, with the exception of a few in the neighbourhood of the settlement on the North shore, and near the North part of the island, are thickly wooded.

There is an inlet on the S.E. face running 3 miles into the body of the island, with 5 fathoms water near the head; and at the eastern extremity of Dumarán is an island connected with the shore by a sandy isthmus, East of which, nearly 6 miles, is a small wedge-shaped island called *Trepang*.

Three small islands front this part of the coast; the S.W. and largest, called *Christmas Island*, lying 4 miles East of the opening of the inlet above

mentioned. S.W. about $1\frac{1}{2}$ mile from the summit of it is a 3-fathom patch of coral, and there is also one with 4 fathoms at 8 cables' lengths N.W. of the same. At $4\frac{1}{2}$ miles S.W. of Christmas Island, abreast of Green Point, the South point of the inlet, is a rocky bank with only 4 fathoms on it. Also S.W. of Green Point, fronting an opening, is a $2\frac{1}{2}$ -fathom patch, lying $1\frac{1}{4}$ mile from the shore.

Barton Point, the S.W. extremity of Dumarán, has a spit with $2\frac{1}{2}$ fathoms water on it, projecting $1\frac{1}{4}$ mile to the westward.

Coral Shoal.—Nearly midway between Barton Point and the inner dry sand-patch already noticed as lying off the coast between High and Endeavour points, is a coral shoal with only 3 fathoms, and perhaps less, over it. From it South Hill, Dumarán, bears E. $\frac{3}{4}$ N. ; Endeavour Point, N. $\frac{1}{2}$ W. ; and Drake Peak, N.W. by W. The soundings in the immediate vicinity of this shoal are 12 and 15 fathoms.

DUMARAN.—The Spanish settlement of Dumarán, next in importance to that of Tai-tai, is $4\frac{1}{2}$ miles to the northward of Barton Point, and in the bottom of a small bay immediately opposite Endeavour Point. The fort stands on a hillock close to the landing place in lat. $10^{\circ} 32' N.$, long. $119^{\circ} 45' 51'' E.$, and in 1850 was in a dilapidated condition, the terre plain, on which a few pieces of old iron ordnance were mounted, being partly constructed of nebang, supported by poles, about 25 ft. from the base of the building. A church forms part of the interior arrangements of the fort. The village is prettily situated in the rear amongst some cocoa-nut trees, and there is a considerable tract of land in the interior under cultivation.

Supplies.—Ample supplies, such as rice, maize, sweet potatoes, tobacco, and cotton are raised, both for the consumption of the inhabitants and for the purposes of traffic. Pigs, goats, and fowls are also plentiful, but an extravagant value is put on them.

There is not any eligible watering-place in the bay.

Anchorage.—Shelter from N.E. winds will be found on the West side of Dumarán in from 9 to 12 fathoms, mud, S.S.W. of the bay where the settlement is.

COOK CHANNEL is the passage between Dumarán Island and the shore of Palawan, and has its southern entrance between Endeavour Point and a rocky spit with a sand-bank on it, dry at low water, extending to the southward $1\frac{1}{3}$ mile from the West point of Dumarán.

The tides set rapidly through the channel, and it should not be attempted by a sailing vessel, unless under peculiarly favourable circumstances.

From Endeavour Point the island of Palawan takes a sudden trend in a N.N.W. direction, and the coast assumes an entirely different character, being fronted by numerous islands and rocks, not one of which partakes of the features of those farther to the southward.

Dampier Point bears N. by W. $\frac{3}{4}$ W., distant 9 miles from Endeavour Point,

and forms the western extremity of the bay mentioned above. *Point Peak*, a sharp peak 960 ft. above the sea, and others of less elevation, immediately over it, joining the range noticed on page 578.

Of the islands in the northern entrance of Cook Channel, the three largest lie on the eastern or Dumarán shore, in a N. by E. and S. by W. direction. *South Channel Island* is 2 cables' lengths West of the southernmost of these three, and is connected with it by a reef awash in some parts at low water.

A rock awash lies apparently in the centre of Cook Channel at 3 cables' lengths from the edge of the reef on the S.E. side of South Channel Island, with the summit of the large island N.N.W. three-quarters of a mile, and Endeavour Point W.S.W. the same distance.

Goat Island, the northernmost on the eastern side of Cook Channel, is N.N.E. $2\frac{1}{2}$ miles from South Channel Island; it is 380 ft. in height above the sea, and has a rocky head just detached from the North extremity.

A 3-fathom coral patch lies W. $\frac{3}{4}$ N. 1 mile from the summit of this island, with 15 and 16 fathoms close to.

Reef and Bivouac Islets.—On the West side of Cook Channel are four small and one larger island. The latter, 200 ft. above the sea, lies nearly West about 2 miles from the centre island on the opposite side, and fronting it are the Reef and Bivouac Islets.

Bivouac Island, 160 ft. high, lies half a mile to the N.N.E. of Reef Islet, is bold to approach, and has a small rocky head on the N.E. side, with 4 fathoms close to it.

North Channel Island is 6 cables' lengths to the N.W. of Bivouac, and from it a reef projects 2 cables in a N:E. direction.

Barren Island, lying to the N.E. of Dampier Point, and separated from it by a channel 2 miles wide, in which there are 23 fathoms, is a narrow island, $2\frac{3}{4}$ miles long, North and South, and 720 ft. in height. It is of a rocky, barren aspect, with comparatively few trees growing upon it.

There is a 3-fathom patch S. $\frac{1}{4}$ E. 8 cables' lengths, and one with the same depth E. by S. $1\frac{1}{4}$ mile from the South extreme of Barren Island, the two being in line with Dampier Point bearing S.W. by W. $\frac{3}{4}$ W.

Water.—A stream in the above-mentioned bay, difficult to distinguish unless close to the beach, was the only eligible place discovered on this part of the coast for watering, which here is a tedious operation if not supplied with long hoses. In the absence of these the natives were found willing to fill the casks and float them off on bamboo rafts, constructed especially for the purpose, at the rate of 75 cents per tun. If the latter expedient be adopted, patience is indispensable.

Tides.—It is high water, full and change, at Barren Island, at 9^h 30^m a.m.; low water at 5 p.m.; rise of tide $5\frac{3}{4}$ ft.

CARLANDAGAN ISLANDS.—The Carlandagan group, lying E.N.E.,

distant 16 miles from the N.E. extremity of Dumaran Island, is composed of two large islands, and three smaller islets or rocks.

Carlandagan, the southernmost island, is 3 miles in extent from North to South, and has a high precipitous conical head to the South.

Maducang Island, 926 ft. high, lies N. $\frac{1}{2}$ E. of Carlandagan, the channel between, in which there are $10\frac{1}{2}$ fathoms, being 6 cables wide. A small island called *Indong* is connected with the shore on the S.E. side, and to the eastward $3\frac{3}{4}$ miles is *Bird Island*, with a remarkable white rock $2\frac{1}{2}$ miles N. by W. of it.

High water, at full and change, occurs at the Carlandagan group the same time as at Barren Island, 32 miles to the westward; rise of tide 6 ft.

The *Coast*.—Immediately opposite Barren Island, and on the North of Point Peak, is an inlet $3\frac{1}{2}$ miles deep, with two islands at the entrance, the largest of which, called *Shadwell Island*, is $1\frac{1}{2}$ miles from the shore.

A *rocky patch*, with 3 fathoms water on it, lies S.E. $\frac{1}{4}$ S. one mile from the summit of Shadwell Island.

SOUTH TAI-TAI ISLAND bears N.W. by N., distant 6 miles from the North extreme of Barren Island, and is separated from the South point of the bay of Tai-Tai by a channel barely a mile wide, with 19 fathoms in it. The highest part of the island is elevated 610 ft. above the sea. A rock awash lies rather more than three-quarters of a mile from the shore on the East side; and at the S.E. extremity of the island is a small spit, with an islet and a white rock near it.

Midway between this island and the North extreme of Barren Island, is a bank nearly a mile in length, E. by S. and W. by N., with 3 and 4 fathoms, coral, upon it.

TAI-TAI BAY is nearly 10 miles wide and 5 miles deep, and is capable of affording good shelter, in the S.W. monsoon. Its western shore corresponds with the eastern side of Malampaya inner sound, the distance across in some parts not exceeding 4 miles.

A high range overlooks both shores, and that portion which separates the N.W. part of Tai-Tai Bay and bottom of Bacuit Bay has an abrupt shoulder 1,680 ft. above the sea, and some remarkable sharp hunch peaks on it, giving rise to the appellation of Shark-fin range. Four islands lie across the entrance of Tai-Tai Bay, extending in a northerly direction from South Tai-Tai Island.

Tai-Tai Fort, lat. $10^{\circ} 50' N.$, long. $119^{\circ} 30' 56'' E.$, in the S.W. angle of the bay, is the principle settlement of the Spaniards on the island of Palawan. From their own account, they first planted themselves here in 1600. The permanent fortress, which now stands on the extremity of a narrow isthmus (nearly isolated at high water), on the eastern side of the small bay where the village is, was commenced in the year 1710, and, as recorded in the interior of the building, finished in 1738. The fort, which had been allowed

to fall into a dilapidated state, was, under the energetic Alcalde, Antonio Gimenez, an officer in the Spanish Royal Engineers, put in an efficient condition. The garrison in 1850 consisted of about 200 soldiers, Manila men, and there were 17 gunboats attached to the station.

The population at the same period was said to be about 600 souls, consisting of Bysayans and half caste Manila people, over whom are placed the Alcalde, or governor of the province, and seven European Spanish officers, including a padre.

Supplies.—The usual supplies, such as pigs, goats, fowls, vegetables, &c., are to be obtained in moderate quantities, and there were some cattle seen in the interior.

Water here, as elsewhere on this coast, is not plentiful, that is, such as can with facility be procured with ships' boats.

From Tai-Tai the shore of the bay takes a northerly direction. At 2 miles is Tai-Tai Head, and $3\frac{1}{2}$ miles beyond is a bush island, just detached from the shore, with a boat channel inside. A reef awash lies $1\frac{3}{4}$ mile off a little to the southward of this.

Polarican.—There is an islet on the North side of a small opening in the reef, 8 miles to the northward of Tai-Tai, which leads to a rivulet of fresh water, and where, on a hill overlooking it, is a stockade and a small settlement, called Polaricon, prettily situated amongst some cocoa-nut trees.

Silanga Bay, which is 2 miles wide and nearly the same deep, has a settlement comprising a stockade and a few houses built upon a small isthmus head in the north-western shore and immediately under a shoulder peak, 1,700 ft. above the sea, called Silanga Peak.

Shelter from N.E. winds may be had in Silanga Bay in 12 and 15 fathoms, West of Smooth Hill, taking care to keep rather on the eastern side, as the shore on which the settlement is, is fronted by coral half a mile off.

Old Castle Point, having the Lion Rock S.S.E. 4 cables' lengths from it, a high precipitous limestone formation, the N.E. limit of Tai-Tai Bay, may also be considered the S.E. point of Silanga Bay. Vessels proceeding into Silanga Bay should haul close round Lion Rock (a steamer may pass into it) in order to avoid the Royalist Reef, and enter to the N.E. of Silanga Islands, keeping a good look-out for discoloured water.

North Tai-Tai, the southernmost island immediately fronting Tai-Tai Bay, is North nearly a mile from South Tai-Tai Island. *Elephant Island* lies about a quarter of a mile to the northward of Castle Island, and has a reef awash at three-quarters of a mile to the eastward. *Snake Rock*, about 60 ft. high, lies to the eastward, distant $3\frac{1}{2}$ miles from the summits of these three islands, which bear respectively S.W. by W. $\frac{1}{4}$ W., W. $\frac{1}{2}$ S., and W. $\frac{1}{2}$ N.

There is a *bank* with 2, 4, and 6 fathoms coral over it, about a mile in extent, N.E. and S.W., lying to the north-westward of Snake Rock.

South Passage Island, $1\frac{1}{2}$ mile in length North and South, lies in the offing

of Tai-Tai Bay, $7\frac{3}{4}$ miles N.E. by N. of South Tai-Tai Island, and nearly 5 miles S.E. by S. of Old Castle Point.

Iguano, the northernmost island in the entrance of the bay, is $5\frac{1}{3}$ miles to the westward of South Passage Island and N. $\frac{1}{2}$ W. nearly $2\frac{3}{4}$ miles from Elephant Island. There is some rocky ground, on which the *Royalist* struck, $1\frac{1}{2}$ miles to the eastward of Iguano.

Dumbell is a remarkable double headed island with a rocky islet a cable off its S.E. point, W. $\frac{3}{4}$ N. $4\frac{1}{4}$ miles from Iguano, and $2\frac{1}{2}$ miles E.N.E. of Polarican. A small double island also lies W. $\frac{3}{4}$ S. nearly 3 miles from Iguano, and between is a rock, with 15 ft. water over it.

A coral patch with 9 ft. on it lies N.N.W. $\frac{1}{4}$ W. nearly a mile from Dumbell Island.

The *Silanga Islands*, three in number, lie off the entrance of Silanga Bay, each being surrounded by a reef barely a cable in extent; but to the S.E. of the centre island there is a patch lying 3 cables' lengths from it.

Tides.—It is high water, full and change, in Tai-Tai Bay, at 9^h 30^m, and the rise of tide is $5\frac{3}{4}$ ft.

Fronting Castle Peak Peninsula is a group consisting of four large and several smaller islands.

Collinson Island, the S.E. and smallest of the four, $3\frac{1}{2}$ miles in circumference, lies nearly East 5 miles from Castle Peak, and has to the N.W. of it *Dome* (1,020 ft. above the sea), and *Montero* Islands, each being separated from the other by a channel from 2 to 4 cables wide.

Gimenez Island, the largest of the group, $3\frac{1}{2}$ miles in circumference, is a mile to the northward of Montero, from which several small islands extend in a northerly direction towards Knob and Triple, and Smith Islands.

Eight cables E. by N. $\frac{1}{4}$ N. of a remarkable red cliff rock on the East side of Dome Island, is a *rock awash*.

It is recommended not to take the passages between the islands forming this group, as they have been but imperfectly surveyed, although the soundings around are deep, viz. 20 and 30 fathoms.

Three-Fathoms Patch.—Some islets lying on the North side of this peninsula have also reefs off them; N.E. $\frac{1}{4}$ N. $1\frac{1}{2}$ mile from the easternmost of which, and S. $\frac{1}{4}$ E. $1\frac{1}{4}$ mile from Pigeon Island, is a 3-fathoms coral patch.

SHARKSFIN BAY, immediately to the northward of Castle Peak Peninsula, is $2\frac{1}{2}$ miles wide at the entrance, and is formed on the North by an island (connected at low water with the shore), 5 miles in extent, on which are two remarkable peaks, called Knob and Triple. Reefs from the northern shore stretch nearly halfway across the entrance.

SMITH ISLAND, $13\frac{1}{2}$ miles to the northward of Collinson Island, and 5 miles north-eastward of Knob and Triple Island, is $2\frac{1}{4}$ miles in extent, having at the South point a remarkable rocky lump, 60 ft. high, three-quarters of a

mile S.E. of which is a rocky islet, resembling in form somewhat that of a bishop's mitre.

ILOC or **AUSTIN ISLAND**, lying $1\frac{3}{4}$ mile N.W. of Smith Island and $6\frac{1}{2}$ miles East of Santa Monica, is 4 miles in extent N. by E. and S. by W., and has, off its N.E. extreme, a smaller island with a rock out of water in the middle of the channel separating them. The western side of this island appears bold to approach, the depths within half a mile being 16 and 17 fathoms. It has, however, been but partially sounded.

CLEOPATRA ISLAND lies North $2\frac{3}{4}$ miles from the eastern side of Knob and Triple Island, 4 miles to the westward of Smith Island, and $3\frac{1}{2}$ miles from the shore. It is $2\frac{1}{2}$ miles in extent, has an undulating summit, and some detached rocks out of water, off the North point. A coral spit projects to the eastward 4 cables' lengths from the South point of the island, to the southward of which, lying respectively at half and one mile from it, are two rocks out of water.

The *Coast* of Palawan between Knob and Triple Island and Santa Monica, about $7\frac{1}{2}$ miles to the northward, is fronted by rocky ground, which in some places extends upwards of a mile from the shore.

North and South rocks, always above water, lie off it, in a N. by W. and S. by E. direction, $2\frac{1}{2}$ miles apart, the latter being 2 miles from the shore, and nearly $2\frac{1}{2}$ miles North of Knob and Triple; in a direct line between these rocks are two patches of 3 and $3\frac{1}{2}$ fathoms, coral, with 10 and 16 fathoms outside.

Santa Monica, the northernmost settlement of the Spaniards on the East coast of Palawan, is situated in a small bay immediately under East peak, (page 566), the stockade being built on a small projecting head, with a few houses at the back amongst some cocoa-nut trees. The population in 1850 was about 100, and in other respects the station is similar to those previously described.

Darcotuan Bay.—Darcotuan Point, forming the South extremity of the bay of that name, is N. by W. $2\frac{1}{2}$ miles from Santa Monica, and has a small rock close to it, from which Cabuli Island, off the North point of Palawan (described in page 567), is distant nearly $5\frac{3}{4}$ miles to the N.N.E.

Bay Island occupies a central position in this bay, about a mile from the shore, and has on the South side some reefs which stretch nearly two-thirds of the way towards Darcotuan Point. Reefs, awash, also extend 8 cables' lengths in a northerly direction from the latter, with 13 fathoms close to.

In the northern part of the bay are the North and South Brother Islets, lying a mile to the S.E. of the opening between Cabuli and Palawan. The depth immediately outside them is 25 fathoms, but in the direction of Bay Island it is only 12 fathoms, mud.

CHAPTER XIV.

NORTH-WEST COASTS OF THE PHILIPPINE ISLANDS, ETC.

IN this chapter the N.W. coasts of the important archipelago the Philippine Islands will be described. The island of Palawan also belongs to the same archipelago. The latter, as before mentioned, has been regularly, though not completely, surveyed by Captain Bate. Our descriptions of the coasts to the northward of this, which form the eastern limit of the China Sea, is chiefly derived from the charts drawn up under the superintendence of Don Antonio Morata, of the Spanish Royal Navy, who was at the head of the hydrographic commission appointed to collect the information upon this portion of the Spanish possessions. To these charts and the resulting remarks some additions have been made by other officers, as quoted and arranged in the ensuing pages, which are derived from the China Sea Pilot, vol. ii.

The general features of the Philippine Islands will be described in a future chapter, only that portion limiting the China Sea being here alluded to.

HASTINGS ISLAND, lying 7 or 8 miles eastward of the North point of Palawan, between it and Linacapan, is $2\frac{1}{2}$ miles in extent N.W. and S.E., and has several summits, the highest being near its South extremity, where, just detached from the point, is an islet head and some rocks awash. Immediately off the N.W. point is a somewhat flat cliffy head, called Base Cliff, and to the northward of the island, between it and Square-top group off Observatory Island, are two peaked islets.

LINACAPAN ISLAND is the largest of an extensive group lying between the N.E. coast of Palawan and the Calamianes, distant 11 or 12 miles from the former. It is about 10 miles in extent, East and West, and has on the North side two deep bays, with several islands and rocks lying off their prominent points. In the eastern bay are several steep conical heads; and

in the S.W. corner is the Spanish settlement of St. Nicholas, comprising a stockade and a few houses. There are 19 fathoms water at a mile from the settlement; but the approach to the bay has not been sounded, and no part of the southern face of the island has been examined.

Several islands and peaked rocks lie between the North side of Linacapan, and Calamion Island; and to the south-eastward there are also some small groups of islands.

Observatory Island, lying E. by N. $\frac{1}{2}$ N. 10 miles from Cabuli, is the north-westernmost of the Linacapan group. It is 758 ft. above the sea, and when first seen, on making Palawan from the northward appears like a conical hill. The island is $1\frac{3}{4}$ mile in extent, N.N.W. and S.S.E., and has at its North extreme a saddle head, with a slip or water-course down it, connected by a low neck of land, on either side of which are sandy bays.

A small rocky point, where observations were usually taken, in the bay on the West side of Observatory Island, is in lat. $11^{\circ} 30\frac{1}{4}'$ N., long. $119^{\circ} 39' 33''$ E.

The channel between Observatory Island and Linacapan is barely $1\frac{1}{2}$ mile wide, and has upwards of 30 fathoms water. A strong current (depending in velocity and direction on the prevailing winds) will be found usually setting through it.

Square Top Group.—Four islands and some peaked rocks, so called, lie off the S.W. face of Observatory Island, S.S.W. 3 miles from the largest of which is Hastings Island.

Base Reef, lying N.W. by N. nearly $3\frac{3}{4}$ miles from the high part of Observatory Island, is about the size of a large boat, and between it and the saddle head are two rocks awash.

Tides.—It is high water, one day after full and change, at Observatory Island at 11^h ; maximum rise observed, $5\frac{1}{4}$ ft. The half tides in the month of May occurred during the day.

The **CALAMIANES** are a group of high islands lying between the N.E. end of Palawan and Mindoro, and extending between the parallels of $11^{\circ} 39'$ and $12^{\circ} 20'$ N., and the meridians of $119^{\circ} 47'$ and $120^{\circ} 23'$ E.

Busuagan or Busuanga, the largest island of the group, is about 34 miles in extent, N.W. by W. and S.E. by E., and 18 miles at its broadest part. It is very irregular in form, being indented with numerous deep bays. The islands and reefs which front its N.E. side, form the western side of Northumberland Strait.

Calamian or Culion Island lies off the S.W. side of Busuagan, from which it is separated by a strait about 3 or 4 miles wide in its narrowest part, and in which are numerous islands, rocks, and shoals. Calamian is 19 miles long, N. by W. $\frac{1}{2}$ W. and S. by E. $\frac{1}{2}$ E., and its greatest breadth, near the middle of the island, is nearly 10 miles. It is also of very irregular shape on the side next Busuagan, but its western side, which alone concerns the

ordinary navigator, is nearly straight, in the direction of the greatest length of the island. Close to the south-western extreme is *Dicabaito*, a small island which is distant nearly 10 miles from the nearest part of Linacapan ; between them lie the numerous small islands and peaked rocks previously mentioned.

Upon the West side of Calamian, in lat. $11^{\circ} 45' N.$, is a small island at the entrance of a narrow inlet or harbour running into the island in a north-easterly direction about 5 miles. A reef, with some rocks above water upon it, projects about a mile to the south-westward of the island. A little over 3 miles N.W. by W. from the island is an islet or rock, surrounded by a reef, which is nearly 2 miles distant from the nearest shore.

Islands and Dangers Westward and Northward of the Calamianes.—*Galoc* is the name of a long narrow island lying close off the north-western extreme of Calamian. It is surrounded by a reef which projects from its south-western end nearly a mile. Close off its northern part, and about a third its size, is an island named *Popototan*, from the western point of which a reef extends more than a mile to the south-westward.

From Popototan a chain of islands and dangers extends across the strait which separates Calamian from Busuagan, and other islands and dangers extend several miles to the northward ; it is, however, only the outer of these that concern the ordinary navigator.

Isla Verde, *Green Island*, or *Nalaut*, in lat. $12^{\circ} 3' N.$, long. $119^{\circ} 47' E.$, and the westernmost island hereabout, is of moderate height, covered with trees, and visible 15 miles off ; it is surrounded by a coral reef, extending about one-third of a mile. About 3 or 4 miles N.W. of the island the *Discovery* got overfalls on a coral shoal, but did not find less than 5 fathoms ; to the eastward of the island 23 fathoms were found, and 9 and 10 fathoms close to the reef.

The *Haycock*, in lat. $12^{\circ} 9' N.$, long. $119^{\circ} 48\frac{1}{2}' E.$, is a high rocky island, about 2 miles off the western part of Busuagan, and may be seen 18 or 20 miles. About $2\frac{1}{2}$ miles West of the Haycock soundings of 26 fathoms were found, with overfalls, 19 fathoms about 6 miles off, and 30 fathoms about 11 miles off.

Elet is the name of a $2\frac{1}{2}$ -fathom patch, which lies close to the westward of two small islets, joined by a reef to a point of the N.W. part of Busuagan, N. by E., distant about 4 miles from the Haycock.

Escollo del Pinnacle, *Pinnacle Rock*, in lat. $12^{\circ} 19\frac{1}{2}' N.$, and about 2 miles West of the North point of Busuagan, is a very sharp rock above water, having 25 fathoms water about 2 miles westward of it, and 12 fathoms about a mile off.

Calavite, *Dimipac*, or *High Island*, in lat. $12^{\circ} 21\frac{1}{2}' N.$, long. $119^{\circ} 53\frac{1}{2}' E.$, by Captain Ross, I.N., lies about 2 miles to the northward of the North point of Busuagan. It is a small island, not quite 2 miles in extent, and the

channel between it and Busuagan does not appear to be free of danger, as some rocks were seen above water eastward of the island.

About a mile north-westward of Calavite Island are rocks above water, one of which, named *Sail Rock*, is very remarkable; and $1\frac{3}{4}$ mile north-westward of this lies a large black rock, named *N.W. Rock* or *Dichilem*, in lat. $12^{\circ} 24\frac{1}{2}'$ N., long. $119^{\circ} 52'$ E. When passing between these the *Discovery* had 38 fathoms, and about 2 miles N.N.E. of N.W. rock, passed over a coral spot in 8 fathoms.

Calocoto, or *North Rock*, in lat. $12^{\circ} 28'$ N., long. $120^{\circ} 1\frac{1}{2}'$ E., is of a dark slate colour, no trees, has two lumps, and when closely approached, appears excessively rugged, having three others a short distance westward of it. It is the northernmost of the islands which lie on the East side of Busuagan, and may be seen 13 or 14 miles from the deck.

Soundings.—The charts exhibit no soundings within 20 miles of the West side of Calamian, but beyond that distance are irregular soundings, 19 to 54 fathoms. In lat. $11^{\circ} 52'$ N., long. $119^{\circ} 26'$ E., is a patch of 9 fathoms, with other patches, 12 to 15 fathoms, within a few miles of it. The soundings near the islands westward and north-eastward of the Calamianes have been given with the description of those islands. They are also very irregular, 17 to 30 fathoms, with patches of 5 and 8 fathoms, and it would appear necessary to be on the lookout for shoal water when navigating in this locality.

A doubtful patch of 5 fathoms is shown on the charts 14 or 15 miles to the northward of the North point of Busuagan, in about lat. $12^{\circ} 35'$ N., long. $119^{\circ} 52'$ E.

Mindoro Strait.—*Dangers in the North Entrance*—Between the parallels of $12^{\circ} 35'$ N. and $12^{\circ} 34'$, there are four banks at the North entrance of Mindoro Strait, which were examined in November and December, 1872, by the Spanish gunboat *Mindoro*.

Hunter Shoal—The most western of the above, named Hunter Shoal, is in lat. $12^{\circ} 40'$ N., long. $120^{\circ} 15'$ E. The part on which the sea breaks is a flat rock about a cable in extent. It trends N.N.W. and S.S.E. for the distance of 2 cables, with 12 fathoms water on it, but at its South end it has but 8 feet at low water. Around it are depths varying from 24 to 64 fathoms. From it Mount Calavite bears N. by E. $\frac{1}{2}$ E., and Apo Islet E. 1° S., which places it in lat. $12^{\circ} 40'$ N., long. $120^{\circ} 9'$ E.

Merope Shoal lies $5\frac{1}{2}$ miles N.E. of Hunter Shoal. From the centre of the bank, Mount Calavite bears N. by E.; Apo Islet S.E. by E.; and Mount Tundalara, S. 2° W.; which places it in lat. $12^{\circ} 43' 29''$ N., long. $120^{\circ} 13' 22''$ E.

Rosamel Bank, 7 miles N. by E. from Merope Shoal, could not be found. It is probably Hunter Bank, for on sounding on its assigned position, and over a radius of 4 to 5 miles, no bottom was found with 90 fathoms of line.

Bajo De Apo or Appo Shoal, lying between the West coast of Mindoro and the island of Busuagan, was examined by the Spanish surveying ships, and also by the British ships *Discovery* and *Investigator*, under the command of Captain Ross in 1813. Its northern extremity is in lat. $12^{\circ} 45' N.$, long. $120^{\circ} 29' E.$; from thence the shoal extends S.E. by S. $7\frac{1}{2}$ miles, where it forms a very narrow spit or East point, in lat. $12^{\circ} 40\frac{1}{4}' N.$, long. $120^{\circ} 34' E.$; from the East point the southern extreme bears S. $35^{\circ} W.$, distant $5\frac{1}{2}$ miles, and between the two points there are several gaps in the shoal, having 9 ft. water. On the western side there are two islands, *Apo* and *Menor*. Apo, the western one is largest, being about half a mile in diameter, and covered with trees; white beaches line its northern and eastern sides, and a surrounding reef projects about half a mile. About $1\frac{1}{2}$ mile E.N.E. of it Menor a small rock on the western edge of Apo Bank was formerly called Little Apo, and is surrounded by reefs; off its N.W. end is an elevated rock covered with trees. Between Menor and Apo is a wide, practicable channel.

Apo is in lat. $12^{\circ} 39' N.$, long. $120^{\circ} 26' E.$; from its centre the North part of the shoal bears N. $24^{\circ} E.$, distant 7 miles; the eastern point E. $9^{\circ} N.$, 8 miles; and the South point S. $56^{\circ} E.$, $6\frac{3}{4}$ miles.

Towards the middle of Apo Bank, at the North end, are two cays, close to each other, and visible some distance.

The whole extent of Apo shoal is 10 miles from its North to the South point, and 9 miles from its East point to the western part of the large island. There are two high black rocks N.E. of the small island, which may be seen about 6 miles off, and the islands in clear weather are visible from an elevation of 20 ft., about 10 miles. At low water many small rocks are dry on the shoal, particularly along its North side.

Ships intending to pass between the coast of Mindoro and the Appo Shoal in the night, should keep about 6 miles off the small islands near Pandan Point, as the eastern point of the shoal is narrow, and should the wind be westerly, it would not readily be perceived, nor would there be breakers to make known the approach to danger.

Discovery Bank.—The centre of this bank is in lat. $12^{\circ} 41' 13'' N.$, long. $120^{\circ} 37' 10'' E.$, with Point Sablayan bearing N.E. by N.; the North islet of Pandan N.N.E. $\frac{1}{3} E.$; the South islet of Pandan N.N.E. $\frac{2}{3} E.$; Mount Calavite N. by E. $\frac{1}{2} E.$; Apo Islet W. $\frac{1}{2} S.$; and Mer or Islet W. $\frac{1}{3} S.$ The bank is very narrow, extending $1\frac{1}{4}$ mile North and South, with 9 fathoms over it, and no change in the colour of the water. The spot was found with difficulty, as the natives knew nothing of it. The *Mindoro* anchored on it, but saw no signs of breaking; there was a slight stream of current visible.

The **WEST COAST of MINDORO ISLAND** has no soundings off it excepting in the bays, or within 1 or 2 miles of the shore in some places. In the interior double and treble chains of mountains extend through the island, and some low points of land project from them into the sea.

GARZA BAY, formed between points Buruncan and Ilim or Ylin, the South extremes of Mindoro and Ilim Islands, affords excellent anchorage and shelter from northerly winds at the mouth of the strait in 10 or 12 fathoms. Garza Island and its extensive shoal also offers shelter from strong easterly gusts. About 3 miles to the W.N.W. of Buruncan Point is a *rock awash*, and $3\frac{1}{2}$ fathoms on its southern side.

The strait between Ilim and Mindoro is free from dangers, but owing to the prevalence of light airs should not be attempted without a fair wind. Caution must be used when entering Garza Bay from the northward by this strait, for the spit off Mindoro shoals suddenly from 10 to 3 fathoms. Keep the channel well open, therefore, borrowing rather on Ylin until Garza is nearly locked in by the eastern point, then haul easterly, anchoring in 12 fathoms.

This neighbourhood, particularly Mangarin, the principal settlement of Mindoro, had been reported, by a Spanish officer who had commanded a gunboat, to abound in stock, water, &c., and much attention was directed to these matters, as likely to be of importance to vessels making this passage from Batavia, Macassar, or Basilan Strait. Indeed, it is immediately off this place that the *Young Queen* was fallen in with, distressed by want of water, which might have been readily obtained at Ylin without inconvenient delay had the coast been known. No inhabitants were noticed in Garza Bay.

MANGARIN or Mangarim Bay.—H.M.S. *Samarang* passed through the strait, between the S.W. part of Mindoro Island and Ylin Island, anchoring off Mangarin Bay, the *Royalist* being moored within the sandy tongue, which is in lat. $12^{\circ} 20' N.$, long. $121^{\circ} 2' 8'' E.$

The interior of the bay is very shoal, and the settlement, $1\frac{1}{2}$ mile N.E. of the spit, only accessible to light boats. There is no inducement to visit Mangarin; little was offered, and that excessively dear, and water fit for consumption was not found; indeed, the marshy, unhealthy location should be avoided.

ILIM or Ylin Island fronts the S.W. part of Mindoro, covering a space of 10 miles in a N.N.W. and S.S.E. direction. The South extreme is bold-to on all its faces. Hence easterly, with the previous warning for the tail of the Garza Shoal, no dangers are known. Northerly, the passage up to the town by the channel is safe, if it can be run with a free wind; but it is safer to pass outside Ambolon, bearing in mind that the tail of the southern shoal, lying off the latter island, is exactly on the line of contact of Ilim and Ambolon extremes at the moment that Ambolon outer point shows clear of the smaller attached island. Indeed, the reef with this warning is so manifestly to be seen that no excuse will warrant the oversight, notwithstanding the deep water between it and the island.

Supplies.—The town of Ilim or Ylin will be found in lat. $12^{\circ} 15' N.$, one mile to the northward of Ambolon Island. A reef extends seaward half a

mile, off which, with the southern large house bearing East, good anchorage will be found in 10 fathoms. A channel, staked by the natives, leads up to the settlement, where a stream delivers itself into the sea; but much sweeter water was found trickling over a cliff just round the town point to the southward, to which the boats had easier access, and from which H.M.S. *Samarang* was readily completed with water. Of the other source, a most excellent run of water was found, but used for all purposes by the people, and difficult to embark, excepting at high tide, owing to the shore being dry at least a cable's length from the mouth of the stream. Fowls, eggs, grain, and vegetables were procured at reasonable prices. Cattle were stated to be abundant at Mangarin, but of this we have already remarked.

AMBOLON ISLAND.—The dangers on the sea-board of this island are all visible, and easily avoided.

On the meridian, or $2\frac{1}{2}$ miles North of Ambolon, a shoal as well as a tongue spitting to the W.N.W. from Ylin must be avoided; and 5 miles North, two coral banks, one dry at low water, cover the entrance to Mangarin Bay.

The safe channel in, will be found by passing the northern dry patch on its northern side, and the next dry patch ($2\frac{1}{4}$ miles easterly) on its South, anchoring the moment the channel between Ylin and Mindoro is fairly open.

Pandan Islands.—The position and configuration of these islands, which lie off the coast of Mindoro, in $12^{\circ} 50' N.$, were verified by the *Mindoro*. During the S.W. monsoon there is shelter to the N.E. of them; but when seeking it, go North of them, or between the two,—never South of them.

Port Sablayan, one of the few harbours on the West coast of Mindoro; has anchorage which may be recommended. Here, vessels of any size can obtain good shelter at all times except with the winds from S.W.; but even with these, small craft can lie under the lee of the reefs, and large and small vessels alike may anchor in safety outside the harbour, North of point Sablayan, between the Pandan Islands and the coast.

PALUAN BAY, at the N.W. end of Mindoro (House Cliff), was examined by the late Capt. W. T. Bate, R.N., of H.M.S. *Royalist*. It affords excellent shelter in the N.E. monsoon, and is also a convenient place for vessels to obtain supplies when passing through Mindoro Strait. The bay is 5 miles wide at entrance, of a semicircular form, running back 3 miles in a northerly direction. There are no dangers in it. Reefs, dry at low water, extend a quarter of a mile from either point of entrance, having deep water close to them. The soundings at the entrance are from 45 to 50 fathoms, half a mile to the southward of which they increase to 200 fathoms.

The best anchorage is in the north-eastern extremity of the bay, in 14 fathoms (to which the water suddenly shoals from 20 fathoms), less than a mile from the beach, and West from a small isolated head, upon which a

hut is erected. There is a black rock close to it, standing a few yards in front of a sandy beach, which shows in good relief. The bottom consists of a black tenacious mud, from which it is difficult to extricate the anchor after it has been down a few days.

Water.—A small river disembogues immediately on the North side of the cliff, where good water can be obtained with facility; and on the beach there is plenty of drift-wood. The coral projects half a mile from the entrance of the river, and has 10 and 12 fathoms close to its edge.

Caution.—Care must be taken when beating into Paluan Bay, for the squalls come violently off the high land, are very sudden, and at night do not give the least warning.

CAPE CALAVITE, the north-western extreme of Mindoro, is in lat. $13^{\circ} 26'$ N., long. $120^{\circ} 18'$ E. Between it and Paluan Bay there are soundings near the shore, which is bold to approach. The few rocks interspersed along this part of the coast, adjacent to the cape, lie close in, and one of them, just above water, has a sandy beach adjoining, upon the projecting part of the coast that forms the cape. Over this point stands Calavite Mountain, which is of regular sloping form, and visible at a great distance in clear weather.

Flying Cloud Rock.—The ship *Flying Cloud*, on the 7th of April, 1854, is reported to have struck on a sunken rock, with from 6 to 12 ft. water on it, and about 30 or 35 ft. in diameter; it is said to lie in lat. $13^{\circ} 28'$ N., long. about $119^{\circ} 34'$ E.

LUBANG ISLANDS.—Lubang, extending about 16 miles nearly N.W. and S.E., is the largest island of a detached group that fronts the S.W. end of Luzon and the N.W. end of Mindoro; it is high in the middle, but low at each extreme. Navigating-Lieutenant Phillips, H.M.S. *Vigilant*, 1863, remarks that the northern part of Lubang is very low land, and when coming from the southward, the northern extreme of the high land in the centre may be mistaken for the end of the island. *Ambil* or *Amul*, to the eastward of it, is a high conical mountain, about 2,500 ft. high. *Golo Island*, a high but long narrow strip of land, 8 miles W.N.W. and E.S.E., with reefs off its N.E., East, and S.E. points, adjoins the south-eastern extreme of Lubang. The northern part of Lubang is lined by a reef, on which the Company's ship *Regent* was driven and wrecked, after having struck on one of the shoals off the S.W. end of Palawan, where she lost her rudder.

Löoc Bay, on the East side of Lubang, is thus described by Sir E. Belcher,—"On the eastern end of Lubang Island, and covered by *Ambil* Island, is the very snug port of Löoc, which affords safe retreat in the event of accident in passing Calavite, or during the passage by the strait of Bernardino. It is pretty free from dangers at the mouth, and good holding ground will be found in depths between 10 and 20 fathoms. Within the former depth it suddenly shoals, and several lines of coral ledge bar the inner depths of the

bay from direct access, although excellent shelter would be found by a vessel moored between these barriers, to which they might easily be conducted. At the village a brisk rivulet supplies most excellent water, but boats cannot fill except at high water.

In approaching the bay caution must be observed, as a $3\frac{1}{2}$ -fathom patch is marked on the chart about $2\frac{1}{2}$ miles to the eastward of the southern horn of the bay. Water, as well as wood, are easily procured, but bullocks, stock, vegetables, &c., are at the same (or higher) prices as Manila.

Another port was indicated on the North side of Lubang. It was cursorily viewed by the *Samarang* in passing, and appeared to be merely sheltered by a reef running parallel to the coast. It might afford shelter to a steamer, but ingress and egress, unless in very favourable weather, owing to its being on a lee shore, is problematical to a sailing vessel. The village is termed *Tagbach*, and may afford supplies to passing vessels which send their boats. It was reported to be a gunboat rendezvous.

Northward of Ambil are some rocks, and the islets of *Mandani* and *Malacatuán*. To the northward of these islets are shoal patches, but the least water over them appears from the chart to be 6 fathoms, the soundings round about being 36 to 50 and 90 fathoms. Westward of Ambil, and 2 or 3 miles from the northern shore of Lubang, are two rather extensive shoals, named *Ambil* and *Afuera Banks*.

Cabra or Goat Island, the south-western extreme in lat. $13^{\circ} 52\frac{1}{2}'$ N., long. $120^{\circ} 2\frac{1}{2}'$ E., is the outer or westernmost island of the Lubang group, and its S.E. point nearly joins the N.W. end of Lubang; it is a low, flat, woody island, about 200 ft. in height, and very even, with a reef of foul ground projecting from its North end. Sir E. Belcher remarks:—"Some doubt existing as to the true position and the dangers reported to extend off this island, a day was devoted to establish this turning point of the navigation of these seas."

"The *Samarang* grazed the island on its eastern side, rounding to and anchoring off its southern face. The distance usually observed in passing land is the only question to be noticed here. No dangers requiring express caution exist. It has also been passed by the *Samarang*, very close on the West side, much within the range that any merchant vessel could try, without the appearance of danger. In the voyage of H.M.S. *Sulphur*, it is observed,— "Both the *Starling* and *Sulphur* shaved the surf-line of Cabra without obtaining soundings; therefore the dangers reported to lie to the northward of this island are incorrectly stated."

The Channel Eastward of the Labang Islands, and also between them and Mindoro, is frequented by the Spanish ships, when going to or coming from Manila. The *Samarang* beat through this channel easterly, and Sir Edward Belcher remarks,— "It is important to remind seamen that from about 4 to

6 a.m. those who frequent this coast state that sudden heavy squalls may be expected off-shore, and as vessels are compelled to carry a press of sail to make progress, they should shorten before they attempt Calavite; and this especially applies to close working to get through the channel between it and Lubang. Even with caution a flurry took two jibbooms in succession between 6 and 10 a.m. The advantage gained by this channel, which is free from dangers as to pilotage, was manifest, as it enabled us, having cleared the channel at 3 p.m., to reach the entrance of Manila Bay with a free wind at 10 p.m."

MINERVA ROCK.—Ships passing eastward of the Lubang group and approaching the S.W. point of Luzon, called Cape Santiago, should be careful to avoid the Minerva Rock, which seems not to have been noticed by navigators, until the *Minerva*, of Alioa, Capt. Robertson, bound from Sydney to Manila, struck on it at 2 a.m., September 10th, 1834, although an American ship had been wrecked on it several years previously. It is said to be a coral rock, having 17 fathoms water near it, and bearing from Cape Santiago S.E. $\frac{1}{2}$ E., distant 4 or 5 miles.

FORTUN ISLAND, in lat $14^{\circ} 2' 45''$ N., long. $120^{\circ} 28' 34''$ E., is shown on the chart as about a mile in extent, with some rocks off its eastern side. Sir E. Belcher observes,—“The island is safe to, and, like Cabra, requires but the seaman’s attention.”

SIMO BANK.—In about lat. $14^{\circ} 4' N.$, long. $120^{\circ} 16' E.$, 14 or 15 miles northward of the Lubang group, and 12 or 13 miles W. $\frac{3}{4}$ N. from Fortun Island, is a bank 4 or 5 miles in extent, with 7 to 11 fathoms water over it, and irregular soundings, 21 to 109 fathoms, near it.

SOUTH-WEST COAST of LUZON.—We have no description of the land between Cape Santiago (the South extreme of Luzon) and Manila Bay, and this part of the coast is quite out of the ordinary track of vessels proceeding up and down the China Sea. The coast line appears by the chart to take from Cape Santiago a north-westerly direction for 4 or 5 miles, when it trends 10 or 11 miles to the northward to San Diego Point, which appears to be low and sandy. This latter part is fronted by a reef which projects in places more 2 miles from the shore.

Fuego Point bears about N. by W. 10 miles from San Diego Point, and just to the northward of the latter is Lian Bay, and about midway between the points is the anchorage and town of *Nasugbu*. Two or three miles southward and south-westward of Fuego Point, fronting a small bay, are several islets and rocks.

From Fuego Point the coast line takes a direction about N. by E. to Limbones Island, which lies close off a point of the main; in this space are some bays and islets, with anchorages off them. From Limbones the coast falls back to the north-eastward, forming the southern part of Manila Bay.

The soundings off this part of Luzon are deep and irregular, 30 to 100 fathoms, and afford but little or no warning when approaching the dangers, close to which are 17 to 60 fathoms; consequently the navigator will have to approach the coast with proper care and caution.

MANILA.

MANILA BAY.—This large inlet is about 30 miles in extent each way, and the land on both sides is high. The city of Manila, standing on its eastern shore, about 25 miles from the entrance, is the capital of Luzon, one of the largest of the Philippine Islands, and the seat of the Spanish Government in the East. The city is large and convenient for trade, the country adjacent producing excellent indigo, sugar, tobacco, hemp for cordage, &c.; but the inhabitants around are indolent. The cigar factories are numerous, several thousand of women working in each. Its chief dependence was formerly on the trade to Acapulco, carried on in two or three ships, which usually sailed in March or April from that place, and arrived at Manila in August or September, but not always regular; now, however, it has a considerable trade with all parts of the world.

The imports of Manila are chiefly British manufactures, linens and cottons, hardware, and articles of British produce; French and German toys and goods, wines, &c. Its exports are sugars, rice, hemp, tobacco, hides, and cotton; a small quantity of coffee, indigo, rhubarb, native cloths, and hats. In 1875, 86 British ships (chiefly from Hong Kong and Australia), or 57,687 tons, entered at Manila; 111 Spanish ships, or 32,316 tons; and 65 foreign ships, chiefly American, or 53,966 tons.

During the months of June, July, and August, the air of Manila is rendered impure by noxious exhalations arising from the swampy land around; and the weather being sultry, with much rain at times, febrile complaints are then likely to appear.

The N.E. monsoon blows strong out of Manila Bay at times, accompanied by a cloud resembling smoke, which is driven out of the bay to the S.W., and forms an arch in that horizon, when the sky is otherwise clear; but sometimes sea-breezes from the S.W. blow into the bay in the N.E. monsoon after mid-day, increasing in strength as you advance into the bay.

The harbour is formed by two piers at the mouth of the River Pasig. A bar lies off the river's mouth covered by 11 feet at low and 14 feet at high water. The harbour itself has as much as 25 feet of water. The channel over the bar runs from the end of the northern mole S.S.W., diagonally across the mouth of the river, and is marked by *two red conical buoys*, which must be passed close-to.

A small *green light* visible seaward between the bearings N.W. and S.E. is shown from a red iron stand on the battery of the South mole head, and a *red light* visible 8 miles from a circular white tower on the North mole head. These lights bear North and South from each other, and that on the North mole head is in lat. $14^{\circ} 36' 7''$ N., long. $120^{\circ} 57' 20''$ E.

Supplies.—Coal of all kinds may be purchased. *Water* can be purchased, but as the water boats have to be sent 5 or 6 miles up the river, timely notice must be given. The water in Manila, excepting the rain preserved in tanks, is brackish and very hard. Fresh beef is or was very bad, being spoiled in the killing. If much be required, the bullocks should be purchased and killed on board. Vegetables are not plentiful.

“The stay at Manila was sufficiently long to prove how very unsuitable a port it is for refitting a ship and recruiting the men; compelled, as the ship is, to anchor at a distance of nearly 2 miles from the shore, with a temperature ranging from 75 to 85 degrees, with an oppressive atmosphere, the temperature of the water being constant at 82 degrees. The public houses open to the crews are dens of infamy, in which the men are hounded, robbed, and turned into the streets, without any chance of obtaining remedy, owing to the insufficiency of the police.”—J. E. Davis, H.M.S. *Challenger*, Nov. 1874.

THE ENTRANCE OF MANILA BAY is divided by some islands into two channels, known respectively as the North and South channels.

Corregidor, or Mariveles Island and Lighthouse, the principal island in the entrance, lies over towards the North shore, and is $3\frac{1}{4}$ miles in length East and West. A Lighthouse 60 feet high stands on its highest point, in lat. $14^{\circ} 23' 5''$ N., long. $120^{\circ} 33' 30''$ E., and exhibits at an elevation of 639 feet above the sea a *white light*, which *revolves every half minute*, and is visible in clear weather at 20 miles. A *fixed white light* is shown from the white tower on the West mole head. There is fresh water to be procured under a steep cliff at the western end of the island, but the landing is on a stony beach, and inconvenient.

Pulo Caballo and Lighthouse.—Pulo Caballo is a high bluff rock 639 feet high, of considerable size, partially covered with verdure, lying about three-quarters of a mile southward of Buri Point, the eastern extreme of Corregidor. A *fixed white light* is exhibited from the low spur on the N.E. part of the rock, 27 ft. above high water mark, and is visible 6 miles. It is *concealed by high land to seaward* between the bearings of S.W. by S. and W. by S., and *screened towards the North shore* between the bearings of N. by E. and N.W. by W. $\frac{1}{2}$ W.

Sangley Point Light.—A *fixed white light* is shown on the eastern shore of Manila Bay, elevated 29 ft. above high water and visible 7 miles off, at Sangley Point, the outer extreme of the low land at the entrance of Port Cavité.

Soundings of 50 to 40 fathoms will be got when within 7 or 6 miles of

Corregidor, decreasing gradually to 27 or 26 fathoms about 2 miles to the westward of it.

Between Corregidor and the North shore the depths are 50 to 48 fathoms within a quarter of a mile of the island, 26 fathoms in mid-channel, decreasing quickly to 16 or 15 fathoms, stony ground, within half a mile of the North shore.

La Monja, the *Nun*, or *Haycock*, is a high rock, bearing from Corregidor Light W. $\frac{3}{4}$ S. distant 3 miles, with 27 fathoms water within a quarter of a mile of it all round. The soundings from it decrease regularly to 29 fathoms within a quarter of a mile of the North shore, and deepen to 29 or 30 fathoms near the N.W. part of Corregidor, close to which there is a perforated rock.

FULTON ROCK.—This danger lies about a quarter of a mile off the northern shore of the entrance, N. by W. $\frac{1}{4}$ W. from Corregidor Lighthouse. There appears to be 6 to 11 fathoms near the rock, and 5 to 6 fathoms between it and the shore. The North shore, several miles north-eastward of it, is fronted by rocks, and about 3 miles north-eastward of the Fulton is or was a *bell buoy* to warn ships to avoid the dangers which lie off Caucave Point.

El Frayle, the *Friar*, rock or islet, which appears like a sail, lies $3\frac{1}{4}$ miles S. $\frac{1}{2}$ E. from Caballo Light, and nearly 2 miles from the South shore of the bay. Close around it are depths of 10 and 11 fathoms, increasing to 17 and 23 fathoms at a short distance to the westward.

A 3 fathoms' patch lies 3 miles N.W. of Point Marijondon, the nearest land, and 4 miles from the Friar.

PORT MARIVELES, on the North side of the entrance to Manila Bay, is about a mile wide and $1\frac{1}{2}$ mile deep, with good anchorage, sheltered from all but S.E. winds. Vessels of any size may moor here, and procure excellent water. Some rocky islets, called *Los Cochinos*, with a rock awash just outside them, project half a mile off the S.W. point of entrance. Vessels may anchor in 17 fathoms, with the village bearing N.W. by W., or they may run farther into the bay if necessary; the bottom being good holding ground and the anchorage safe. This is a convenient place for ships to touch at when in want of wood and water, the former being an expensive article at Manila.

St, Nicolas Banks are two shoals lying midway between Caballo Island and Port Cavité. The outer shoal, nearly a mile in extent, is the larger of the two, and has but 5 feet water on its shoalest part. From its outer or northern edge in 11 feet water, Corregidor Light bears W. by S. $\frac{3}{4}$ S., and Cavité Church E. by N. $\frac{1}{2}$ N. Within a ship's length to the north-westward there are 13 and 15 fathoms water, the soundings being no guide in approaching it, because the bank is so steep. A buoy was placed on this shoal, but had disappeared when H.M.S. *Nassau* was here in 1871.

CAVITE, on the eastern shore of Manila Bay, is the port and marine arsenal of Manila, where ships are built, and to which those are hove down that want repairs, it having excellent conveniences for that purpose. The town is well fortified, and stands on a low point of land, which forms a good harbour or cove, the deepest water in which appears to be $3\frac{1}{2}$ fathoms, soft mud, with shelter from West and S.W. winds. As the water in the wells here is brackish, the inhabitants are supplied with fresh water from the river by Old Cavité.

ANCHORAGE IN MANILA ROAD.—A good berth is in 7 fathoms, stiff mud, with the church of Santo Domingo (white, with two square towers, an excellent mark for entering or leaving the bay) bearing E.N.E. $\frac{3}{4}$ E.; light on North mole, N.E. by E. $\frac{1}{2}$ E.; an isolated cloister to the right of the town, E.S.E. $\frac{1}{2}$ E.; and the light-tower at Cavité, S. by W. This anchorage is only 2 miles from the town, and has the advantage of a fair wind for boats to and from the mouth of the river. Large ships generally anchor at Cavité Harbour. Sir Edward Belcher observes, that anchorage may be taken up anywhere among the shipping, but the best and most convenient is in 5 or 6 fathoms, having the flagstaff of the garrison gate open to the right of the convent dome, which is within the walls. This position enables boats to fetch off under canvas, against the fresh afternoon breezes, when a very unpleasant sea prevails, which not only renders pulling in laden boats laborious, but entails wetting, a matter in tropical climates to be specially avoided, irrespective of damage to light goods.

Tides.—It is high water, full and change, in Manila Bay, at $10^h 40^m$, and springs rise about $2\frac{1}{2}$ ft. The tides are irregular; with an easterly wind, the ebb runs out 18 hours together, between Corregidor and the North shore pretty strong; the flood about 6 hours to the eastward, sometimes weak, at other times with considerable strength.

Directions.—If intending to enter Manila Bay by the North channel,—when about 6 miles to the westward of Corregidor, steer for it; with a fair wind the common passage is between it and the Haycock, afterwards on the North side of Corregidor. From hence to Manila the course is N.E. by E. $\frac{3}{4}$ E., distant 25 miles, and to Cavité E. by N. $\frac{1}{2}$ N. 22 miles. To avoid San Nicolas Shoals, keep the Haycock open of the northern part of Corregidor bearing W.S.W. until the steeple of Cavité Church bears East, and a remarkable hummock, which stands close to the sea upon a point of land on the North shore, W.N.W.; being then clear of the shoals, steer for Cavité or Manila at discretion.

In the fair channel, between the shoals and the North shore of the bay, the depths are 17 and 18 fathoms, decreasing gradually towards that shore to 5 and 4 fathoms; and in steering eastward, the depths also decrease regularly to 5 fathoms off Cavité, where ships anchor a little more than a mile off shore in that depth, the bottom all stiff mud.

In using the channel northward of Corregidor, care must be taken not to near the North shore under a mile, in order to avoid the Fulton Rock and the dangers fronting that part of the coast. It appears from the chart that the Haycock kept to the westward of S.W. $\frac{1}{4}$ W., will lead clear of these dangers.

South Channel.—When the wind is blowing from the eastward, out of the bay, the current runs out through the North channel to the westward; it is therefore proper at such times to adopt the channel between Corregidor and the South shore, there being more room in it to work to windward. To enter the bay by this channel, caution is requisite when the vessel is abreast Point Marijondon, the easternmost high land on the South shore, N.W. of which is the 4 fathoms patch before mentioned. The trail of the St. Nicolas Banks also trends away gradually towards this high land, and the water may shoal suddenly in approaching them from 12 to 7 or 6 fathoms, rocky ground. Do not, therefore, come under 13 fathoms when in their vicinity, and when to the eastward, keep the Haycock open with the northern part of Corregidor. From 15 fathoms water, the east may be 7, and then 8 fathoms on the verge of the St. Nicolas Banks, when the Haycock is shut in with Corregidor.

To avoid the St. Nicolas Banks at night, Corregidor Light must not be brought to the westward of S.W. by W. $\frac{3}{4}$ W.

Within three-quarters or half a mile of the eastern part of Corregidor there are 22 and 23 fathoms; and when it can be rounded, stand over for and work along the North shore, which has 15 or 16 fathoms at a quarter of a mile, and 10 or 12 fathoms about a cable's length off; although, in some places, the water shoals suddenly from 15 to 10, 7, and 5 fathoms, there is no invisible danger, and when past Corregidor, the North shore has good anchorage over a sandy bottom. Farther to the northward and eastward this shore becomes more flat, the soundings decreasing regularly from 10 to 8, 6, 5, 4, and 3 fathoms close in shore.

Sir Edward Belcher remarks, that it is customary to enter this bay by the passage between Mariveles Bay and Corregidor Island, but experience has proved that this practice is injudicious, that the wider channel easterly, where less tide prevails, is to be preferred, where the local or coasting pilot well knows, that by hugging the eastern coast of the bay or wide channel, a fair leading or working breeze will be experienced at times when calms prevail on the western side of the bay. As an instance of this, at 5^h 30^m a.m. on the 16th March, 1844, an American frigate was seen at dawn well to windward, taking the western channel. Fresh working breezes prevailed, and at noon the *Samarang* having beat up by the eastern channel, had brought El Frayle S.S.W. $\frac{1}{2}$ W. and Cavité Lighthouse E.N.E. In 12 hours, viz., at 5^h 30^m p.m. she was moored off Manila. At dawn the next morning the

American frigate was seen becalmed on the West side of the bay, and she did not anchor off Manila before 8 o'clock.

The only reason advanced for the custom before alluded to, is, that it is more convenient for the guard boat to communicate by the western channel, and the officer of the guard boat generally instructs vessels in an authoritative manner to adhere to routine, even to threaten if his directions are not obeyed.

Working up on the eastern side of Manila Bay, the chart furnishes sufficient warning as to where danger may be apprehended. The best leading mark for avoiding the San Nicolas Banks (until Cavité Lighthouse bears E. by N. $\frac{1}{2}$ N.) is never to open El Frayle to the westward of the more distant land to the southward. Nevertheless, it is prudent to hug that shore, on short boards, up to that limit, particularly about noon, or before 2 p.m., as the S.E. sea breeze first makes easterly, then southerly, off Cavité, which affords a fine lead to the anchorage of Manila.

The *Coast* from Mariveles Point, at the entrance of Manila Bay, takes a general direction nearly N.W. by W. $\frac{1}{2}$ W. for about 7 miles to Luzon Point, and is indented with several small bays; it then trends nearly North for about the same distance, and then north-westward for another 8 or 9 miles, thus forming a bight, named Bagac Bay, the town of Bagac being in the depth of it, in lat. $14^{\circ} 35' N.$ From the north-western extreme of this bay the coast line trends to the northward to Port Subig.

The *Coast* from Mariveles Point to Port Subig is in general equally steep, and may be approached to 1 or 2 miles in some parts; but it will be prudent to give it a wide berth, because rocks or foul ground extend 2 miles or more from some of the points.

PORT BINANGA, or Minangas, is the first bight to the southward of the entrance of Port Subig. Small vessels may anchor in 3 fathoms, sheltered from all winds excepting those at West and W.S.W.; the course into it is East and E. by N., about mid-channel between the points, to avoid the shoals projecting from them, and there are 4 fathoms, fine sandy bottom, inside, within a musket-shot of the shore.

PORT SUBIG has *Grande Island* at its entrance in lat. $14^{\circ} 47' N.$, long. $120^{\circ} 12\frac{1}{2}' E.$, to the westward of which is the safe passage into the port; for the passage to the eastward is intricate and lined by reefs. This port stretches 8 or 9 miles inland, and forms two excellent harbours, one on the East side, named Port *Olongapo*, or Olonapo, and the other at the northern extremity, opposite the village of Subig; here ships of any description may be sheltered from all winds in 7 to 10 fathoms, mud.

PORT SILANGUIN, in lat. $14^{\circ} 47\frac{1}{2}' N.$, long. $120^{\circ} 5' E.$, is about half a mile wide at entrance, and 2 miles deep, having tolerable shelter from all winds, but rather exposed to the N.W. and W.N.W. The southern part is formed by a high, round, bare hill, with a reef projecting from it about a

musket-shot to the northward; this must be avoided in steering East into the entrance of the port, where the depth is 30 fathoms, decreasing gradually to the anchorage a little inside, near the beach on the South shore, which is the best berth.

About $2\frac{1}{2}$ miles S.S.W. of the southern point of this port there are several rocky islets, called the *Three Friars*, with a coral reef projecting from them nearly a mile to the north-westward, and between these rocks and the shore there are 40 and 42 fathoms water.

There is a stream of *fresh water* at the bottom of Port Silanguin.

CAPONES POINT, in lat. $14^{\circ} 54' N.$, long. $120^{\circ} 3' E.$, is the most western point of this part of Luzon, and therefore important to vessels proceeding to and from China, and passing close to this coast. It bears from Cabra, or Goat Island, North, distant 60 miles, and is high, bare land, of reddish aspect, having two islands about 2 miles distant to the north-westward of it; the outermost of these, called Great Capones, is about one mile in length East and West, and nearly 3 miles distant from the shore. It has a sunken rock off its North side.

About a mile outside Capones Point the depth is 42 or 44 fathoms; from 40 to 35 fathoms will be found within a mile of the shore, between this part of the coast and the North part of Port Subig, and generally 45 to 50 fathoms about 3 or 4 miles off.

The *Coast* from Capones Point takes a general N. by W. $\frac{1}{2}$ W. direction for 33 miles, to the southern part of Palauig Point. A town named *Cabangan* lies about 7 or 8 miles northward of Capones Point, and another and more important town, named *Iba* or *Yba*, the capital of the province of Zambales, 6 or 7 miles southward of Palauig Point. A reef is also shown as lying about 2 miles off shore, in lat. $15^{\circ} 10' N.$, with several other dangers between it and Palauig Point. At 19 or 20 miles to the northward of Capones Point, is *Playa-Honda*, formed of a small hill, projecting a little into the sea; and the fort is 2 miles farther northward amongst trees, by which it is not easily perceived. The coast between them is of moderate height, with a level space of considerable extent northward of Capones Point; but inland, the country is formed of high double mountains, one of which has a small sharp peak upon it. About 2 or 3 miles off, the depths are 35 and 40 fathoms, and the shore is lined by coral reefs, stretching out nearly a mile in some places; about $1\frac{1}{2}$ mile from the beach there is a small coral bank, bearing S.W. by S. from Playa-Honda Fort, having 2 fathoms water, and close to it 10 or 12 fathoms. From Manila Bay entrance to lat. $15^{\circ} N.$ the land is generally high and mountainous. Here it begins to decrease in height; and near the sea in lat. $16^{\circ} N.$ is not much elevated.

PALAUIG POINT and BANK.—The southern part of this point is in about lat. $15^{\circ} 26\frac{1}{2}' N.$, long. $119^{\circ} 53' E.$; from thence the coast line trends

northward for 5 or 6 miles to the southern point of entrance to Port Masingloc.

Palauig Bank is a danger about 2 miles to the south-westward of the point; from its outer part the West end of South Salvador Island bears N. by E. $\frac{3}{4}$ E., and Mount Yba E. by S. The *Luzon*, a new steamer, commanded by Mr. McGowan, was wrecked upon this shoal in December, 1864; and as, by the same authority, there appear to be several other dangers on either side of the point, it will be prudent to give this part of the coast a berth of 3 or 4 miles.

The *Coast* from Palauig Point to Cayman Point, bearing N. by W. $\frac{1}{4}$ W. 30 miles, is indented with several deep bays filled with shoals, projecting beyond the points that form their entrance. Just round the northern part of Palauig Point, in about lat. $15^{\circ} 31' N.$, is a small port named Masingloc; and 16 or 17 miles farther northward, inside the Hermans or Sisters Islands, is the port of Santa Cruz. Between Santa Cruz and Caiman Point is Bazol Bay, which appears to be encumbered by many dangers.

HERMANAS and CULEBRA ISLANDS.—Hermanas Islands, or the *Two Sisters*, are low and woody, with a conspicuous sandy beach, the northern one, in lat. $15^{\circ} 48' N.$, being the larger, and distant about $2\frac{1}{2}$ miles from the other. *Islote Culebra*, about $5\frac{1}{4}$ miles northward of the North Sister, is small, with trees on it and a sandy beach. These islands have shoals projecting a long distance from them, and it will be prudent to give them a good berth in passing, for they are about 6 miles off shore.

PUNTA CAYMAN, or Cayman Point, in lat. $15^{\circ} 55\frac{1}{2}' N.$, has a reef projecting to the S.S.W.; but the channel is safe between it and Culebra Island, having 30 fathoms water, and the point may be approached occasionally to 10 fathoms on the tail of the reef.

Seno de Bazol, or *Tambove Road*.—The channel between Culebra Island and Caiman Point leads to the extensive bay called the Seno de Bazol, or as formerly Tambove Road, which lies to the eastward of Caiman Point, and is open only to southerly winds. There appears to be many detached reefs in it. Steering for the extremity of the beach, to the eastward of the point, the depths will be 12 to 15 fathoms, coarse sand and shells, near the termination of the beach; the water will then deepen, but until in soft mud it will be improper to anchor, for rocks are scattered over the bottom, where it consists of sand.

Wood and good water may be got here.

The Coast.—From Caiman Point to the entrance point of the Bay of Lingayen, the land is level, of moderate height and sterile aspect, with a steep beach fronting the sea, and may be seen in clear weather about 24 miles. The coast in this space is bold to approach, having no ground at 50 fathoms within a mile of it in many places; there are soundings near the

beach in some of the small bays, where a vessel may anchor occasionally, but there is no safe place of shelter for large ships.

LINGAYEN GULF, or *Pangasinan Gulf*, the entrance to which between *Purra Island* off Bolinao on the West and Punta de San Fernando on the East, is 17 miles wide, and from the line joining them to its head at the town of Lingayen 26 miles in depth, is very extensive, formed by the low land of *Cabaluyan Island*, taking a south-easterly direction about 12 miles; and then the Mongos-Mongos chain of islets and rocks, extending along it nearly S.E. by S., lines the West side of the bay.

The Gulf is about 30 miles deep, and about 20 miles wide across the entrance, from Santiago Island to San Fernando Point, or Balanac. Lingayen River, a place of some trade, disembogues at the bottom of the bay, and into which the small coasting vessels can pass over the bar. The rivers San Fabian and San Thomas are farther eastward, the former directly in the S.E. angle of the bay.

Port Sual.—About $1\frac{1}{2}$ or 2 miles to the southward of the high islet *Calamitian*, which is the last of the Mongos-Mongos chain, there is good anchorage in muddy bottom, at the entrance of a small port, called Sual, into which a ship might be warped, should circumstances render it necessary.

Navigating Lieut. Harvey, of H.M.S. *Magicienne*, in 1859, made a rough plan of Port Sual, and furnished the following account:—

The port is of small extent, the entrance narrowed by rocks and reefs to the breadth of about a third of a mile, while an extensive coral bank, with but 5 ft. water over it, fills up a large portion of the port.

The land about Portuguese Point, the northern point of entrance of the port, appears like an island when viewed from a distance of 7 or 8 miles; the point may be recognized by a small round tower on its bluff, and between it and Calamitian Island the ground is foul, with rocks just awash. A reef extends nearly $1\frac{1}{2}$ cable's length from Portuguese Point. It is always covered, and the sea breaks upon it only when the wind sets in. *Mangos* or *Manzas Point*, the southern point of entrance, has rocks extending some distance from it; but they are always uncovered, and may be approached to half a cable's length. In the S.W. part of the port is the village, which has a church and a small landing jetty. Mr. Harvey made the position of Port Sual to be lat. $16^{\circ} 7' 20''$ N., long. $120^{\circ} 2' 44''$ E., and the rise of tide 6 feet.

When approaching the port, keep about $1\frac{1}{2}$ or 2 miles from Calamitian or Calamitian Island, steering for Manzas Point; pass the outer rock off that point at the distance of half a cable's length, and then steer for the church, taking care to avoid the large coral patch, the southern edge of which lies between the N.E. point of the port and the church, bearing from each other N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W.; anchor in 5 or $4\frac{1}{2}$ fathoms.

DILE POINT, in lat. $17^{\circ} 34\frac{1}{2}'$ N., long. $120^{\circ} 20\frac{1}{2}'$ E., is the most prominent point of this part of the coast, projecting far to the north-westward. Between it and San Fernando Point there are several towns along the coast. The country is formed of high double mountains, with low woody points to seaward in some places, and the direction of the coast is mostly North and N. by E. H.M.S. *Samarang* met with a dangerous patch in the bay near Dile Point, $2\frac{1}{2}$ miles off shore, a church bearing E.S.E.

Vigan or *Bigan Road*, in lat. $17^{\circ} 24'$ N., is sheltered from northerly winds by Dile Point, but exposed to the southward and westward. A patch of $3\frac{1}{2}$ fathoms is marked on the chart about a mile off shore. The anchorage is near the shore, off the river, bearing about East, in 10 or 12 fathoms; the bank shelves suddenly off to no soundings. About 9 miles inland to the E.N.E. of the road there is a *chasm* between two mountains, called *Abra de Vigan*, or *Gap of Vigan*, which is very conspicuous when viewed from the offing, and is a good mark to know this part of the coast.

Lepog or *Salut-Salut Bay*, at 11 miles north-eastward of Dile Point, is sheltered from all winds but those that blow between S.W. and W.N.W. There are good depths in it, and the reefs bounding the entrance, with a rocky bank in the mouth of the bay, will be seen in clear weather. The rocky bank has 1 and 2 fathoms on it, with a passage on each side of 9 or 10 fathoms water; but that to the northward, between it and the North point of the bay, is too contracted.

The coast from *Vigan Road* to this bay should be given a good berth, for *Pingue* or *Pinget Island*, or *Bantay*, surrounded by breakers and foul ground, lies about $1\frac{1}{2}$ mile off the projecting part of the land to the southward of Lepog Bay; and to the northward of it the coast is lined with coral reefs, stretching out a great way, as far as the entrance of Lepog Bay.

PORT SALOMAGUE, adjoining to the northward of Lepog Bay, is separated from it by a point of land encompassed with shoals. West from this point, $1\frac{1}{2}$ and 2 miles distant, are two rocky banks, with $2\frac{1}{2}$ fathoms, or probably less, water on them. This port is more capacious, sheltered from the same winds, and deeper than Lepog Bay.

The North point is also, like the southern one, encompassed with a reef, which stretches to the eastward along the northern side of the port; and an island of moderate height lies about three-quarters of a mile from the point, with a reef projecting off it about a cable's length to the S.W. This place may be known from the offing by a chasm or gap in some high mountains, which overtop the rest of the chain on this coast. It resembles the Gap of *Vigan*, but it is not so large, nor does it approach so near the sea as that gap; it may also be seen bearing about S.E., when a ship is 12 or 13 miles West of Salomague Bay. When the Gap of Salomague bears about E. $\frac{1}{4}$ S., an East course will lead direct towards Salomague Island at the North point of the port, which should be approached in a large ship, bearing about

East; and the reef off its S.W. point ought to be passed close in 25 or 30 fathoms, mud, to avoid the rocky banks that lie to the westward of the South point of the port; she may then steer right in the middle of the port, rather inclining towards the northern shore, and anchor in 8 fathoms. Farther in there is a shoal spot, which will be perceived in clear weather by the discoloured water on it. The best berth to moor is in 6 or 7 fathoms, mud, opposite some rice magazines on the North shore.

The Coast from Port Salomague trends about N. by E. to Cape Bojeador; in the bight to the southward of the cape there is said to be anchorage near the shore; in some parts the coast is low and woody to seaward.

The chain of high mountains inland, which commences near St. Fabian, in the Gulf of Lingayen, extends parallel to the coast, gradually diminishing in height, and stretching more inland about 24 miles to the southward of Cape Bojeador, leaves a spacious plain fronting the sea. Another chain of hills begins about 7 or 8 miles from the shore, and stretches northward parallel to the coast-line.

About 9 miles northward of Salomague is *Badog* or *Sinay Isle*, about half a mile off a point of land, surrounded by a reef; and the coast between these places is rocky, with breakers projecting from it about a mile.

Ilara Hummock stands near the sea, about 9 miles southward of Cape Bojeador; being of middling height, with patches of trees on it, and there being no other of similar appearance, it is a good mark in sailing along the coast. Soundings are got about 3 miles off shore from Salomague to *Ilara Hummock*, but from 4 or 5 miles beyond the latter to Cape Bojeador, none are obtained at the distance of 2 miles from the shore; and the whole of this part of the coast is destitute of shelter for ships, and has rocky patches stretching out above a mile in some places.

CAPE BOJEADOR, in lat. $18^{\circ} 30' N.$, long. $120^{\circ} 34' E.$, is a low point with a reef of breakers projecting off it, which forms the north-western extreme of Luzon. From hence the coast takes a N.E. direction, and at the distance of 6 miles is *Negra Point*, on the East side of which is anchorage with southerly winds. The deep bay between this point and *Dialao Point*, 9 miles to the N.E., has much foul ground on its eastern shore. There is anchorage at the bottom of this bay, near the small port of *Bangui*, which is said to have been long shut up by an earthquake.

Cauagan or *Mereira* or *Mayraira Point*, distant about 20 miles N.E. of Cape Bojeador, has a reef projecting about a mile out. *Caravallo* or *Patapat Point*, bearing about E. by S. 11 or 12 miles from *Cauagan Point*, is a bluff, steep point of white cliffs, having a mass of high mountains, the *Montes Patapa*, contiguous to it. To the eastward of *Caravallo Point* there is a round hill of middling height, called *Pata Point*. The whole of the coast from Cape Bojeador to this place is steep, without any soundings until near the shore.

The land is of moderate height, and in some parts rather low close to the sea, with several rivers; but the country inland is high and mountainous.

SCARBOROUGH or **Maroona Shoal** was surveyed by Nav. Lieut. Wilds in H.M.S. *Swallow*, March, 1866. It is a dangerous coral reef, rising out of deep water, and it affords, and that only in the calmest weather, a single precarious anchorage off the entrance to the lagoon, at its south-eastern extremity. The opening to the lagoon is about 2 cables wide, but it is dangerous from the large jutting pieces of coral extending from point to point, over which there are only 9 ft. water, with 5 and 6 fathoms close to; just within it shallows.

The reef consists of a narrow belt of coral, nearly level with the water's edge, enclosing a lagoon of clear blue water. On the belt are scattered several rocks 3 to 10 ft. above water, visible about 5 miles. The 10-ft. rock is $1\frac{1}{2}$ mile S.W. of the opening. In shape the reef is a right-angled triangle, with the corners rounded off, the western side being nearly perpendicular to the southern, the direction of the three sides being S. $\frac{3}{4}$ E. $7\frac{1}{2}$ miles, S.E. by E. 10 miles, and E. $\frac{1}{2}$ N. 8 miles. The South side and North point are in lat. $15^{\circ} 5' N.$ and $15^{\circ} 12' N.$ respectively, and the West side and East point in long. $117^{\circ} 44'$ and $117^{\circ} 52' E.$

In March, 1866, the current ran strong to the westward; in April, 1853, its direction was very doubtful in the proximity of the reef. It is high water, full and change, about 11^h , and the rise is 5 ft.

The **TRURO SHOAL**, in lat. $16^{\circ} 19' N.$, long. $116^{\circ} 41' E.$, was discovered by Capt. T. J. Duggan, of the ship *Truro*, in September, 1857. He states, "Whilst taking my forenoon observation, distinctly saw the bottom, white coral. Got a cast of the lead instantly at 10 fathoms; again, about half a mile more North, had 19 fathoms; steered North for another half mile, and had 22 fathoms, and the next cast no bottom at 40 fathoms; no shoal patches were visible from the mast-head."

PRATAS ISLAND and **REEF** was surveyed by Navigating Lieutenant John Richards, R.N., April, 1858. Patras Island, the N.E. end of which is in lat. $20^{\circ} 42' 3'' N.$, long. $116^{\circ} 43' 22'' E.$, rises from the West side, and near the middle of the sunken part of the Pratas Reef. It is about $1\frac{1}{2}$ mile long, E. by S. and W. by N., half a mile wide, and 40 ft. high, of which elevation the scrubby bush, with which it is covered, forms about 10 feet. It is composed of sand, not a particle of mould or earthy matter could be found on it, and its shape is that of a horse-shoe, enclosing a shallow inlet or lagoon, which runs into its western side for about half a mile, and must afford shelter to the Chinese fishermen who come here to fish in the early part of the year. Brackish water can be obtained by digging a few feet

into the sand. Gannets are numerous, and may be knocked down with sticks.

The island is visible at a distance of 9 or 10 miles, in clear weather, from the deck of a large vessel; from the westward it will make like two detached but contiguous islets, the centre being lower than the ends. It is visible when near the southern extreme of the reef, but more conspicuous when approaching it from the westward or northward.

The N.E. point of Pratas Reef is in about lat. $20^{\circ} 47'$ N., long. $116^{\circ} 53'$ E., is a coral barrier of nearly circular form, encircling a lagoon of 5 to 10 fathoms water, and thickly studded with coral knolls round its margin, but comparatively clear near the middle. The reef is about 40 miles in circumference, 1 to 2 miles broad, and slightly flattened on the northern side. Nearly two-thirds of it, or the North, East, and South sides, are just dry at low-water springs; the remainder, or western side, forms a sunken barrier, across which are two channels leading into the lagoon, one on each side of Pratas Island. The North channel is about 3 miles wide, between the island and the edge of the breakers, and 3 fathoms may be carried near the middle of it at low-water springs. The South channel is by far the better of the two, from being wider, a little deeper, as well as its comparative freedom from coral knolls.

Tides.—During the survey of Pratas Reef, April, 1858, it was high water, full and change, at about 4 a.m., and the rise was about 5 ft. There was only one perceptible ebb and one flow in the 24 hours at the springs. The highest tide occurred on the third day after the full moon, but the tides were very irregular.

Anchorage.—Although Pratas Reef is steep-to in most parts, there are several spots where, in case of necessity, a vessel might find anchorage outside the breakers, particularly on the West side, abreast the middle of the channels through the sunken part of the reef, and at the distance of about $1\frac{1}{2}$ or 2 miles on either side of the island. At each of these spots there is good anchorage in the N.E. monsoon, in 20 to 10 fathoms, but the position abreast the South channel is considered the best, the sunken reef at this part being deeper and the bottom more even than in the channel North of the island. A vessel of light draught might even anchor in safety on the reef, in the middle of the South channel in $3\frac{1}{2}$ fathoms at low water, or cross it and take up a berth inside the lagoon in 10 fathoms, fine sand.

Captain Ross, I.N., visited this reef in the *Discovery*, with the *Investigator* in company, August, 1813. The first soundings obtained were 74 fathoms, fine coral, about $1\frac{1}{2}$ or 2 miles from the N.E. point; from thence the former vessel steered along the North side, about three-quarters of a mile from the breakers, in soundings of 31 to 38 fathoms; the *Investigator* keeping about a quarter of a mile off, had great overfalls of 10 to 24 fathoms. After rounding the N.W. part of the reef about a mile off in 35 fathoms, rocky

bottom, they anchored in 24 fathoms, about $1\frac{1}{2}$ mile from the West end of the island, with the island bearing from S.E. $\frac{1}{2}$ S. to E.S.E. About half-way between this position and the shore the depths were 4 and 5 fathoms, and then very shoal water.

H.M.S. *Highflyer*, in May, 1857, anchored about 8 cables' lengths from the West end of the island, in 20 fathoms, coral and clay, the extremes bearing S.E. $\frac{2}{3}$ E. and E. by S. She also anchored, with stream anchor, at half a mile from the S.E. edge of the reef, in 32 fathoms, white mud, with the centre of the island N.W. $\frac{1}{2}$ W. distant 10 miles; there were 13 fathoms water at 2 cables' lengths from the edge of the reef, and 7 fathoms at a short distance from the edge. In April, 1859, H.M. steam gunboat *Leven* anchored three-quarters of a mile off shore in 5 fathoms, with the centre of the island bearing E. by N.

Caution —When beating against, or running with, the strength of the monsoon up or down the China Sea, vessels should always endeavour to pass to leeward of Pratas Reef, on account of the invariable set of the current to leeward; for there are no soundings to indicate a near approach, and the weather is frequently thick and hazy in this vicinity. The safest quarter to make the reef is from the N.W., the island being on its western side, and the currents in the neighbourhood invariably running in a N.E. or S.W. direction according to the monsoon. Approaching the reef, a vessel should be coned from the fore-top. The sun should be well above the horizon, and if possible astern or on the beam, as the bottom can then be easily seen in 10 fathoms.

The *Hossack Shoals* were said to have been seen by Mr. Hossack, commanding the ship *Cyclone*, 9th August, 1861. He reports, "When standing to the N.W., wind W.S.W., tacked ship, having seen two patches, the easternmost of which appeared to be very shoal, about 2 or 3 fathoms water, extending about 400 ft., and the water breaking on it. From good observations the position of the reef is lat. $21^{\circ} 31' N.$, long. $117^{\circ} 7' E.$ " These shoals were sought for in vain by H.M.S. *Serpent* in 1866.

CHAPTER XV.

THE CHINA SEA, WITH ITS ISLANDS AND DANGERS.

THE great channel between the continent of Asia on the N.W., and the line of the islands of the Indian Archipelago between Borneo and the Philippines on the opposite side, have been described in previous pages.

The Coasts of Malaya and the Gulf of Siam are described in Chapter X, pages 400 to 427.—The Coasts of Cochin China and Ton King, with the Island of Hainan, are given in Chapter XI, pages 428—480.—The North-West Coast of Borneo, in Chapter XII, pages 480 to 512. Palawan Island and the Philippine Islands are included in Chapters XIII and XIV, pages 513—608.—The South-West part of the China Sea, or that between the North coast of Java and the Coasts of Sumatra and Borneo, is described, with its detached islands and shoals, in Chapter VIII, pages 295—356.

The CHINA SEA, although the main ship route towards the long frequented parts of China, was but imperfectly understood previous to the examination commenced by Lieut. J. W. Reed, R.N., in H.M.S. *Rifleman*. Before this, the charts were disfigured by numerous shoals, which closer examination showed to be either non-existent, or placed so far out of their true positions as to have been announced at different times as distinct dangers, widely separated.

The important results of Lieut. Reed's survey have been to show that there are two clear channels, free from all known danger, the one to the N.W. upwards of 230 miles in breadth between the coasts of Cochin China and a line of reefs and dangers lying along the centre of the China Sea, generally parallel with its limiting coast. The other channel, termed the Palawan Passage, lies between the reefs on the edge of the bank of soundings on the N.W. side of that island and the S.E. limit of that apparent archipelago of reefs which limits the northern channel.

The labours of the officers in command of the *Rifleman* have wisely been confined in the outset in determining the outer limits of this line of dangers,

and the result has been not merely the determining of the exact character of many previously announced reefs and banks, but proving the non-existence or wrong identity of others, and the discovery of several new groups of banks, which are not dangerous, but will serve as excellent points of verification and departure in this troublesome navigation.

The currents of this region, also, do not appear to be well understood, and some remarks by Captain Polack, on pages 85—91, will be read with interest, as giving the result of much experience in these waters, and the best means of utilizing every slant of wind or current in making a direct passage against the adverse monsoon, instead of the very circuitous routes formerly advocated.

From the fact of its dangers having thus disappeared, and those which are determined having shown that there are safe routes under the lee of either shore, it is probable that a great portion of the commerce will pass through this main ship channel, instead of being carried through the distant and imperfectly known passages to the eastward of Borneo.

The S.W. portion of the China Sea, which has been previously described, is separated from the main area by three groups of islands, the Anamba Islands and the two clusters of the Natuna Islands, which have broad and safe channels between them. In describing these, we follow, as heretofore, the compilation published by the British Admiralty.

THE ANAMBA ISLANDS.

The westernmost group, termed by Europeans the Anambas, is not known by that name to the natives. They are mountainous and sterile, and the scanty products of the land and sea are disposed of by the few Malay inhabitants at Singapore. Formerly they had an evil name for piracy, but are now peaceful traders and fishermen, nominally subject to the Dutch, a flag of that nation being shown at Terempa, where a magistrate is appointed.

The approach to the group from the westward is not dangerous, and the French surveys of this part, made in 1828 and 1831, may be used with confidence.

Climate.—From the vegetation and the stout build of the people, the climate must be considered very favourable. While the average temperature in Bangkok and in the Gulf of Siam had been, in daytime in the shade, 93° to 95°, and at night 88° to 90½', it was at the Anamba Islands only, respectively, 84° and 77°. The cause of this low temperature appears to be the frequent heavy rains, preceded by fresh breezes. (Corvette *Nymphe*, June, 1873.)

The **SOUTHERN GROUP** consists of the White Rock, high above water, in lat. 2° 20' N., long. 105° 34' E., and the following islands:—

Pulo Repon, or Saddle Island, in lat. $2^{\circ} 25' N.$, long. $105^{\circ} 52' E.$, the most southern island of the group, is about three-quarters of a mile in extent. Captain Goldsmith, of H.M.S. *Ilyacinth*, states that this island has discoloured water three-quarters of a mile off its N.E. end, with regular soundings of 33 and 35 fathoms, sand and shells, about $1\frac{1}{2}$ mile to the westward of it.

Capt. Laplace, of the French Imperial corvette *La Favorite*, in April, 1831, passed about midway between White Rock and Pulo Repon, carrying depths from 30 to 34 fathoms, muddy bottom.

Baua is a small group, about 11 miles north-eastward of Repon; and about 15 miles N.E. by E. $\frac{1}{2}$ E. from Baua is another small group, called Rittan, in lat. $2^{\circ} 39' N.$ This last group forms the south-eastern limit of the Anamba Islands.

The Riabu Group extends from about 5 to 13 miles N.N.W. of the Rittan group. Pulo Riabu is a high island, about 6 miles in extent, having a much smaller island, named Piling, close to the westward of it, and several islets and rocks off its S.E. extreme.

The **WESTERN GROUP** comprises a high island, called *Djimaja*, about 14 miles in length, with several small islands, nearly joining each other, off its N.W. extreme; their N.W. limit is in lat. $3^{\circ} 5' N.$, long. $105^{\circ} 32' E.$, and the South point of the large island is in lat. $2^{\circ} 50' N.$ Djimaja has a peak on it, and a bay on the North side, with islets and reefs about a mile distant on the western side, and soundings of 24 to 35 fathoms near them.

Courier Rock.—There is a sunken rock, on which the *Courier* struck, in lat. $2^{\circ} 58' N.$, about 3 miles from the western shore of Djimaja, and nearly the same distance S.W. $\frac{1}{2}$ S. from Joulan Point, which projects to the westward near the parallel of $3^{\circ} N.$

Pulo Domar, in lat. $2^{\circ} 45' N.$, long. $105^{\circ} 25' E.$, and the most western of the Anamba Islands, is a high, barren rock, with 34 or 36 fathoms water close to it, 35 to 40 fathoms between it and Djimaja, and 32 to 39 fathoms in the channel between it and Pulo Aor. Sir E. Belcher states it to be 150 feet high, and that in fine weather safe landing may be found on its S.E. extreme.

Telaga Group.—Telaga or Peaked Island, in lat. $3^{\circ} 5' N.$, and about 8 miles north-eastward of the East end of Djimaja, is about 3 miles in extent, and has a high peak on its northern end. Close to its N.W. end is Little Telaga, an island about half its size, and close to its western side are some islets and rocks.

Some groups of small islands lie between Telaga and Riabu, and others between the former island and the northern group.*

* In sailing round the northern group of the Anamba Islands, Telaga or Peaked Island is a most remarkable object, and appeared higher than any land about it. Douraj Island

The **NORTHERN GROUP** of the Anamba Islands is comprised between the parallels of 3° and $3^{\circ} 30'$ N. Its western portion consists of three large islands, and there are numerous smaller ones to the south-eastward, with other detached islets. The longitude of the most eastern islets is $106^{\circ} 29'$ E. The larger islands are inhabited, and abound with fruits and vegetables.

Captain Laplace examined this group in 1831, and he makes the three large islands to extend from lat. $3^{\circ} 9'$ to $3^{\circ} 27\frac{1}{2}'$ N., the two northernmost, called *Mata* and *Mobur*, having a channel about a mile wide between them, called *Selamata* (more properly *Selat-Mata*), with depths of 15 to 28 fathoms in the South entrance and middle part; but the northern part has several isles and rocks, and appears, by the chart of the survey, not to have been examined. Between the South point of *Mobur*, the westernmost island, and *Mangar* Island, fronting it about a mile distant to the westward, is the entrance of a deep inlet, named *Paris Cove*, which extends about 3 miles to the northward into *Mobur*, nearly dividing that island into two sections; the general depths in it are 23 to 17 fathoms, decreasing near the shore at the upper part, and it appears to form a safe harbour. The German corvette *Nymphe*, in June, 1873, anchored in 18 fathoms of water, with a house on the West side of the cove bearing W.S.W., and the S.E. point of the bay S.E. $\frac{1}{4}$ S. A supply of good water was procured, but no provisions.

Siantan, the southern large island, fronts the South end of *Mata*, being separated from it by a channel from 1 to $1\frac{1}{2}$ mile wide, in which the depths are from 10 to 24 fathoms. The eastern entrance of this channel is obstructed by a chain of shoals, but there is thought to be a narrow passage, with from 5 to 9 fathoms water, to the southward of them, by keeping close along the reef that borders the eastern side of *Siantan*. The western entrance of the channel is formed by *Tupinier Bay*, which is 3 miles wide between *Pedasse Point*, the N.W. extreme of *Siantan*, and the South point of *Mangar*, which bear nearly North and South of each other; the centre of the entrance is in lat. $3^{\circ} 16\frac{1}{4}'$ N., with depths from 24 to 32 fathoms.

Terempa.—About $1\frac{1}{2}$ mile inside *Pedasse Point*, is *Terempa* village, at the bottom of a small bay, where a vessel might anchor in from 10 to 15 fathoms, sandy bottom, sheltered from all winds. *Terempa*, containing 300 or 400 inhabitants, is the chief place of the group, and the residence of the native magistrate appointed by the Dutch. The German corvette *Nymphe* anchored here in $20\frac{1}{2}$ fathoms water, with *Rigni Island* bearing N.W. by N. and *Pedasse Point* W. by N.

is high, about the same height as *Paat Island*. *Sendock* is a low rock, and will not be seen till *Namas Island* (which is high and one mass of large rocks) bears about S.E. *Guerite Rock*, when first seen, makes like a topsail schooner; on a nearer approach the stone on the summit appears like the top of a lighthouse, and on a S.W. bearing, like a schooner running before the wind.—Navigating Lieutenant J. W. King, H.M.S. *Vernon*, June, 1847.

Two miles eastward of Terempa a bay is formed in the N.E. part of Siantan, with depths of 10 to 15 fathoms near the reef that borders the shore, where it would appear by the chart ships might anchor completely landlocked.

The following is from the report of the German corvette *Nymphe*, 1873:—

From Terempa we steered southerly around Siantan Island for the southern entrance of Clermont Channel, but we found the chart too incomplete. We therefore proceeded North through Thetis Channel, along the eastern shore of Bougainville Island, for the northern entrance of Port Clermont, which, according to the chart, was to be looked for in a south-westerly direction from a cliff running out to the North. This we found to be correct; but the eastern coast of Bougainville Island proved to be quite different from that represented on the chart, on which it trended first about 2 miles North and South, and then 2 miles N.N.W. and S.S.E., with a small bight midway of the latter part, while in fact there were two bays, the southernmost of which was about a mile deep, with an entrance similar to Port Clermont, with depths of from 11 to 17 fathoms; the northern bay was wider and of less depth. The southern bay is quite foul, and, as the entrance much resembles that of Port Clermont, may be dangerous.

In Port Clermont we found the reefs and shoals to extend considerably into the channel, rendering it quite narrow. The hilly shores are everywhere steep-to; the harbour is quite roomy, and, having three entrances, would be an excellent place of refuge when better surveyed. The water in the creek shown on the chart is in such small quantity that it would hardly suffice for one vessel.

NATUNA ISLANDS.

The name given by Europeans to these groups is entirely unknown to the Malay inhabitants. They own allegiance to the Prince of Johore, who lives under British protection at Singapore. The larger islands only are inhabited, and according to Mr. Crawford, the Great Natuna had a population of 600, the northern group 300, and the southern 400, making a total of 1,300. The islands are rocky and sterile, and the few articles of trade, fish, raw sago, and cocoa-nut oil, are exchanged in the straits of Malacca for rice, clothing, and iron.

The northern groups were examined by Captain Laplace, in the French Imperial corvette *La Favorite*, in 1831, and a survey was made by Lieutenant E. Paris. The South Natuna Islands were surveyed by the late Lieutenant D. M. Gordon, R.N., in H.M.S. *Royalist*, in 1847.

The Natuna Islands extend in a N.N.W. $\frac{1}{2}$ W. direction to the distance of 100 miles from Tanjung Api, the N.W. extreme of Borneo. They may be

divided into three groups,—the South Natuna, near Borneo; the Great Natuna and its contiguous islets; and the North Natuna.

SOUTH NATUNA ISLANDS.—This group extends from the coast of Borneo to about lat. $3^{\circ} 3' N.$; it is subdivided by a safe channel, and the outside channel, between it and Great Natuna, is spacious. The two principal islands are Sirhassen and Subi.

Marundum, the southernmost island of the group, is in lat. $2^{\circ} 4' N.$, long. $109^{\circ} 7\frac{1}{2}' E.$, and bears from Tanjong Api N.W. by W. $\frac{1}{2}$ W., 14 miles. It is about a mile in extent, and 120 ft. high. A reef, which dries, lies about a mile off its West side, and there is a patch of $4\frac{1}{2}$ fathoms about the same distance from its N.E. side. The soundings round about are very irregular.

API PASSAGE, the channel between the coast of Borneo and Marundum, appears to be free from danger, with depths varying from 11 to 23 fathoms. The description of the adjacent coast of Borneo will be found on pages 287 and 480, *ante*.

South Haycock Island, in lat. $2^{\circ} 17' N.$, long. $108^{\circ} 55\frac{1}{4}' E.$, is a mere islet, said to be, however, very conspicuous; it is surrounded to the distance of about a third of a mile by a reef, and there appears to be an islet, or rock above water, close to the southward of it.

Sembuni and Molu Shoals comprise an extensive mass of dangers lying between Marundum and Sirhassen. The Sembuni is the name given to that portion which lies nearer to Marundum, the channel between that island and the shoals being 7 or 8 miles wide, free from danger, but with depths varying from 8 to 16 fathoms. The Larkin Shoal, of Horsburgh, appears to be one of the Sembuni patches.

The Molu Shoals lie to the eastward of Haycock Island, and cover a space about 5 miles in extent; the channel between the island and the shoals is about 5 miles wide, with depths varying from 11 to 20 fathoms.

A rock is placed on the chart 4 or 5 miles to the N.E. of the Molu patches, with Prantou Island bearing N. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles, and the apex of Brian Island N.W. $\frac{3}{4}$ W. 13 miles. To the eastward of this rock is a space 7 or 8 miles in extent, which has not been sounded over, and where it is probable other dangers may exist.

SIRHASSEN PASSAGE is bounded on the South by Haycock Island and the northern part of the shoals and dangers just described, and on the North by Sirhassen and its contiguous islands. Its narrowest part, between the rock N.E. of the Molu Shoals and Prantou Island, is about 5 miles wide, and appears to be free from danger, although the soundings here, as elsewhere in this neighbourhood, are very irregular, 14 to 40 fathoms.

SIRHASSEN GROUP.—*Sirhassen* or *High Island*, is 9 miles long, East and West, and represented on the chart as mountainous, except on its N.E. side,

where the lofty extremes of the island have a low sandy bay between them. Nearly joining the island on its S.W. side are several islets, the largest of which, *Brian Island*, is 760 ft. high. These islets, having but very narrow channels between them, must at a distance appear as part of the main island. The chain of islets running about 7 miles in a N.N.E. direction from the N.E. point of Sirhassen, give a partial shelter from the north-easterly winds to vessels which may anchor in the sandy bay before mentioned, the depths in which are from 10 to 17 fathoms.

It is reported that the ship *Lightfoot*, Pierce, master, from Whampoa to London, struck on a coral shoal the 3rd September, 1854, about $3\frac{1}{2}$ miles to the westward of Sirhassen Island, in lat. $2^{\circ} 32' N.$, long. $108^{\circ} 58' E.$; whilst the ship was on shore, found the current was setting to the eastward 3 knots per hour.

Prantou, a small island, 465 ft. high, lies nearly 3 miles to the southward of the eastern extreme of Sirhassen, with a deep channel of 20 to 40 fathoms between them.

Royalist Haven is on the S.W. and West side of Sirhassen Island. The leading mark in is *Mount Koti* (765 ft. high, on the N.W. part of the island), on with David Point bearing N.N.W. The entrance is about 2 cables wide between Rimell and Wilkinson Rocks, with 7 to 10 fathoms in the channel, and 7 to 11 fathoms in the haven; there are several rocky heads with deep water between them in and near the anchorage, in 9 or 10 fathoms, nearly half a mile within the entrance, though a vessel of large draught may thread her way between the coral heads at least 2 miles within the entrance towards Banff Bay to the N.N.W. The Dutch have or had a small supply of coal on Sirhassen Island.

KOTI PASSAGE is the name of the channel between Sirhassen and Pulo Panjung, dividing the South Natuna group into two divisions. It is 9 or 10 miles wide, and appears, with the exception of the Milton Shoal, to be quite free from danger, although the depths are very irregular, 15 to 30 fathoms generally, with some deeper holes—no bottom 35 to 37 fathoms—near mid-channel.

This passage is often used by vessels proceeding from Singapore to Hong Kong against the N.E. monsoon, and which are unable to weather Subi.

Milton Shoal.—Capt. Le Boutillier, of the *John Milton*, reports a shoal in the Koti Passage, as follows:—"On the 22nd September, 1869, passed over a shoal, where on the chart is marked 20 fathoms water. This shoal is about a quarter of a mile in breadth, the bottom of large round coral stones; found no less than 28 ft. of water, being very smooth at the time, seeing the bottom quite plain, vessel going at the rate of one mile per hour. At the same time took several cross bearings, and found the said shoal to be in lat. $2^{\circ} 37' N.$, long. $108^{\circ} 50' E.$ "

SUBI GROUP.—*Subi* or *Soubi*, or *Flat Island*, the northernmost and largest island of the South Natuna, is about 12 miles long North and South, and 5 miles wide, including an island about 2 miles in extent off its northern end, to which it is connected by a reef. It is also apparently connected with the smaller island of Panjung and its neighbouring islets, lying 7 miles to the S.S.E. by the rocky bank on which both seem to be based.

Subi appears to be surrounded, except on its S.W. side, with shelving rocks, to the distance of 2 or 3 miles, and on their outer edge are several rocky islets, the principal of which is Bucu, on the West side of Panjung, completely detached; and 16 miles south-westward of Subi is the hilly island called *Serai*, or *West Island*, in lat. $2^{\circ} 40' N.$, long. $108^{\circ} 35' E.$, with the Doua Rock $1\frac{1}{2}$ mile north-eastward of it.

Pumunabung Reef, lying about 3 miles West of the Panjung group, is about 2 miles in extent, East to West, by one mile North and South, with soundings of 4 to 15 fathoms near it. There is also a rocky patch, the *Jabak Reef*, at $3\frac{1}{2}$ miles N.N.W. of this; and West of the latter, and North, distant $3\frac{1}{2}$ miles of the Doua Rock, is the *Jaring Reef*, which is a rock with a bank extending about 3 miles to the north-eastward from it. There is also a rocky patch called *Laut Reef*, off the East side of Subi, about $2\frac{1}{2}$ miles outside the reef surrounding the island, from which the hill, 200 ft. high, on the northern extreme of Subi bears N.W. $\frac{1}{4}$ W., and the eastern apex of Pulo Panjung S. by W. $\frac{3}{4}$ W. Vessels should be cautious in approaching the eastern side of Subi.

The *Soundings* round the South Natuna group vary from 10 and 15 to 30 and 40 fathoms, and to the south-eastward extend to the coast of Borneo in average depths of 14 to 20 fathoms.

Current.—The current at times is strong among the South Natuna Islands, according to the prevailing winds. In the Koti Passage it has sometimes been found to run $2\frac{1}{2}$ miles per hour to the northward, during the southerly monsoon.

The *Channel* between Subi and Low Island is ordinarily used by vessels proceeding to China by the Palawan route, during the N.E. monsoon, although, as has been previously remarked, it sometimes happens that vessels are unable to weather Subi, and find it convenient to proceed through the Koti Passage. Low Island lies 60 miles to the westward of Subi, but the channel is narrowed to about 50 miles by reefs which lie eastward and south-eastward of Low Island.

LOW ISLAND, in lat. $3^{\circ} 0' N.$, long. $107^{\circ} 48' E.$, is in extent about $3\frac{1}{2}$ miles North and South, and $2\frac{1}{2}$ miles East and West, having shoal water extending to a considerable distance from its eastern and western sides. The following dangers render great caution necessary in passing to the southward of it:—

JACKSON REEF lies off the S.E. part of Low Island, in lat. $2^{\circ} 56' N.$,

long. $107^{\circ} 55'$ E. The bottom was perceived in 14 fathoms, coral, and the boat in sounding near the ship, had from 5 to 7 fathoms, coral; in one place only $4\frac{3}{4}$ fathoms, with apparently less water on other patches of this coral shoal, which extends about 2 miles in a S.E. and N.W. direction, bearing from the East point of Low Island E.S.E., distant about 6 miles. This shoal ought to be avoided, as well as Hutton Reefs to the northward; they may probably be a continuation of the chain of shoals formed of coral patches, now ascertained to exist in the proximity of Low Island.

Hutton Reefs are thus described in the journal of Mr. Howard:—Observing shoal water to extend a long distance off the East and West ends of Low Island, edged out to give it a wide berth in passing on the South side. From 10 a.m. to noon steered E. by S. 3 miles, and East 2 miles, when discoloured water was seen bearing East; hauled up N.E. by N. to go between it and the island, the extremes of the latter then bearing from N.W. by N. to W. by N., distant about 3 miles, observed lat. $2^{\circ} 59'$ N.

In passing between the shoal and island, the least water was 8 fathoms, rocks, with the East part of the island bearing S.W. by W. $\frac{1}{2}$ W. 3 miles, and the nearest patch of shoal water S.E. This appears to be an extensive shoal, consisting of patches, and formed in the shape of a horse-shoe. After passing between it and Low Island, sent the first officer in a boat to examine the nearest patch, on which he had $3\frac{3}{4}$ fathoms, pyramidal rocks, and there is probably less water on some of the patches, with channels between them. The South or outer patch appeared to lie 4 or $4\frac{1}{2}$ miles from Low Island in an E. by N. or N.E. direction.

Diana Reefs.—This dangerous coral reef, lying to the N.N.W. of Low Island, is thus described by Lieutenant Kempthorne, who grounded upon it in H.M. brig *Diana*:—Saw the bottom, and sounded in $4\frac{3}{4}$ fathoms, but lost the lead, by its getting fixed in the coral. Wore to the eastward, and had $5\frac{1}{2}$, 6, 7, 8, 10, 11, 17 fathoms, then no bottom at 20 fathoms. The boat sent to sound had $3\frac{1}{2}$ fathoms, and several casts of $5\frac{1}{2}$ fathoms on the points of coral, with deep water between them; two spots of discolored water, one bearing South, and the other S.W. by W. about 2 miles, appeared much shoaler than where the boat sounded. The shoal seemed to extend N.E. by E., and S.W. by W. $1\frac{3}{4}$ miles; no broken water was visible upon it, but when the swell rolled over the points of coral, it resembled a shoal of fish.

When the bottom was first seen in $4\frac{3}{4}$ fathoms, the N.E. point of Low Island bore S.E., and the N.W. point, with the S.W. point just open of it, bore S.S.E. $\frac{1}{2}$ E., Haycock Island, N. 43° W., distant from Low Island about 9 or 10 miles. Where the boat sounded, she had nearly the same bearings, but was half a mile more to the N.W., with Haycock Island just in sight from her.

Caution.—The channel between the Natuna and Anamba Islands is wide

and safe in daylight; but as several coral spots with but little water on them have been discovered in the vicinity of the Natunas, a good look-out is necessary, as other shoal patches, yet unknown, may probably exist.

Yong Sabal Bank, is placed on the Dutch chart W. $\frac{1}{2}$ S. 19 miles from the S. W. point of Low Island.

North Haycock Island, in about lat. $3^{\circ} 17' N.$, long. $107^{\circ} 34\frac{1}{2}' E.$ is high, of conical shape, having a reef projecting 3 or 4 miles from it to the S. W. and South, with 30 and 33 fathoms near its edge.

Elphinstone Rock is named after the ship which discovered it in 1844, and is thus described by her commander, Mr. Crawford:—It stands high out of the water, about 69 feet. From the southward a reef projects about a mile, at the extreme of which is a rock which is partially covered at high water. From this a dangerous reef projects a long distance to leeward, and is probably a continuation of the Hutton or Diana Reefs. To the northward of the main rock there appears to be a safe passage. This rock is in lat. $3^{\circ} 23' N.$, long. $107^{\circ} 50\frac{1}{2}' E.$, and in a dark night or thick weather a ship would be on it before it could be seen, as the soundings are no guide; from 40 to 23 fathoms in a cast.

GREAT NATUNA GROUP.—Great Natuna Island, called *Pulo Boong-Ouran* by the Malays, extends from $3^{\circ} 38\frac{1}{2}'$ to $4^{\circ} 16\frac{1}{2}' N.$, and two small islands off the North point, joined to it by a reef, extend about 3 miles farther with 17 fathoms water within a mile of them. The North extreme of the island is in long. $108^{\circ} 11\frac{1}{2}' E.$, and the East extreme in $108^{\circ} 23' E.$, its breadth being about 25 miles.

The interior of the island is mostly high; and on the northern part are two mountains of considerable elevation, *Mount Bedong* or *Quoin Hill*, in lat. $4^{\circ} 3' N.$, and *Mount Ranay*, near Cape Senubing, the East point of the island, in lat. $4^{\circ} N.$; the latter is 1,890 feet high, and may be seen 44 or 45 miles. Some of the projecting parts of the coast are rather low, particularly from lat. $4^{\circ} N.$ to the North end of the island, where there are red cliffs.

Reefs and islets front the eastern coast of this island, rendering it dangerous to approach under 6 or 7 miles in some places, at which distance the depths are usually from 34 to 46 fathoms. Mr. Whiteside, commanding the ship *Sarah*, describes an extensive coral bank in patches, in passing over which the ship received a slight shock, at which time a small island off the Natuna bore S. W. by W., distant about 6 miles. A one-fathom patch, in lat. $4^{\circ} 4' N.$, long. $108^{\circ} 26' E.$, called in the chart *Mieulle Reef*, agrees with this bearing, but it is only half the distance from the island, which is called *Senoang*, and lies close to Cape Senubing.

Devonport Rock is 10 miles distant from the East coast of the Great Natuna Island, and in the neighbourhood of deep water 34 fathoms. It has about 17 ft. water on the part where the *Devonport* struck. From the ship

the following bearings were taken; Senoang Island N.W., and Kamodi Island S.W. by W., which places it in about lat. $3^{\circ} 54' N.$, long. $108^{\circ} 30' E.$

A reef is placed upon the Admiralty chart S. by E. $\frac{1}{2} E.$, distant $3\frac{1}{2}$ miles from Kamodi, the outermost of two islets lying off this coast; and another reef is said to lie 3 or 4 miles farther in the same direction from that islet.

The Dutch vessel *Lamina Elizabeth* struck on a reef lying off the S.E. coast of Great Natuna, with Kamodi and Jantay Islets nearly in one, bearing N. by E. $\frac{3}{4} E.$; Mount Ranay N. by W. $\frac{2}{3} W.$; the nearest high land on Natuna W. by N. $\frac{1}{4} N.$; the South point of the same W. $\frac{1}{2} N.$; and the point of Lagong Island about W. by S. It appears necessary to be cautious in approaching the eastern and south-eastern coasts of Great Natuna.

The western coast of Great Natuna is also fronted by islands, the chief of which are the Duperré group, lying near its S.W. extreme. They are high islands; *Sédédap*, in lat. $3^{\circ} 34' N.$, is the southernmost. *Salaor*, or *Peaked Island*, in lat. $3^{\circ} 53' N.$, is also high; likewise *Seluan*, or *North-west Island*, in lat. $4^{\circ} 9' N.$, long. $107^{\circ} 50' E.$, which has a reef projecting a mile or more from its South point, with depths of 30 to 20 fathoms on its S.W. side; a reef is marked on the chart at $2\frac{1}{2}$ or 3 miles distance from the western side of this island, and one 3 miles S.S.E. of Sededap.

A reef of coral rock, with only 2 fathoms on it, and from 20 to 30 fathoms near it on the West and S.W. sides, lies in lat. $4^{\circ} 3' N.$, about 5 miles S.S.W. from Seluan Island; about 5 miles S.W. $\frac{3}{4} S.$ from this reef, and 10 miles N.W. by W. from Peaked Island, and about the same distance from Seluan Island is another coral shoal in lat. $3^{\circ} 59' N.$, having 3 fathoms, rocks, on it, and from 20 to 30 fathoms, mud, close around. These shoals were explored by Captain Ross, in 1814. There is also a reef named *Semapi*, midway between Seluan and the North point of Great Natuna, 9 or 10 miles off shore; it appears to be of considerable extent.

PYRAMIDAL ROCKS, in lat. $4^{\circ} 3' N.$, long. $107^{\circ} 21\frac{3}{4}' E.$, are in the track of ships returning from China late in the season, when they pass between the Anamba and Natuna Islands, proceeding towards Gaspar Strait. The *Windham* and *Coldstream*, in 1817, passed on the East side of these rocks at 4 miles distance; they described them as a clump, of rugged aspect, elevated about 20 or 25 feet above the sea. The *General Kyd*, commanded by Mr. Nairne, in 1818, passed 4 or 5 miles to the westward of them; when Seluan Island bore N. $85^{\circ} E.$, the rocks were on a transit line with Salaor Island bearing S. $72^{\circ} E.$, distant 4 or 5 miles.

In 1863, H.M.S. *Rifeman* carried a line of soundings from Victory Island to the position of a doubtful rock that was placed on the Admiralty chart 11 miles S.W. of the Pyramidal Rocks. The *Rifeman* passed close to the spot without discovering any danger, and had soundings in 33 fathoms. The

Pyramidal Rocks were also passed within 4 miles, but it was getting too dark to examine them closely.*

A *Doubtful Rock* is placed upon the chart in lat. $4^{\circ} 11' N.$, long. $107^{\circ} 34\frac{3}{4}' E.$, about 15 miles N.E. by E. from the Pyramidal Rocks, and the same distance to the westward of the North point of Seluan Island. The Dutch notice, previously alluded to, states that a rock, 25 ft. above water, was discovered lying N.E. by E. $\frac{1}{4}$ E. of the Pyramidal Rocks. Its appearance was similar to those in the neighbourhood of Pulo Semione, and it is said to be in long. $107^{\circ} 26' E.$

Success Reef is about 2 miles in extent, in lat. $4^{\circ} 22' N.$, long. $107^{\circ} 55' E.$, nearly midway between Semione Island and the North point of Great Natuna. When the breakers on the reef were seen from the ship's deck bearing E. by S. about 2 miles, Semione bore N.W. $\frac{3}{4}$ W. about 12 miles; the eastern extreme of North Natuna N. by E.; and the western extreme of Great Natuna S. by W. $\frac{1}{4}$ W. about 20 miles. The ship afterwards tacked in 35 fathoms, within a mile of the breakers. The *Favourite*, Captain La Place, in March, 1831, passing close to the eastern extremities of these dangers, marked as two patches in his chart, carried soundings of 30 to 20 fathoms, sandy bottom.

Semione or Saddle Island, in lat. $4^{\circ} 31' N.$, long. $107^{\circ} 42' E.$, has a reef projecting from its South end, and another from the N.W. end, with less than 3 fathoms water on it, and 40 fathoms close-to.

There is a rock above water about 4 miles S. by W. $\frac{1}{2}$ W. from this island and between them are depths of 28 fathoms.

THE NORTH NATUNA GROUP are of moderate height, producing coconuts and some other fruits, and are inhabited by Malays. They comprise a long island named *Pulo Laut* (Sea Island), stretching N.E. by N. and S.W. by S. 8 miles, with *Pulo Stokong*, a smaller island, near its northern extreme, and several islets and rocks close to its southern end, upon the reef that fronts the shore. There is also a rocky islet, in lat. $4^{\circ} 39' N.$, about $2\frac{1}{2}$ miles S. by E. $\frac{1}{4}$ E. from the S.E. point of Laut; and S. $\frac{1}{8}$ E., $2\frac{1}{2}$ miles from this islet, a rock touched on by the *Louise and Marguerite*, drawing $14\frac{1}{2}$ ft. water, in 1873. From it the S.W. end of Pulo Laut bore N.N.W. $\frac{1}{2}$ W. *Gloria Reef*, on which the Spanish steamer of that name was wrecked in May, 1877, lies 2 miles N.W. of the *Louise and Marguerite*. From this wreck, lying in 15 feet water, the West extreme of Pulo Laut bore N.N.W., and the South extreme of Semione Island W.S.W. Between the two reefs a depth of 12

* From the Pyramidal Rocks, H.M.S. *Rifleman* carried a line of soundings to the position of the *French Rocks*, shown on former charts as three rocks above water lying N.N.W. $\frac{1}{2}$ W. of Pulo Laut. Their position was approached on a W. by N. $\frac{1}{2}$ N. bearing, and at noon the *Rifleman* was 2 miles North of it. She then steered South $7\frac{3}{4}$ miles, N.W. 9 miles, and N.E. $6\frac{3}{4}$ miles, without discovering any signs of the rocks. The soundings about the spot were from 35 to 40 fathoms.

feet was found, so that the locality must be most carefully avoided until examined properly. About 9 or 10 miles south-westward of the rocky islet is *Cockeran Bank*, with 8 fathoms on it, from which Semione Island bears W. by S. $\frac{1}{4}$ S., distant 11 miles.

The North extreme of these islands is in lat. $4^{\circ} 51' N.$, long. $108^{\circ} 3' E.$ There are 35 fathoms water about $1\frac{1}{2}$ mile N.N.W. from Stokong, but the whole of the western coast of Laut is fronted by a dangerous reef, which extends nearly 5 miles W. by S. and W.S.W. from the S.W. point of that island, having no bottom at 40 fathoms within a mile of its West extreme; but both North and South of this extreme there are soundings of 32 to 36 fathoms, mostly coral bottom.

SHOALS ON EASTERN SIDE OF MAIN ROUTE.

Scawfell Shoal and Charlotte Bank are hereafter described.

Vanguard Bank is crescent-shaped, about 37 miles long, with an average width of 6 miles. It has no danger whatever on it, the least water being 9 fathoms, the general depths varying from 20 to 60 fathoms. The horns of the crescent are respectively in lat. $7^{\circ} 16\frac{1}{2}' N.$, long. $109^{\circ} 26' E.$, and lat. $7^{\circ} 31' N.$, long. $109^{\circ} 57' E.$, the convex curve being on the N.W. side, and reaching to the parallel of $7^{\circ} 36' N.$

Grainger Bank, lying 33 miles north-eastward of the Vanguard, is pear-shaped, $5\frac{1}{2}$ miles long, N.E. and S.W., by $2\frac{1}{2}$ at its widest part. It has only 6 fathoms least water on it, but no danger; the general depths are under 20 fathoms, the bottom coral, quite visible over nearly the whole of it. The centre is in lat. $7^{\circ} 47\frac{3}{4}' N.$, long. $110^{\circ} 29' E.$

Prince Consort Bank (discovered by the *Rifleman*), lies between the Vanguard and Prince of Wales Bank, and extends from $7^{\circ} 46' N.$ to $7^{\circ} 58' N.$, and from $109^{\circ} 55'$ to $110^{\circ} 6' E.$ No danger exists on it; the general soundings are from 30 to 50 fathoms, sand and coral, the least water found being on a small coral patch of 10 fathoms.

Prince of Wales Bank, the centre of which is in lat. $8^{\circ} 8\frac{1}{2}' N.$, long. $110^{\circ} 32\frac{1}{2}' E.$, is in shape an irregular oblong, 12 miles in extent N.E. and S.W., by $7\frac{1}{2}$ miles wide; near its N.W. corner is a patch having 4 fathoms on it, but nothing less was found. It is in character just the same as the other banks in the neighbourhood, coral, having three or four excrescences on it, but no danger, without the 4 fathoms may be considered so; the general depths upon it are under 20 fathoms.

Alexandra Bank, in lat. $8^{\circ} 1\frac{1}{2}' N.$, long. $110^{\circ} 36\frac{3}{4}' E.$, is in shape a full oval, 5 miles in extent North and South, by $3\frac{1}{2}$ miles wide. A small patch with only 3 fathoms water on it was found close to the eastern edge, but no other dangers exist. The average depth on the bank is about 15 fathoms; the bottom coral, distinctly visible.

Rifleman Bank lies between the parallels of $7^{\circ} 31'$ and $7^{\circ} 57' N.$, and the meridians of $111^{\circ} 32'$ and $111^{\circ} 45\frac{1}{2}' E.$ Shoal patches were found round its edges, one of which, of only 11 ft. water and half a mile in extent, lies on its northern edge in lat. $7^{\circ} 55' 20'' N.$, long. $111^{\circ} 42' E.$; with this exception, 4 fathoms was the least depth obtained on the bank. In the centre of the bank, the soundings are from 20 to 40 fathoms, sand and coral; and around its edge, outside, a few deep casts were obtained varying from 300 to 600 fathoms.

Bombay Castle Shoal.—The 11 ft. patch on the North edge of this bank is the shoal seen by Mr. Cameron, commanding the *Orleana*, who obtained a cast of 8 ft., and placed the danger in lat. $7^{\circ} 56' N.$, long. $111^{\circ} 38' E.$ The 8 ft. knoll was not found by the *Rifleman's* boats, but it is quite possible to have escaped the lead, for large isolated rocks are known to exist on coral reefs, though extremely difficult to find. Heavy breakers mark the position of this patch, in any but the finest weather.

The *Rifleman* sounded over the position assigned to the Bombay Castle Reef, in lat. $7^{\circ} 56' N.$, long. $111^{\circ} 51' E.$, but no bottom could be obtained with upwards of 10 fathoms of line; nor could any sign of shoal water be seen from the mast head under most favourable circumstances, when on, and cruising around its supposed position; it is therefore deemed probable that the *Bombay Castle* must have sighted the 11 ft. patch on the Rifleman Bank, as the latitude is nearly the same, though the longitude differs 9 miles.

LADD REEF (*Rob Roy Reef* of former charts), the eastern extreme of which is in lat. $8^{\circ} 40\frac{1}{4}' N.$, long. $111^{\circ} 41' E.$, is a coral bank 3 miles long E.N.E. and W.S.W., and a mile wide at its broadest part, which is at its eastern end. In the centre of the reef is a lagoon with a bottom of clear white sand, which shows up with remarkable distinctness. The surrounding reef uncovers at half tide in many places, and at low water it is almost impossible for boats to cross over into the lagoon. A conspicuous beacon was reported to exist on it in 1868.

Gillies Island, doubtless identical with Ladd Reef, reported to be in lat. $8^{\circ} 38' N.$, long. $111^{\circ} 28' E.$, is now removed from the charts. H.M.S. *Rifleman* found 800 fathoms in its supposed position.

SPRATLY ISLAND, in lat. $8^{\circ} 38' N.$, long. $111^{\circ} 54' 30'' E.$, bearing E. $\frac{1}{2}$ S., distant 14 miles from Ladd Reef, is evidently identical with *Storm Island*, as no other island exists in the vicinity. It is a flat islet, about 8 ft. high, and very small, being in extent but $2\frac{1}{2}$ by $1\frac{1}{2}$ cables' lengths, with a margin of bright white sand and broken coral, which, when the sun is shining on it, is conspicuous from the mast-head at a considerable distance. It was described by Mr. Spratly, commanding the *Cyrus*, whaler, as "a low sandy island, the top appearing to be covered with bushes." Commander Ward says that not a bush or even a blade of grass is to be found upon it,

and the appearance described by Mr. Spratly was no doubt the effect of the mirage, which exaggerates the size and distorts the appearance of the driftwood on the beach and the sea birds which throng it. At a distance of 3 or 4 miles, the birds standing erect look very like small bushes.

The islet is on the West side of a coral bank, which is $1\frac{1}{2}$ mile long N.E. and S.W., and three-quarters of a mile wide. Northward of the islet the bank is shallow, there being only $3\frac{1}{2}$ fathoms close to the edge of the deep water, three-quarters of a mile distant from the islet, decreasing towards the shore. North-eastward of the islet there are 7 or 8 fathoms on the bank, which extends not quite half a mile from it. Rocky ledges, dry at low water, surround the islet, rendering it necessary to be cautious when landing in boats, which during the S.W. monsoon may be effected on the lee side. The bank is steep-to, the sea breaking heavily upon it in the S.W. monsoon, except in very fine weather.

A square *beacon* was erected by Commander Ward on this islet. It is formed of four uprights of rough driftwood spars, 27 feet high and 15 feet apart. The uprights are shored up, and the centre space solidly filled in and built up to the height of 15 feet with driftwood, rubble, &c. The top is at present covered in with canvas—to be replaced by plank if circumstances permit—with black and white sides, and may be seen in clear weather at a distance of 8 miles.

The *Rifleman* anchored in about 6 fathoms on the N.E. point of the bank, but it is so steep-to, that, riding with the wind W.S.W., and 50 fathoms of chain out, the vessel's stern was in 54 fathoms; this position was, however, fairly sheltered from the S.W.; the extremes of the islet bore S.W., $\frac{1}{2}$ S.; and S.W. by W. $\frac{1}{2}$ W., and the extreme of the breakers on the western edge W. $\frac{3}{4}$ S.

In the months of June and July the island swarmed with turtle of a very fine description, and they may possibly frequent it at other seasons. Large numbers were taken, being easily turned over by two or three men on the beach, in the evening or night, and occasionally in the daytime; they are apparently identical with the green turtle of Ascension. Immense quantities of their eggs were found on the S.W. side of the islet. Fish were numerous, but very few captures effected. Sea birds' eggs literally covered the ground. About seventy sprouts of cocoa-nut trees were planted, and at the end of a fortnight exhibited every promise of a vigorous growth.

Tides.—Observations at Spratly Island in the S.W. monsoon showed but one tide during the 24 hours, and in the early part of July it was found to be high water at 9^h a.m., the rise and fall being $5\frac{1}{2}$ feet. No observations up to the present time have been obtained during the N.E. monsoon, which probably creates a great change. The direction of the stream at the N.E. corner of the bank was S.W. during the rising tide, and S.E. to E.N.E. during the falling tide.

The *Ruby Shoal*, a small spot formerly shown upon the Admiralty chart in lat. $8^{\circ} 35' N.$, long. $112^{\circ} 4' E.$, was searched for in 1864 and in 1865 by the *Rifleman* without success; it is now expunged from the chart.

LONDON REEFS.—*West London Reef*, bearing E. by N. $\frac{3}{4}$ N. distant 31 miles from Ladd Reef, is the westernmost of a group of shoals, the London Reefs of the charts. It is a bank $4\frac{1}{2}$ miles long, N.E. by E. and S.W. by W., $3\frac{1}{4}$ miles wide, and almost surrounded by coral reefs, some of which dry at low water. There is a space in the centre of the bank with from 6 to 10 fathoms water in it, but also many shoal spots. The only approach to this central space is from the S.E. side, but so many coral patches crop up that the navigation is extremely hazardous. On the East side of the bank, in lat. $8^{\circ} 52' N.$, long. $112^{\circ} 14\frac{3}{4}' E.$, is a sandy cay, a quarter of a mile in extent N.E. and S.W., but only 26 yards wide, and 2 feet above high water. The *Rifleman* anchored at the middle of the North side of the bank in lat. $8^{\circ} 53' N.$, long. $112^{\circ} 12\frac{3}{4}' E.$

Central London Reef, the centre of which is in lat. $8^{\circ} 55\frac{1}{3}' N.$, long. $112^{\circ} 20' E.$, was discovered by the *Rifleman* whilst sounding between the East and West London Reefs. It is a coral patch, awash, half a mile in extent, with a shallow lagoon inside the belt of coral. On the S.W. extreme of the reef is a sandy cay, 60 or 70 yards in circumference, which is probably covered at high-water springs.

This is in every respect a most dangerous reef, and lies directly in the track of vessels working up or down the China Sea. Being small, it is not marked by great masses of breakers, like those which so readily point out the positions of East and West London Reefs, for one of which it has probably been mistaken, when sighted, as it has doubtless been.

Caution.—Like all other dangers in the China Sea visited by the *Rifleman*, the Central London Reef is surrounded by deep water, thus rendering the lead useless; it is therefore essentially necessary to observe the greatest precaution when in their vicinity, and never to stand towards them with the sun shining ahead, as under these circumstances it becomes almost impossible to distinguish shoal water or breakers.

East London Reef is 7 miles long, East and West, from 1 to 2 miles broad, and its East end is in lat. $8^{\circ} 49' 38'' N.$, long. $112^{\circ} 37' 26'' E.$ The coral round its edges encloses a lagoon, having 4 to 8 fathoms water. No entrance into the lagoon could be discovered, but there were apparently numerous shoal patches inside. The sea breaks heavily on the reef, and on its western extreme are one or two rocks which seldom cover. No soundings could be obtained with 100 fathoms of line at one mile from where the coral dries, nor with 500 fathoms at 2 miles North of it.

Quarteron Reef, named after the Spaniard who discovered it, is awash, and in shape like a crescent, whose chord is 3 miles in length, E. by S. and

W. by N., with the curve to the southward. Its eastern extreme is in lat. $8^{\circ} 50' 54''$ N., long. $112^{\circ} 49' 34''$ E.

This reef was found steeper-to than any yet visited, for although deep water is found close to all of them, there was generally some slope from the rocks awash, on which the *Rifleman* could anchor with safety for a short period, to enable the position to be fixed; here, however, although she anchored in 5 fathoms, with the jib-boom over the rocks awash, the reef was so steep as to cause the anchor to roll down the incline, and run the cable out to the clinch. Captain Ward is of opinion that no vessel should ever venture to sight this reef.

The **Fiery Cross or Investigator N.W. Reef**, which was marked as two distinct dangers on former charts, was found by Lieutenant J. W. Reed in H.M.S. *Rifleman* in 1867, to be but one extensive coral reef, having several dry patches on it, upon most of which the sea breaks even in light winds, or with a light swell. It is 14 miles in length N.E. by E. and S.W. by W., and 4 miles in breadth. Its S.W. end is in lat. $9^{\circ} 32'$ N., long. $112^{\circ} 53'$ E., and its N.E. end in lat. $9^{\circ} 41'$ N., long. $113^{\circ} 4'$ E. The largest dry patch is at its S.W. end, and here were found the wrecks of two vessels, supposed to have been those of the *Fiery Cross* and *Meerschaum*, both of which are known to have been lost upon this reef.

Dhaulle Shoal, reported in the year 1826, by the vessel of that name, which anchored on it in 3 fathoms, is now erased from the charts. Its reported position was 25 miles westward of the South end of Fiery Cross Reef, in lat. $9^{\circ} 32'$ N., long. $112^{\circ} 24'$ E. Here, and in the locality in favourable weather, H.M.S. *Rifleman* was employed a whole day in searching for this reef, but with no success, a depth of 1,060 fathoms being found on the spot. The *Dhaulle* doubtless anchored on the end of Fiery Cross Reef.

DISCOVERY GREAT REEF, the South end of which is in lat. $10^{\circ} 0' 42''$ N., long. $113^{\circ} 51\frac{1}{2}'$ E., is a long, narrow coral shoal, the greater part of which dries at low tides, with several large rocks upon it which always show above water; in the centre is a lagoon, which appeared to be shallow, and to have no passage through the reef leading into it. From the South point the reef trends first North, 5 miles, then N. by E., 5 miles, and it is a mile broad at the South end and half a mile at the North. No bottom was found with 100 fathoms line within a very short distance of any part of the reef except off its North end, where the *Rifleman* anchored in 42 fathoms, nearly half a mile from the rocks; a third of a mile off its S.W. point a sounding of 192 fathoms, sand and coral, was obtained.

The reef reported 10 miles north-eastward of Discovery Great Reef was found to have no existence by H.M.S. *Rifleman*.

Discovery Small Reef, in lat. $10^{\circ} 1\frac{1}{2}'$ N., long. $114^{\circ} 1\frac{1}{2}'$ E., is a small

round coral patch, a third of a mile in diameter, dry in places at low tides, with very deep water all round. Soundings of 174 and 180 fathoms, sand and coral, were obtained very close to its eastern side, and no bottom at 210 fathoms the same distance off the opposite side.

Western or Floral Temple Reef, the centre of which is in lat. $10^{\circ} 15' N.$, long. $113^{\circ} 37' E.$, is the westernmost reef in this part of the China Sea, and very dangerous, having patches of rock just under water at the S.W. part, and but 1 to 3 fathoms in other places. It is $1\frac{1}{2}$ mile long N.E. and S.W., and rather more than half a mile broad at the southern part, decreasing to half that breadth at the opposite end. The *Rifleman*, for the purposes of the survey, anchored in 5 fathoms on its north-eastern extreme, which had to be approached with great caution, as shoal water was seen at a very short distance inside the edge; soundings of 18 to 74 fathoms were obtained close to, but at a short distance off no bottom at 100 fathoms.

The reef upon which the *Flora Temple* was wrecked in 1859 was said to lie 6 miles north-westward of the western reef, but the *Rifleman* passed over that position, and certainly no danger exists there; moreover, the description of the reef given at the time of the wreck applies exactly to the Western reef, where, without doubt, the ship was lost.

TIZARD BANK and REEFS.—From Discovery Small Reef, the nearest part of this bank bears N.E. by E., and is distant 16 miles. It is very extensive and, like the generality of the large coral banks in the China Sea, consists of a lagoon, bordered by shoal patches. Several of the patches up on the Tizard Bank are dangerous reefs, dry at low water, two with islands on them, and a third a sand cay. The bank lies in an E.N.E. and W.S.W. direction, and extends nearly 31 miles; its breadth in the middle being 11 miles, at the S.W. part 7 miles, and at the opposite end $3\frac{1}{2}$ miles.

Itu Abaar, the larger of the two islands, is situated at the N.W. corner of the bank, and is three-quarters of a mile long E. by N. and W. by S., and a quarter of a mile broad. The reef surrounding it extends in some places to the distance of a short half mile, and in others not so far; its limits, however, are generally defined by a line of breakers. The island is covered by small trees and high bushes, together with numerous nests of sea birds. Two or three cocoa-nut and a few plantain trees stand near a small well, but the most conspicuous object is a single black clump-like tree on the North side of the island, which may be distinctly seen 10 miles off; this is in $10^{\circ} 22' 25'' N.$, and $114^{\circ} 21' 45'' E.$

A little more than 6 miles East from *Itu Abaar* is a small *sand cay*, nearly in the centre of a round-shaped reef, three-quarters of a mile in diameter. The island and cay are connected by a line of shoal patches, which form the N.E. part of the bank; and nearly midway between, but nearer the island, is a dangerous reef, entirely covered at half-tide, about the same size as that surrounding the cay. Elsewhere on the northern edge of the bank

there is not less than 4 fathoms, and vessels may safely anchor in from 7 to 11 fathoms about $1\frac{1}{2}$ mile westward of the sand cay, midway between it and the reef last described.

Petley Reef, an oval-shaped patch a little over a mile in extent, lies E. by N. $\frac{3}{4}$ N. $5\frac{1}{4}$ miles from Sand Cay; it forms the extremity of a remarkable strip of coral, $1\frac{1}{4}$ mile wide, projecting like a horn in a N.N.E. direction from the main body of the bank, the edge of which trends E.S.E. from the cay; not less than 6 fathoms was found upon the strip, except within a mile of the southern part of the reef above mentioned, where it shoals to 4 and 3 fathoms, and no bottom could be obtained with 100 fathoms at a short distance on either side of it.

Eldad Reef, the N.E. end of which is in lat. $10^{\circ} 23' N.$, long. $114^{\circ} 42' E.$, forms the eastern extreme of Tizard Bank. It is a peculiarly shaped reef, $4\frac{1}{2}$ miles long, N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W., the southern and middle parts being about $1\frac{1}{2}$ mile wide, but of irregular outline; and the northern part tapering away in the form of a long, narrow tongue, on either side of which no bottom could be obtained with 100 fathoms of line. A few large rocks are visible at high water, and at low water many smaller ones uncover. Shoal patches extend nearly three-quarters of a mile to the westward of the reef.

Namyit Island lies due South from Itu Abaer, distant $11\frac{1}{4}$ miles; it is very small, being only 3 cables long East and West, and 1 cable broad, and is surrounded by a reef which projects more than a mile to the westward, and about a third of a mile in other directions.

Gaven Reefs are two dangerous reefs, covered at high water, which lie to the westward of Namyit; the first is oval-shaped, three-quarters of a mile long N.N.W. and S.S.E., the island bearing from it E. $\frac{2}{3}$ N., distant 6 miles; the second is a mile long North and South, and nearly three-quarters of a mile broad at its northern end, narrowing to a point at the opposite end; this last is the westernmost danger of the Tizard group, and its outer edge is in $10^{\circ} 13' 20'' N.$, and $114^{\circ} 13' 7'' E.$

Anchorage.—The above comprise all the dangers found upon this great bank, and, with the exception of a small 3-fathom patch which lies N.E. nearly a mile from Namyit Island, nothing less than 4 fathoms was found upon any of the shoal patches surrounding the lagoon; so that vessels of moderate draught can, in cases of necessity and in fine weather, find convenient anchorage, observing always due care and caution in approaching them, so as to guard against possible danger from some shoal spot having escaped detection by the lead.

Hainan fishermen, who subsist by collecting trepang and tortoise-shell, were found upon most of these islands, some of whom remain for years amongst the reefs. Junks from Hainan annually visit the islands and reefs of the China Sea with supplies of rice and other necessaries, for which the

fishermen give trepang and other articles in exchange, and remit their profits home. The junks leave Hainan in December or January, and return with the first of the S.W. monsoon. The fishermen upon Itu Abaer Island were more comfortably established than the others, and the water found in the well on that island was better than elsewhere.

LOAI-TA BANK and REEFS extend 21 miles N.E. and S.W.; its southern part is $5\frac{1}{2}$ miles wide, and its centre 7 miles; from thence it gradually narrows to a point at its N.E. extreme.

Loai-ta Island (South island of Horsburgh) lies N. $\frac{3}{4}$ E., distant 18 miles, from Itu Abaer, its N.W. extreme being in lat. $10^{\circ} 40' 45''$ N., long. $114^{\circ} 24' 54''$ E. It is a low sand island, covered with bushes, and small, being only $1\frac{1}{2}$ cable in diameter; a reef surrounds it, extending, in some places, nearly half a mile.

A reef, about $1\frac{1}{2}$ mile in extent, dry at low water, and having a small sand cay near the centre, lies 5 miles north-westward of Loai-ta. Another and larger reef lies three-quarters of a mile to the south-westward of the one just mentioned, extending in that direction $1\frac{3}{4}$ mile, its width being about a mile. The S.W. extreme of this last reef, which is also the S.W. extreme of Loai-ta bank, is in $10^{\circ} 42'$ N., and $114^{\circ} 19'$ E.; the sand cay bearing N.E. distant nearly 3 miles, and Loai-ta Island E. by S. 6 miles.

From the sand cay above mentioned the north-western edge of the bank trends away E.N.E. 5 miles, and then N.E. 13 miles; no less than 4 fathoms was found anywhere upon this part of the bank.

Lan-Keeam Cay, a coral patch, half a mile in extent, which partly dries at low water, lies E. by N. 2 miles from Loai-ta Island; and E.N.E. $6\frac{1}{2}$ miles from the same island is a larger reef, three-quarters of a mile in diameter, having a sand cay near its centre; this cay, known to the Hainan fishermen as Lan-Keeam, is in $10^{\circ} 43' 20''$ N., $114^{\circ} 31'$ E.

N.E. by E. $\frac{1}{2}$ E. 3 miles from Lan-keeam is a small dry patch, which forms the S.E. angle of the great Loai-ta Bank, and N.E. $\frac{1}{4}$ N. $4\frac{1}{4}$ miles from that cay is another small reef; this last is the northernmost patch which dries.

From the reef just mentioned the south-eastern edge of the bank trends to the N. by E. about 9 miles, when it meets the north-western edge; nothing less than 4 fathoms was obtained on this part of the bank.

SOUBIE REEF, the S.W. end of which is in lat. $10^{\circ} 53\frac{1}{2}'$ N., long. $114^{\circ} 4'$ E., is the westernmost danger in this locality. It is an irregular-shaped coral reef, nearly $3\frac{1}{2}$ miles long, N.E. and S.W., and 2 miles broad, is dry at low water, and has a lagoon, into which there appears to be no passage.

THI-TU REEFS and ISLAND, or the *N.W. Dangers*, consist of several very dangerous patches grouped upon two coral banks, separated by a narrow deep gut. Thi-tu is a low sand island, somewhat round in shape, and

not quite half a mile in diameter. Near its S.W. end is a dark clump tree in lat. $11^{\circ} 3' 9''$ N., long. $114^{\circ} 16' 25''$ E.; in addition to this clump tree the island has upon it some low bushes and two stunted cocoa-nut trees, near to which is a small well and a few plantain trees.

From the island the western bank widens out in directions N.W. and S.W. for a distance each way of $2\frac{1}{2}$ miles; the North side of this part of the bank is marked by a round coral reef, three-quarters of a mile in diameter, between which and the reef surrounding the island are soundings of $2\frac{1}{2}$ to 7 fathoms, the deep water being nearer the island. The South edge of the bank is also marked by a reef, but this is much smaller than the one just described, and the depths between it and the island are more favourable for anchoring upon than the opposite side of the bank, being in no place less than $4\frac{1}{2}$ fathoms. From these two reefs the bank gradually narrows, and terminates in a point in lat. $11^{\circ} 2' 30''$ N., long. $114^{\circ} 10' 30''$ E., the island bearing E. $\frac{3}{4}$ N., distant 6 miles.

On the North edge of the bank is a sand cay, which bears from the island W. $\frac{1}{3}$ N., nearly $3\frac{1}{2}$ miles. This is also on a large patch of reef, dry at low water, and between it and the western extreme of the bank are dangerous reefs, nearly always marked by breakers. There is a passage into the lagoon between the sand cay reef and the one $2\frac{1}{2}$ miles N.W. of the island, with depths of 5 to 12 fathoms.

The South side of the bank is not nearly so dangerous as the North side, and vessels may anchor upon it with the sand cay bearing between N.E. by N. and N.W. by N., or to the eastward of the patch which lies S.W. $2\frac{1}{2}$ miles from the island, with the cay bearing N.W. by W. $\frac{1}{2}$ W., and the island N.E. $\frac{1}{2}$ E. In the lagoon the depths are 17 to 19 fathoms.

The eastern bank is a mass of dangerous reefs and patches; its western extreme is more than a mile eastward of Thi-tu Island, extending from thence $1\frac{1}{2}$ mile East and $3\frac{1}{2}$ miles N.E., with an average breadth of 2 miles.

TRIDENT SHOAL, lying E. by N. 16 miles from North Danger, is a coral bank $7\frac{1}{2}$ miles long and 6 broad, of the shape of a shoulder of mutton, the broad part being to the northward; it is composed of many patches with less than 10 fathoms water over them, two of which are dangerous. These patches lie round the edges of the bank, forming a lagoon, the depths in which are 26 to 37 fathoms; close outside of them, there is no bottom at 100 fathoms.

The most dangerous patch is at the northern extreme of the shoal. This patch extends $1\frac{3}{4}$ mile East and West, and half a mile North and South, and near its centre, in lat. $11^{\circ} 31' 30''$ N., long. $114^{\circ} 39' 15''$ E., is a small spot which dries at low water springs; the depths on other parts of the patch vary from $1\frac{1}{4}$ to 6 fathoms. The other patch is at the eastern extreme of the shoal, and is distant $3\frac{1}{2}$ miles S.E. $\frac{1}{2}$ S. from that just described; it is a small spot of $2\frac{1}{4}$ fathoms, with depths of 3 to 5 fathoms at half a mile around.

it. Some casts of 4 fathoms were had about a mile W. by S. from the dry spot, but not less than 5 fathoms on any of the other patches.*

LYS SHOAL lies 2 miles southward of Trident Shoal, and like the latter is formed of a number of patches under 10 fathoms, with a lagoon in the centre; only one danger, a small spot of 17 ft., was found, and this lies near the S.W. extreme of the bank, in lat. $11^{\circ} 19' 40''$ N., long. $114^{\circ} 34' 24''$ E.; around it the depths are 5 fathoms. Some 5-fathom patches were also discovered near the N.E. end of the bank, but nothing under 6 fathoms was met with elsewhere, the general depths on the patches being 7 to 10 fathoms, and a short distance outside of them bottom was not reached with 100 fathoms of line.

North Danger Reef, of coral formation, is about $8\frac{1}{2}$ miles long, N.E. and S.W., and $4\frac{1}{2}$ miles broad. On its N.W. side are two sandy cays, the north-eastern of which is half a mile long, one-quarter of a mile broad, and 10 ft. above the level of the sea at high water; the south-western cay is only 4 cables long, and $1\frac{1}{2}$ cable broad, but its elevation is 15 ft. above the same level. Between the cay is a passage 1 mile wide, with from 4 to 9 fathoms water, leading into the lagoon of the reef, where the depth is from 20 to 25 fathoms.

Shoal water exists all round the edge of North Danger Reef, and there are heavy breakers over the coral, awash at its N.E. and S.W. extremes. No soundings could be obtained close to the edge of the reef with upwards of 100 fathoms of line, but one cast of 380 fathoms was procured $1\frac{1}{2}$ mile to the N.E. of the breakers on its N.E. extreme. On the eastern side of the reef no bottom could be obtained with 450 fathoms of line.

Both cays are covered with coarse grass, and on the north-eastern of the two is a stunted tree in lat. $11^{\circ} 28' N.$, long. $114^{\circ} 20\frac{3}{4}' E.$ The cays are frequented by Chinese fishermen from Hainan, who collect biche-de-mer, turtle-shell, &c., and supply themselves with water from a well in the centre of the north-eastern cay.

Caution.—Vessels should not attempt to pass through the reefs in this part of the China Sea, as a line of dangerous shoals, extending many miles, is known to exist eastward of the dangers just described.

Currents and Tides.—Whilst the *Rifeman* was at anchor on the reefs, careful observations were taken of the set of the current, which, for 16 hours

* Mr. Lyall, commander of the *Trident*, who discovered the Trident Shoal, placed it 6 miles to the northward of this position. The *Rifeman* was employed five days searching that locality without discovering any danger, and it is certain none exists there.

The Bremen vessel *G. E. Lorenz Meyer* was reported by her commander, Mr. Moller, to have struck at night upon a shoal in lat. $11^{\circ} 25' N.$, long. $114^{\circ} 51' E.$; this position was also examined by the *Rifeman*, but no danger discovered, and there is but little doubt that the vessel struck on the eastern patch of the Trident.

out of the 24, invariably set to windward, generally with the greatest force when the monsoon was strongest.

The rise of tide at springs was about 5 ft., and at neaps 1 to 2 ft. ; one tidal stream in 24 hours.

ISLANDS AND DANGERS IN THE FAIRWAY OF THE MAIN ROUTE.

CHARLOTTE BANK.—H.M. surveying vessel *Rifleman* anchored in 8 fathoms upon the Charlotte Bank, in lat. $7^{\circ} 7\frac{1}{4}'$ N., long. $107^{\circ} 37\frac{1}{4}'$ E. From this position the bank extended North three-quarters of a mile, South $1\frac{1}{4}$ mile, East three-quarters of a mile, and West 3 miles ; the least water found was 5 fathoms. The bank will be avoided by keeping under 30 fathoms water when passing its parallel.

SCAWFELL SHOAL.—Mr. Thompson, commanding the ship *Scawfell*, reports as follows:—"On the 13th of May, 1865, on my passage up the China Sea, just before noon I observed an unusual quantity of fish around the ship, and while taking noon observations, rocks were reported under the bottom. I immediately got a cast of the lead, and had 9 fathoms, the lead trembling off the coral gave half a fathom more. The water was very smooth at the time, the vessel having just steerage way, with a very light air from the N.E. Other casts of the lead gave $7\frac{1}{2}$ fathoms until about the middle of the shoal, when the lead got fast between the coral rocks and was lost ; this part appeared as shoal as any that was visible round the ship. Got another lead ready as soon as possible, when we had 17 fathoms, then losing sight of the bottom, the ship drifting to the N.N.W., with a light northerly current about one knot an hour. On sounding an hour later, the ship going in the same direction at the same rate, had 22 fathoms ; one hour afterwards 20 fathoms, this last being 5 or 6 miles north-westward of the shoal.

"The noon observations taken on the shoal gave lat. $7^{\circ} 19'$ N., and by mean of forenoon and afternoon sights for chronometer, made the longitude of the shoal to be $106^{\circ} 51'$ E.. Made Pulo Condore next day, and by that island, together with observations taken in Sunda and Gaspar Straits, the chronometers appeared to be quite correct."

It will be seen that the position of this shoal is about as far to the westward of the usual track of shipping proceeding up or down the China Sea before a fair monsoon as the Charlotte Bank is the eastward of it. Lying so near the fairway, it appears extraordinary that it has not been before observed.

BANDA SHOAL, discovered in 1871, has a depth of 3 fathoms over it, and lies S.E. 48 miles from Pulo Condore, in lat. 8° N., long. 107° E. It is marken on the charts as a small isolated patch.

PULO CONDORE has been before noticed on page 429. It is 50 miles off the coast of Cambodia, and is to the westward of the main track through the China Sea, but immediately in the way of those going between Singapore and Saigon. It is occupied by the French, who use it as a penal settlement. The approaches to the island are safe. The village in the Great Bay on the S.E. side is in lat. $8^{\circ} 40' 57''$ N., long. $106^{\circ} 36' 11''$ E.

The Great Bay is formed by the projection from the main body of the island of two high points of land, which are about 5 miles apart. Off the southern point a chain of four islets extends nearly $1\frac{1}{2}$ mile to the eastward, and the bay is fronted in that direction by an island, named Haon Bai Kan, having an islet off its South side, named Haon Lap.

There are three passages into this bay; that between the southern point and the islets to the eastward of it, although but a quarter of a mile wide, is quite safe, with depths of 20 and 16 fathoms, decreasing to 9 and 7 inside. The passage between the islets and Hoan Bai Kan is about $2\frac{1}{4}$ miles wide, but is nearly filled up by a bank with depths generally of $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, hut having one patch of only $2\frac{3}{4}$ fathoms, and two patches of 3 fathoms upon it. The $2\frac{3}{4}$ -fathom patch lies about two-thirds of a mile N.E. $\frac{3}{4}$ E. from the easternmost of the islets. One of the 3-fathom patches lies nearly a mile N.E. by E. from the same islet, and the other is about half a mile S. by W. $\frac{3}{4}$ W. from the western part of Haon Bai Kan. The passage between the northern point of the bay and Haon Bai Kan is the best for large vessels, being two-thirds of a mile wide, with depths of 10 to 19 fathoms.

The northern sides of the islets off the southern point of the bay are fringed with coral, as is the western side of Hoan Bai Kan; but Hoan Lap islet appears to be bold close-to, the chart, however, has no soundings near its astern side. The bay, inside a line connecting its northern and southern points—which bear from each other N.E. $\frac{3}{4}$ N. and S.W. $\frac{3}{4}$ S.—is encumbered with an extensive shore flat, as also many detached shoal patches having less than 6 ft. water over them. On account of these dangers vessels should not go inside the line connecting the points, excepting at the S.W. part of the bay, where they may stand in until the North point of Haon Bai Kan bears N.E. by E. $\frac{1}{4}$ E., there being nothing outside that line more dangerous than a patch of $3\frac{1}{2}$ fathoms, with $4\frac{1}{2}$ and 5 fathoms near it, which lies nearly half a mile N. by E. $\frac{1}{2}$ E. from the southern point of the bay; and a small patch of $3\frac{3}{4}$ fathoms, with 6 and 7 fathoms around it, which lies N.N.E. $\frac{1}{2}$ E., distant $1\frac{1}{4}$ mile from the same point.

The anchorage in Great Bay is only available during the S.W. monsoon. In order to avoid the sea, vessels should anchor in its S.W. part, where, however, the squalls are heavier, but the holding ground is good, the bottom being gray mud. There appears to be good, safe anchorage, with depths of $5\frac{1}{2}$ and 6 fathoms, inside the $3\frac{1}{2}$ and $3\frac{3}{4}$ fathoms patches, with the South point

bearing from S. by W. to South, and Haon Lap Islet from E. $\frac{1}{2}$ N. to E. $\frac{1}{2}$ S. A good berth for a large ship appears to be in 7 or 8 fathoms, with Haon Tai-leung, the largest islet off the South point of the bay, bearing about South, and Haon Lap East or E. $\frac{1}{2}$ N.

North-East Bay is to the northward of the North point of Great Bay, and would appear to offer convenient shelter in the S.W. monsoon for vessels not wishing to enter Great Bay. It appears to be quite free from danger, but the depths decrease rather quickly from 6 to 5 fathoms. Vessels should therefore anchor in 7 fathoms, or directly the water shoals under that depth.

Haon Cao is the name of a bold island, nearly a mile in extent, lying 2 miles N.E. by E. from Haon Bai Kan. In the channel between them are depths generally from 12 to 15 fathoms, but near Haon Cao the soundings appear to be more irregular, 17 to 29 fathoms.

A barren white rock lies N.E. by E. $\frac{1}{4}$ E. $3\frac{1}{4}$ miles from the N.E. point of the largest island of the Pulo Condore group; around it are 17 to 22 fathoms.

South-West Bay, or Pulo Condore Harbour, called by the Cochin-Chinese Queou Dam Leun, is formed between the S.W. end of the large island and an adjoining high island called Little Condore, or Bae Vioung, the East point of which is separated from the S.W. point of the large island by a narrow gullet, but to the north-westward they are separated about three-quarters of a mile, forming the entrance to the harbour. Here the depths are 9 and 7 fathoms, gravel and mud, decreasing to 5 and 3 fathoms near the flat that occupies the head of the harbour, and which is dry at low water. This bay is well sheltered by the surrounding hills, except from the north-westward, but the wind is seldom strong from that quarter; it affords shelter to seven or eight vessels. The heavy squalls require precaution, but holding ground is good.

Some islets lie off the North point of this bay, to the northward of which is a high island named Haon Trap, having some rocks above and below water extending from its N.W. side.

Haon Tae, another high island, lies about a mile to the north-westward of Haon Trap; off its north-eastern extreme is an islet. Haon Tae Niao is another island lying a little more than 2 miles to the north-eastward of Haon Tae, having a reef and some rocks extending a little over a cable's length from its North and East sides. There is a safe passage inside the two last-mentioned islands, with depths of 16 to 22 fathoms.

Supplies.—At the time of the *Riflemen's* visit, in 1862, the inhabitants were living in a state of great poverty in miserable huts, and subsisting upon yams, pumpkins, fruit, and fish. Horsburgh remarks:—"These islands abound with timber, but there are no articles of trade to be procured; the soil being generally dry and unfruitful, the country unhealthy, and abound-

ing with reptiles, there is no inducement for strangers to visit this place ; consequently few ships touch here."

In the *Mer de Chine*, 1st part, page 197, published in 1865, it is stated that "the character of the inhabitants is very mild. The country, without being rich, yields plenty of fruit, timber for building, and vegetables. The natives rear a large quantity of pigs and poultry."

Water may be procured in the N.E. part of South-West Bay, a short distance to the southward of the landing-place.

Tides.—At the Pulo Condore group it is high water, full and change, at 2^h 30^m, and springs rise 6½ feet.

Soundings.—The soundings 13 or 14 miles outside the Brothers are 17 or 18 fathoms ; 13 and 12 fathoms within 2 miles of them on the East and N.E. sides, deepening to 17, 18, and 20 fathoms close to Pulo Condore. When Pulo Condore bears North, or N. by E., distant about 30 miles, the soundings are 19 and 18 fathoms ; when N.W. about 25 miles, 18 and 17 fathoms ; West 45 or 50 miles, 24 fathoms ; West 60 miles, 27 fathoms. Rounding Pulo Condore on the South and S.E. sides within 2 to 3 miles distance, the depths will be 17 or 18 fathoms.

From 18 fathoms, near the White Rock off the N.E. end of the Pulo Condore group, the soundings continue between 18 and 17 fathoms for a few miles in a direct line to Cape St. James, when they gradually decrease to 15, 14, and 13, with an occasional cast of 17 fathoms, as that headland is approached.

From Pulo Condore, steering direct for the Great Catwick, the depths increase very slowly until within 40 or 45 miles of the latter, then rather quicker from 30 or 34 to 45 and 50 fathoms near the Catwick.

The following accounts of the reefs and dangers to the north-eastward are chiefly derived from the result of a survey made by navigating-lieutenant J. W. Reed, commanding H.M. surveying vessel *Rifleman*, between the 3rd April, and 21st May, 1863.

ROYAL BISHOP BANK.—From near the Great Catwick, the *Rifleman* carried a line of soundings for this bank until she came to a coral patch, 3½ miles long, E.N.E. and W.S.W., and about 1½ mile broad, having 10 fathoms least water upon it, in lat. 9° 40' N., long. 108° 14' E. There are 28 to 30 fathoms all round it.

Circumstances did not permit of a farther search for the 7 and 8 fathoms patches said to be found on the Royal Bishop, and which will probably be discovered to the northward of the bank examined.

Corsair Rock is now removed from the charts. Its existence has been frequently denied, and the *Rifleman* passed so close to its reported position, lat. 9° 54' N., long. 108° 35' E., that she must have seen it if it had been there.

RAGLAN BANK.—The ship *Lady Raglan*, in September, 1858, is said to

have passed over a rocky shoal lying about S.E. $\frac{3}{4}$ S. 39 miles from Pulo Sapatu, in lat. $9^{\circ} 28' N.$, and long. $109^{\circ} 25' E.$; no soundings were tried for, but the rocks were plainly visible under the vessel's bottom; shoal water was seen a short distance off; the direction, however, is not stated. This is another doubtful danger which could not be found by the *Rifleman*, there being upon the spot no bottom with 300 fathoms. The *Lightning* steamer also passed over this position recently without observing any appearance of danger, although circumstances were very favourable for doing so.

In 1875, the French government gave notice that the vessel *Jackmel* had passed near a shoal supposed to be the same as that seen by the British ship *Lady Raglan* in 1858. The *Jackmel* passed close to the shoal, on which the sea was breaking heavily, and the position assigned to it by that vessel is lat. $9^{\circ} 24' N.$, long. $109^{\circ} 26' E.$ The position of this danger must be considered as approximate, and caution is necessary when navigating near it. It will be observed that the position assigned to the danger by the *Jackmel* is 1' to the eastward and 4' to the southward of the spot searched by the *Rifleman*.

PULO SAPATU (or *Sapata*), or *Shoe Island*.—Its summit, 347 ft. high, is in lat. $9^{\circ} 58' 23'' N.$, long. $109^{\circ} 5' 57'' E.$ It is the easternmost of three islands that go by the name of Catwicks. It is a high, barren rock, frequented by numerous birds, one-third of a mile long North and South, about half as broad, and visible in clear weather at 22 or 23 miles. Under very favourable circumstances it is possible to effect a landing upon the rocks at its base; but otherwise it is impossible. When viewed in some directions, it resembles a shoe; at others it seems a large square column; and when bearing to the westward it assumes the form of a pyramid. Ships generally endeavour to sight this island, or to pass within 20 or 25 miles of its eastern side, in proceeding up or down the main route of the China Sea. With the exception of a rock awash lying a quarter of a cable's length eastward of its South end, the island is bold close to; 16 and 17 fathoms were obtained about 2 cables' lengths eastward of it, and half a mile off in that direction 25 to 30 fathoms. On the West side the soundings are a few fathoms deeper.

JULIA SHOAL is a small coral patch about a quarter of a mile in extent, with only $2\frac{1}{2}$ fathoms on it at low tides, lying S.E. by E. distant $3\frac{1}{2}$ miles from Pulo Sapatu.

The Little Catwick in line with the northern extreme of Sapatu, N.W. by W. $\frac{2}{3}$ W., leads nearly half a mile north-eastward of the Julia; the Little Catwick exactly in line with the southern extreme of Sapatu, leads over 10 fathoms water on the S.W. edge of the shoal; and the Little Catwick well open of the southern extreme, N.W. $\frac{2}{3}$ W., leads half a mile south-westward of it.

When the Little Catwick is just lost behind the southern extreme of Sa-

patu, and the angle of elevation of that island is $1^{\circ} 22'$, or more (the height of the eye being 15 feet), ships will be one mile or more inside the Julia. When the angle of elevation is $0^{\circ} 45'$, or less (the height of the eye being 15 feet), they will be one mile or more outside the shoal.

It is strange that no mention of this important danger is made in Horsburgh. In 1836 Mr. Thomas, commanding the ship *Good Success*, observing a rippling, sent a boat to examine it, and found a sharp pinnacle rock, to which the boat was held by a boat hook. In 1847 it was examined in the ship *Julia*, but no less water than 3 fathoms could be found, which is no doubt the usual depth upon the shoal, although it is not safe to depend upon finding more than $2\frac{1}{2}$ fathoms. It is possible that the *Christopher Rawson* knocked off the pinnacle mentioned by Mr. Thomas. She struck with great force, dragging the stern post out of her.

From the examination made in the *Julia* the danger obtained a position on the charts, which position was very nearly the same as that ascribed to it by Mr. Thomas. Lieut. Reed agrees with both in bearing, but makes the distance from Pulo Sapatu (which with them must have been a matter of judgment only) a mile less than they.

This shoal has been the cause of more anxiety, perhaps than any other in the China Sea. In all probability many of the reported positions of dangers in that locality (for instance the Hopkins Bank), have proceeded from this shoal having been seen, and its position wrongly estimated. In the note below* are given Lieutenant Reed's reasons for believing that the *Christopher*

* The *Rifleman* searched carefully for the dangers supposed to exist to the eastward of Pulo Sapatu, but without success. The Rawson Shoal was marked on the charts as a doubtful danger about 20 miles E.S.E. of Pulo Sapatu. It was hereabouts the *Christopher Rawson* was supposed to have struck. But bearing in mind that the accident occurred in the middle of the night, when the ship was running under double-reefed topsails before a strong N.E. monsoon, and that she went down a few minutes after striking, the crew having barely time to save their lives by taking to the boats, it was manifestly impossible under such circumstances to calculate the position of the shoal with any degree of certainty; it must have been a matter of mere conjecture.

It happened that the gunner's mate of the *Rifleman* belonged to the *Christopher Rawson* when she was lost. Overhearing him speak of the wreck in the passage out from England, Lieutenant Reed questioned him as to the circumstances. He asserted that they had seen no land before the vessel struck, but shortly after they had taken to the boats (which were running before the wind) an island was seen upon the starboard quarter about 4 or 5 miles off. If this statement be true, the vessel could not have been lost in the position shown in the charts, for Sapatu is only visible from the bridge of the *Rifleman* at a distance of 22 miles.

The *Rifleman* steamed about the position of the *Rawson* a whole day, but could find no appearance of danger. The soundings upon the spot were 162 fathoms, with similar depths around it. H.M.S. *Saracen* also passed over this spot some years ago and saw no danger. It has also been passed over by many other vessels with the same result.

Rawson (the only vessel heard of striking on a shoal near Pulo Sapatu) was lost upon the Julia; and that from the impossibility of correctly calculating the ship's position at the time of the accident, the navigation of the China Sea was for twenty years encumbered with the Rawson Shoal.

The **PYRAMID**, or **LITTLE CATWICK**, is a small peaked rock 56 feet high, lying N.W. by W. $\frac{1}{2}$ W. $2\frac{1}{4}$ miles from Pulo Sapata. It is steep close to, with no danger near it, and can be seen about 9 to 10 miles.

The channel between this rock and Pulo Sapatu is free from danger, and the soundings in it are deep, 50 to 65 fathoms. The following observations from Horsburgh are very valuable,—“Although this passage seems to be safe with a commanding wind, it ought not to be adopted excepting in a case of emergency, for it is contracted, and the currents are strong and irregular about these islands. Ships passing here in the night, during the N.E.

A day was also spent in searching for the Hopkins Bank, but no sign of danger was met with in this case either.

For these reasons, therefore, and considering also that no authentic account of danger having been seen near the position has since appeared, Lieut. Reed thinks that it may be fairly inferred that the *Christopher Rawson* was lost on Julia Shoal; and that there is no good reason for believing that any other danger exists in that locality.

A day was spent in carefully searching for the Forth, Columbia, and Alexander Shoals, but nothing of the sort could be met with. Upon the positions of the Forth and Alexander the *Rifleman* had no bottom with 500 fathoms; and no bottom with 350 fathoms upon that of the Columbia.

Mr. T. B. White, the late commander of the *Lanrick* and *Fiery Cross*, a gentleman of great experience in the China Sea, in an able paper communicated to the Nautical Magazine in 1853, thus mentions these shoals:—“The Shepherdess, Christopher Rawson, Forth, and Alexander Shoals, I do not believe to exist. The *Rawson* was no doubt bilged on the 3-fathoms patch (the Julia Shoal) lately found a few miles S.E. of Pulo Sapatu. The Forth Rock is said to have been seen at 2 a.m. in a dark squally night, and the *Alexander's* wreck is asserted to have been seen on the Western Reef. Nor need we be much surprised at this latter discrepancy, when it is known that in the strength of the S.W. monsoon, observations are often not to be had for 36 or 48 hours, and the current in that season often runs from 30 to as much as 56 miles in 24 hours, varying in direction from E. by S. to N.E. by E.”

Mr. Crockett, now commanding the steamer *Clan Alpine*, who has had similar experience in the China Sea to Mr. White, also states that he has passed over the positions of all these supposed shoals, and has never seen any sign of danger. Many similar statements have been received from other captains not so well known as those referred to, but in every way worthy of credit.

From the above statements, and from the result of the examination in the *Rifleman*, it may be inferred that the main route to China is not fraught with so much difficulty and danger as it has been hitherto considered to be, and that, with the exception of the Julia and Raglan Banks, there is no reliable report of the existence of any danger between Pulo Sapatu and the western edges of the reefs known to extend from the North Danger Reef far to the south-westward.

monsoon, ought to make proper allowance for a south-westerly current, which is liable to deceive, and to carry them down upon the island, particularly if the wind is strong at the time."

ROUND ISLAND, or **GREAT CATWICK**, is a barren rock 196 ft. high, and about $1\frac{1}{2}$ cables in diameter, bearing W.N.W., distant $11\frac{3}{4}$ miles from Sapatu, and nearly South, about 30 miles from Pulo Ceicer de Mer. It is bold close-to, having 30 to 50 fathoms at a short distance from it in all directions.

LA PAIX ROCK is a small spot with a pinnacle awash lying nearly in the fairway of the channel between Great and Little Catwick, and which may, with this exception, be considered safe to navigate. From the pinnacle the Great Catwick bears west-northerly, distant $4\frac{1}{4}$ miles, and the Little Catwick is seen open to the southward of Pulo Sapatu, bearing S.E. by E.-easterly, $5\frac{1}{2}$ miles. Except in exceedingly fine weather, the sea always breaks upon this rock, but vessels should not attempt the channel at night, unless their position is exactly known, and other circumstances are favourable.

YUSUN SHOAL, in lat. $10^{\circ} 16' N.$, long. $109^{\circ} 2' 15'' E.$, is a small coral patch of 4 fathoms, lying in the fairway of the channel between Ceicer de Mer and the Catwicks. From it the S.W. summit of the former bears N. by W. $\frac{3}{4}$ W. $17\frac{2}{3}$ miles, the Great Catwick S.S.W. $\frac{1}{4}$ W. $14\frac{3}{4}$ miles, and Sapatu S. by E. $\frac{1}{4}$ E. 18 miles, which is very nearly the position assigned to it by its discoverer; close around it are 45 and 50 fathoms, which is the general depth of the middle of the channel; but about a mile W.N.W. of the shoal is a patch of 24 fathoms.

In fine weather the shoal is not easily seen, but when blowing hard in the strength of the monsoons, the sea has been frequently observed to break heavily upon it.

There is good reason to believe that the Yusun is the only danger in the channel between Ceicer de Mer and the Catwicks, which is otherwise spacious and safe. The soundings in the channel are irregular, and will be better understood by a reference to the chart.

PULO CEICER DE MER is $3\frac{1}{2}$ miles long North and South, and $1\frac{1}{2}$ mile broad. There are two small hills towards its North end, and they bear E.N.E. and W.S.W. distant a mile from each other. The S.W. and higher hill of the two is in lat. $10^{\circ} 32' 36'' N.$, long. $108^{\circ} 56' 30'' E.$; it is 360 feet high, has a round top, slopes gradually until it joins the low land. and is visible at 24 or 25 miles. The N.E. hill, 306 ft. high and of a conical form, rises abruptly from the low land, and has several irregular masses of rock near its summit, which give it a somewhat remarkable appearance.

Nearly half a mile off the N.E. end of the island are several masses of rocks with foul ground around them; the most conspicuous is a large black rock 60 ft. high. This part of the island should not be approached by ves-

sels of large draught nearer than $1\frac{1}{2}$ or 2 miles, nor by small vessels nearer than a mile. In a case of emergency it is possible, perhaps, to gain shelter from the S.W. monsoon by anchoring off the N.E. end in 14 or 15 fathoms; but the bottom is rocky, bad holding ground, and by no means to be recommended as an anchorage.

On the East side of the island is a sandy bay which has the appearance of affording convenient anchorage; but a coral reef not only fills it completely up, but projects in such a manner that the 5 fathoms line of soundings forms an arc of a circle convex to seaward more than a mile distant from the depth of the bay, and approaches within a cable's length or two of the N.E. and S.E. points of the island. Vessels should be extremely cautious in approaching this treacherous bay, as the soundings decrease so suddenly from no bottom with 40 or 50 fathoms to 4 or 5 fathoms, that the land cannot be relied upon to give warning of the danger in sufficient time to avoid it.

At half a mile off the S.E. end of Ceicer de Mer is a small island lying in a North and South direction, the highest point of which is 133 ft. above the sea. The S.E. part of Ceicer de Mer is nearly the same height, and both present steep rugged cliffs to the eastward. In the middle of the channel between these islands is a mass of rocks just above water, between which and the small island is a channel for boats. A quarter of a mile S.E. of the small island is a conspicuous black rock 30 feet high, with smaller rocks around it; 2 cables' lengths S.E. of which, again, are two rocks awash. The small island, therefore, should not be approached within a mile when bearing to the westward of North.

Anchorage.—A sandy beach extends along the whole West and S.W. coasts of Ceicer de Mer, the S.W. point being formed by a number of black rocks. There is fair anchorage in 13 to 16 fathoms, with a bottom of sand and shells, all along these shores; but the best is just to the southward of the S.W. point, where vessels may conveniently anchor in 10 to 14 fathoms. It is necessary, however, to be careful in coming to, as shoal water and rocks extend about one-third of a mile from the island, and the depths rapidly decrease from 11 to 4 fathoms.

Supplies, etc.—Pulo Ceicer de Mer is inhabited by poor fishermen and others, and is well cultivated, yet no supplies could be obtained. The natives brought off a few fowls on one occasion, and seemed pleased to receive some empty bottles, biscuit, &c., in return; but they refused all offers of money, and would not be prevailed upon to sell anything. They were much disturbed at the vessel remaining so long in their neighbourhood, and kept up an almost incessant noise with drums and gongs all the time she was at anchor. They always lined the beach, armed with spears and other Chinese weapons, when any boat landed, but did not attempt to molest the crew.

HIGH ROCK, of a white colour, 50 ft. high, and the resort of sea birds,

lies N.W. $\frac{1}{2}$ N. nearly 5 miles from the N.W. point of Ceicer de Mer. Nearly half a cable's length northward of it is a small rock a few feet above water, close to the northward of which is a rock awash.

In the channel between Ceicer de Mer and High Rock the depths vary from 8 to 12 fathoms, and the bottom is coral. Near the rock some patches of 5 and 6 fathoms were found, but no danger discovered. The channel between Ceicer de Mer and Holland Bank is about 12 miles wide. The depths in it are very irregular, varying from 26 to 10 fathoms, the bottom generally sand, or sand and shells, at the deep soundings, and rocky at the shoal ones.

HOLLAND BANK is composed of coral, and has various depths of water upon it. Its greatest length (under a depth of 10 fathoms) is $6\frac{1}{2}$ miles E.N.E. and W.S.W., and its breadth 4 miles. The shoalest patches are towards its N.E. end. The soundings on these patches are very irregular; the least water found was $2\frac{1}{2}$ fathoms, reduced to low water springs. From the centre patch, in lat. $10^{\circ} 39' N.$, long. $108^{\circ} 43' E.$, the S.W. summit of Ceicer de Mer bore about E.S.E. 15 miles, and High Rock about E. by S. $10\frac{1}{2}$ miles.

The S.W. hill of Ceicer de Mer bearing S.E. by E. $\frac{1}{4}$ E. leads just outside the depth of 10 fathoms, on the N.E. end of Holland Bank; and bearing E. by S. $\frac{1}{4}$ S., leads outside the same depth on the South end. Therefore, vessels passing northward of the bank, should not bring the S.W. or high and sloping hill of Ceicer de Mer to the eastward of S.E.; and those passing southward of the bank should not bring the same hill to the southward of East.

The soundings round the bank are very irregular, and afford no certain guide, but the bank is much steeper on its eastern edge than elsewhere. The lead, however, is not at all to be relied on in approaching that edge, for 20 fathoms may be had at one cast, and 4 fathoms the next. Excepting at the eastern part, if the lead be attended to and hove quickly, it will point out the edge of the bank before a ship gets into danger.

The following valuable remarks, from Horsburgh, cannot be improved upon:—"To avoid this bank on its western side, do not raise Pulo Ceicer de Mer more than to have the summits of the two hills visible from the poop of a large ship when the island is bearing E. $\frac{1}{2}$ S. and S.E.; for if the low part of the island between the hills be *in sight from the poop*, bearing from E. by S. to E.S.E., the vessel will be near the edge of the bank."

Caution.—Vessels should keep a good look-out when passing between Ceicer de Mer and High Rock, or High Rock and Holland Bank; for although many hundreds of soundings were obtained by the *Rifleman*, in the neighbourhood, and the result of the survey affords reasonable assurance that these channels are quite safe, yet with depths so irregular, and the bottom mostly of coral, the possibility of some small patch having escaped

the lead, even in the most careful survey, should always be borne in mind and guarded against as far as possible.

The **MINERVA BANK**, lying to the north-eastward of Pulo Sapatu, was discovered by the company's ship of this name, in 1821, "At noon, observed in lat. $10^{\circ} 32' N.$, steered N.E. $\frac{1}{2} N.$ 5 miles, and about half-past noon, the water appearing very much discoloured, kept the lead going quick; had 40 fathoms first cast, then 35, 30, and 28 fathoms; shortened sail, and hove to, head to the S.E.; next cast had 39, 40, and 42 fathoms, and continued this depth by repeated soundings. From noon till 2 p.m., when lying to, had steered N.E. $\frac{1}{2} N.$ 8 miles, which gave 6 miles northing, placing the bank in $10^{\circ} 38' N.$; and good sights taken at the same time made the long. $110^{\circ} 18' E.$ by means of three chronometers. The soundings upon the bank were all coral rock, and it appeared to extend to about $1\frac{1}{2}$ mile in a north-easterly direction, as in hauling to the southward the depth greatly increased. About a quarter past 2 p.m. bore away, and gradually increased the soundings from 45 to 50 fathoms, then no bottom at 55 fathoms.

Soundings were tried for in the *Rifleman* on the supposed position of this bank, but no bottom was obtained with 200 fathoms. Lieutenant Reed has, however, no doubt that it exists somewhere near its assigned position on the chart; but as 28 fathoms is the least water reported upon it, he did not deem it sufficiently important to occupy his time in making a closer search.

THE PARACEL ISLANDS AND REEFS.

The **PARACEL ISLANDS** and **REEFS** are an extensive group of low islands, reefs, and shoals, which extend from lat. $15^{\circ} 45\frac{1}{2}'$ to $17^{\circ} 8' N.$, and from long. $111^{\circ} 9'$ to $112^{\circ} 43' E.$ Vessels should carefully avoid coming within their limits, as the dangers among them are not accurately known. This will be seen by the following description, taken from the survey made by Captains Ross and Maughan, of the Bombay Marine, in 1808. It may induce caution if we remind our readers that H.M. gun-vessel *Staney* was wrecked on Drummond Reef of this group during a gale on 16th May, 1870, when 3 officers and 46 men were drowned, and only 9 of the crew saved. The ship *Caractacus* also went ashore during the same gale.

TRITON ISLAND, in lat. $15^{\circ} 46' N.$, long. $111^{\circ} 11' E.$, extends in a N. W. and S.E. direction about 3 or 4 miles (according to a plan of it by Captain Brown, of the *Triton*), and is thought to be the most southern and western danger of the Paracels.* Its North part is a sandy lump, about 20 ft. high,

* In June, 1815, Captain Maughan, in the *Investigator*, passed within a quarter of a mile of apparently some patches of coral, having, he supposed, about 6 or 8 fathoms water over

sloping down in a low point to the S.E., with high breakers projecting a great way in that direction; another reef projects from its N.W. end; there are no soundings near it.

BOMBAY SHOAL, lying between lat. $15^{\circ} 59'$ and $16^{\circ} 6' N.$, and long. $112^{\circ} 26'$ and $112^{\circ} 38' E.$, is a reef of breakers of oblong form, about 12 miles in extent E. by N. and W. by S., having apparently an entrance at the western part, with deep water inside; some of the rocks are level with the water, and have sandy patches inside of them. This shoal is steep-to, for at three-quarters of a mile at its South side, the *Bombay* had no bottom with 100 fathoms of line; and close around it Captain Ross in his survey could get no bottom. It seems to bear about S. by W. from Pyramid Rock, for although the *Bombay* made it several miles more easterly than the longitude stated above from the survey of Captain Ross, it probably is not so; because the *Jehangire* observed at noon, in lat. $16^{\circ} 5' N.$, long. $112^{\circ} 52' E.$, and no danger could be discerned from the mast-head.

JEHANGIRE BANK is named after the above ship, which got upon a coral bank in lat. $16^{\circ} 18' N.$, long. $112^{\circ} 35' E.$, and had 12, 10, and $9\frac{1}{2}$ fathoms water; the next cast was 30 fathoms, and in less than an hour had no bottom, drifting to the south-eastward by the lead, being calm at the time. This seems to agree with the account of Capt. Ross's pilot, who stated that there are soundings on coral banks in a narrow line between Lincoln Island and the Bombay Shoal, which, with those dangers, form the eastern boundary of the Paracels.

Bremen Bank.—The North German schooner barque *Charlotte*, of Bremen, Captain B. Steengrafe, reports a shoal under the following circumstances:—Left Hong Kong on the 18th of March, bound on a voyage to Bangkok. After a favourable passage of four days sighted the Paracels; being desirous of ascertaining the rates of chronometers, found old rates to be exactly correct by good observations and cross bearings. At 9 a.m. Lincoln Island bore E. by N., and Pyramid Rock South per compass; thence sailed S.S.W. 16 miles until noon. After having taken the meridian altitude of the sun, found ourselves upon a coral bank. Set the lead going immediately, and sounded carefully from $10\frac{1}{2}$ to $12\frac{1}{2}$ fathoms, within a few minutes to 1. Sailed over it a distance of 5 miles in S.S.W. direction; southern edge appeared to stretch W.N.W. and E.S.E.; bank visible from the topgallant yard as far as we could discern. Had with more than 20 fathoms line no soundings at about half a cable's length from the South edge. The true position of the point of the bank we were on was, by dead reckoning, lat.

them; but no soundings could be obtained with 110 fathoms of line at that distance, and a boat could not be hoisted out to examine them, on account of the high sea and blowing weather. These patches, seen at 2 p.m., are in lat. $14^{\circ} 12' N.$, long. $112^{\circ} 52' E.$; but it is uncertain that they were real dangers.

16° 24' N., long. 112° 24' E.; by observations lat. 16° 24' N., long. 112° 25' East. Had very fine weather at the time, light easterly winds and little swell from the same quarter, sky clear.

LINCOLN ISLAND, the S.E. point of which is in lat. 16° 39' 34" N., long. 112° 44' 23" E., is 1½ mile long, N.W. and S.E., three-quarters of a mile wide, and about 20 ft. high; it is covered with brushwood, and surrounded by a coral reef, dry at low water, which extends 1½ mile from its S.E. point, half a mile from its North and East sides, and about a cable's length from its S.W. side. A narrow coral shoal runs off to the southward from its S.E. point, which is said by Horsburgh to extend 11 miles; time did not admit of its being properly examined by the *Rifleman*, but judging from the soundings that were obtained, the dangerous part of this shoal does not appear to extend farther than 3 miles from the island. Good anchorage can be obtained in the N.E. monsoon under its lee in 8 to 10 fathoms, coral, about half a mile from the shore. The spring of excellent water in the centre of this island, mentioned by Horsburgh, is merely a well dug by the Hainan fishermen close to a stunted cocoa-nut tree, into which the salt water filters.

PYRAMID ROCK bears S.W. ¼ W., distant 7½ miles, from the S.E. point of Lincoln Island, and 10½ miles N.W. by W. from the South end of the bank extending southwards from that island. Between Lincoln Island and the Pyramid there are depths of 27 to 31 fathoms.

H.M.S. *Dido*, in 1844, observed a shoal about 10 miles to the eastward of Lincoln Island. It is shown on the chart as a doubtful danger in lat. 16° 45' N., long. 112° 54' E.

PASSOO KEAH, in lat. 16° 6' N., long. 111° 46' E., is a small sandy island, surrounded by a coral reef, having no soundings near it.

DISCOVERY SHOAL or REEF.—The West end of this dangerous shoal is in lat. 16° 11' 40" N., long. 111° 33' E.; from thence it extends E.N.E. 15 or 16 miles to its eastern extremity in lat. 16° 16' N., long. 111° 48½' E. The reef is of the shape of an extended oval, with an opening 1 cable wide on its South side, having in it overfalls from 2 to 20 fathoms, and a small opening on the North side. There are no soundings about 20 yards from the reef, and scarcely 2 fathoms water over any part of it, with many spiral rocks a few feet above the water's edge. The Hainan boats come here to fish from January to May.

Vuladdore Shoal, lying 9 or 10 miles E. by N. from the Discovery Shoal, is 7 miles in extent E.N.E. and W.S.W. It has a few small spiral rocks on it above water, with high breakers, and no soundings at the distance of a cable's length on either side. Captain Ross made the centre of this shoal in lat. 16° 18' N., long. 112° 2' E.; the Portuguese snow *Vuladdore*, in her passage from Macao to Manila, saw it in lat. 16° 19' N., long. 112° 5' E., bearing S. 15° W. 39 miles from the Amphitrite Islands. She had passed

to the westward of these islands on the preceding day, and in steering southward had no soundings, nor did she see any other shoal but that which has been named after her.

The Crescent Chain of islands and reefs, called by Captain Ross, Money, Robert, Pattle, Drummond, and Duncan Islands, extends from lat. $16^{\circ} 27'$ to $16^{\circ} 37'$ N., and from long. $111^{\circ} 28'$ to $111^{\circ} 46'$ E. They consist of six low sandy islands, for the most part connected by reefs, stretching nearly East and West in the form of a crescent, at the East end of which an elbow is formed by part of the reef turning round to the south-westward; on this part stand the two Duncan Islands, with an opening 4 miles between their contiguous reef and the Antelope Shoal, which lies about 2 miles to the eastward of Money, the western island of the group. This opening is on the South side of the chain, and inside there are soundings; but the ground is chiefly coral, with great overfalls from 25 to 5 fathoms. The best anchorage is close to the reef, on the North side of Duncan Island, where there are some broad patches of sandy bottom.

The Duncan and Drummond Islands were more particularly examined by the *Rifleman*, and the passage between them sounded. The two Duncan Islands are now joined by a sandy spit which is always uncovered; they extend a mile in an East and West direction, are 4 cables in breadth, and surrounded by a coral reef which extends in some places 4 cables from the shore, and dries at low water. On the westernmost of the islands is a coconut tree.

Drummond Island is nearly round, its diameter being about 3 cables; at 2 cables South of it is a rock which never covers. A reef of coral extends a short distance from the West side of the island, but runs for miles to the eastward and north-eastward of it. Both Duncan and Drummond Islands are covered with brushwood. Between them is a safe channel, upwards of a mile in width, with from 19 to 20 fathoms water. Horsburgh says this channel should not be taken in large vessels, the passage westward of Duncan Island being preferable; but the *Rifleman*, when passing between Duncan and Money Islands, suddenly got to shoal water, which appeared to extend across that channel, and therefore the channel between Duncan and Drummond Islands is certainly safer for steamers. Vessels may anchor to the northward of Duncan Island in from 16 to 18 fathoms, about half a mile off shore.

Observation Bank, in lat. $16^{\circ} 36'$ N., long. $111^{\circ} 40\frac{1}{2}'$ E., is small, lies on the North side of the Crescent Chain, and may be considered as part of it. Within this bank, about 3 miles to the southward, is an anchorage from 5 to 20 fathoms, on a coral bottom.

Hotspur Shoal, on which an American ship of this name was wrecked in 1860, is said to lie in lat. $16^{\circ} 51'$ N., long. $111^{\circ} 30'$ E.; it is likely, however, to be the North shoal, lying to the northward.

AMPHITRITE ISLANDS are in two groups, lying N.N.W. and S.S.E. of each other, and having a deep-water channel between them. The northern group consists of four low, narrow islands, connected by a reef of rocks that projects 2 or 3 miles beyond their extremes; upon the westernmost island there is a cocoa-nut tree, from which it has received the name of Tree Island. The western extremity of the reef surrounding these islands is in lat. $16^{\circ} 59'$ N., long. $112^{\circ} 12'$ E.; the reef extends about 10 miles E.S.E., the eastern extremity being in lat. $16^{\circ} 54'$ N., long. $112^{\circ} 22'$ E., and it forms the northern limit of danger in this part of the archipelago. There are no soundings on the North side, but there is good anchorage in 10 fathoms, sand, under the S.E. side of the chain, about half a mile from the rocks; no fresh water is procurable.

The southern group consists of two islands, called Woody and Rocky, lying very near each other. Woody Island, in lat. $16^{\circ} 50\frac{1}{2}'$ N., long. $112^{\circ} 19'$ E., is about 3 miles in circumference, covered with small trees. A reef projects around this island to the distance of three-quarters of a mile, connected with Rocky Island.

Rocky Island, in lat. $16^{\circ} 52'$ N., long. $112^{\circ} 19\frac{1}{2}'$ E., is small, and nearly of the same height as Woody Island; there are no soundings to the N.E. or eastward of it, but irregular soundings extend 6 miles to the S.W. of these islands, decreasing to 14 fathoms in some places. Close to the reef on the West side of Woody Island there are 25 fathoms; and the depths decrease gradually from 30 to 15 fathoms towards the Amphitrite Islands, where a vessel may anchor if requisite.

The North Shoal, extending E.N.E. and W.S.W. about 6 miles, is narrow and steep-to, having soundings only on the North side, 14 fathoms within half a cable's length of the rocks. The East end of this shoal or reef is in lat. $17^{\circ} 6\frac{1}{2}'$ N., long. $111^{\circ} 32\frac{1}{2}'$ E., and it appears to be the north-western danger of the Paracels.

Tides and Currents.—At the Crescent chain, and at some other of the Paracel Reefs, there are regular tides during the springs. The currents run generally strong before the wind in both monsoons, but in light winds between the monsoons they are continually changing their direction amongst the shoals. Ships ought, therefore, never to come within the limits of these dangers, if it can possibly be prevented, for they may be drifted upon some of the reefs during calms, close to which there is no anchorage. There are several channels between the different reefs or shoals, from 12 or 15 to 30 and 35 miles wide.

MACCLESFIELD BANK, discovered by the English ship of this name in 1701, is of greater extent than is generally supposed, for the *Fort St. David*

country ship is said to have obtained soundings in lat. $15^{\circ} 17' N.$, on its southern part; and in lat. $16^{\circ} 19' N.$ by noon observation, the *Stormont* had 14 fathoms on its northern part, and about 1 mile farther to the southward she had 14 fathoms water; the *Cirencester* also had a quarter less 10 fathoms, in lat. $16^{\circ} 19' N.$, long. $114^{\circ} 33' E.$, deepening gradually until in lat. $16^{\circ} 21\frac{1}{2}' N.$, then 55 fathoms, no ground. The bank, therefore, appears to extend from lat. $15^{\circ} 17'$ to $16^{\circ} 21' N.$; its length East and West being about 90 miles, the western edge being nearly in long. $113^{\circ} 40' E.$, and the eastern edge in about long. $114^{\circ} 53' E.$

The depths on this bank are generally very irregular, from 25 or 30 to 40 or 50 fathoms, coral rock; and in some places, where the soundings are a little regular, the bottom is coarse or fine sand. There appear to be gaps in some parts of the bank, where no soundings have been obtained with 80 or 100 fathoms of line; for several ships, in steering directly over it, after getting ground, have lost soundings for a considerable time, and obtained them again.

On the northern and eastern parts of the bank there are level patches of considerable dimensions, with regular soundings from 9 to 15 fathoms, sandy bottom; there are also some patches on the southern and western parts, with 14 to 17 fathoms upon them.

The greatest extent of the bank, East and West, appears to be near its northern extremity, for soundings have been obtained in long. $114^{\circ} 51' E.$ In lat. $15^{\circ} 56' N.$, and long. $114^{\circ} 51' E.$, the *Thetis* had $11\frac{1}{2}$ fathoms, and carried soundings 3 or 4 miles farther to the eastward, deepening to 20, 40, 60, and 75, then 80 fathoms, no ground, when in long. $114^{\circ} 55' E.$

The Admiralty chart shows soundings of 17 and 20 fathoms, in about lat. $15^{\circ} 58' N.$, long. $115^{\circ} 6' E.$, and a cast of 130 fathoms in long. $115^{\circ} 10'$, which is 17 miles eastward of Horsburgh's extreme eastern position. The chart also shows $5\frac{1}{2}$ and 6 fathoms between the parallels of $16^{\circ} 4'$ and $16^{\circ} 12' N.$ in about long. $113^{\circ} 54' E.$, with 30, 40, and 80 fathoms extending to the northward, the latter depth being in lat. $16^{\circ} 35' N.$

In 1857 the Siamese vessel *Bangkok*, Captain Moses, when crossing this bank in lat. $16^{\circ} 2\frac{1}{2}' N.$, long. $114^{\circ} 2\frac{1}{2}' E.$, got suddenly into $5\frac{1}{2}$ to 4 fathoms, coral and red sand, and as suddenly deepened to 10, 16, and 20 fathoms; the weather was fine and the sea smooth, otherwise with a swell he believes it would break.*

* H.M.S. *Rifleman* made three passages across the bank from North to South, in about long. $114^{\circ} 30'$, 114° , and $113^{\circ} 40'$. The following description of these passages will be of service.

On the first occasion, on her way from Hong Kong to the North Danger, she crossed the Macclesfield Bank in March, 1865. Soundings were struck in lat. $16^{\circ} 11' N.$, long. $114^{\circ} 26' E.$, in 115 fathoms, bottom sand and mud, a line of soundings was then carried in a

Between the western edge of the Macclesfield Bank and the eastern limit of the Paracel Reefs, it has been said there are other coral banks, with soundings of various depths upon them; yet, in this space of about 30 miles, probably no soundings are to be obtained.

ST. ESPRIT SHOAL.—The examination of the various positions ascribed to this shoal was made in May, 1866, by Navigating Lieut. John W. Reed, Commanding H.M.S. *Rifleman*, in the tender *Dove*. The shoal was stated to be “6 leagues in diameter, with 9 to 15 fathoms on its southern part, and on the northern part there are rocks even with the water’s edge,” but no such dangerous shoal exists near any of these ascribed positions, all of which were sounded over by the *Dove* under circumstances extremely favourable for observing the sea topping or breaking over dangerous patches, had any such existed.

The Esprit Shoal was found to be a coral bank $2\frac{1}{4}$ miles in length, East and West, and $1\frac{1}{2}$ mile in breadth; its centre being in lat. $19^{\circ} 33' N.$, long. $113^{\circ} 2' E.$ The general depths upon it are 9 fathoms, the least water obtained being 7 fathoms, with 60 to 80 fathoms close to. The *Dove* remained at anchor upon the shoal for two days, on both of which good observations were obtained for determining its position.

Captain Ross, of the *Discovery*, who passed over the shoal in 1813, placed it about 5 miles to the south-eastward, and Monsieur D’Apres 19 miles to the westward, of the above position. D’Apres’ position was well sounded over, and regular depths of 95 to 100 fathoms obtained. The *Assevedo’s*

S. by E. direction over the bank, and the least depth of water met with was 12 fathoms, the general depths being from 40 to 50 fathoms; but a patch of 15 fathoms was found near its southern edge in lat. $15^{\circ} 34' N.$, long. $114^{\circ} 30' E.$; and 5 miles farther southward no bottom could be obtained with 307 fathoms of line.

On the second occasion, in April, 1867, star observations placed the ship at $5^h 30^m$ a.m. in lat. $16^{\circ} 34' N.$, long. $114^{\circ} 13' E.$; from thence steered for the 4-fathom patch, reported to have been passed over in 1867, by Mr. Moses, commanding the Siamese vessel *Bangkok*, in lat. $16^{\circ} 2' 30'' N.$, long. $114^{\circ} 2' 30'' E.$; the deep-sea lead was kept constantly going, but no bottom was obtained with 50 to 60 fathoms of line. At noon found the ship to be in lat. $15^{\circ} 59' N.$, long. $113^{\circ} 58' E.$, and that she had passed about 2 miles to the westward of the ascribed position of the patch. Proceeding to the southward, soundings of 42 fathoms, coral bottom, were had on the northern edge of the bank in lat. $15^{\circ} 51' N.$, long. $113^{\circ} 57' E.$ Regular depths of 42 and 43 fathoms were carried until in lat. $15^{\circ} 30' N.$, long. $113^{\circ} 57' E.$, where 32 fathoms were obtained; 3 miles South of this position no bottom was reached with 103 fathoms.

On the third occasion, during her passage from Hong Kong to the reefs in May, 1868, she struck soundings in 40 fathoms on the northern edge of the bank in $15^{\circ} 38' N.$, and $113^{\circ} 40' E.$; from this position a line of soundings—40 to 33 fathoms—was carried across the bank in a S. $\frac{1}{2}$ E. direction for 11 miles, when no bottom with 50, and immediately afterwards no bottom with 100 fathoms of line could be obtained.

account placed the shoal in lat. $19^{\circ} 6' N.$, long. $113^{\circ} 4' E.$, and this position was also sounded over, but no bottom could be obtained with 200 fathoms of line.

The *Dove* also sounded over the position of the discoloured water seen from the *Althea* in 1806, lat. $19^{\circ} 36' N.$, long. $112^{\circ} 17' E.$, but regular depths from 65 to 70 fathoms were found in that locality.

Helen Shoal is a small patch $1\frac{3}{4}$ mile in length, E.N.E. and W.S.W., and a mile wide; its centre is in lat. $19^{\circ} 12' N.$, long. $113^{\circ} 53' 39'' E.$ The least water upon it is $6\frac{1}{2}$ fathoms, the general depths being 8 and 9 fathoms; around it no bottom could be obtained with 100 fathoms of line.

Currents.—The strong rippings mentioned by Ross, were not observed by the officers of the *Dove*, during the two days she was anchored on the St. Esprit Shoal. Strong rippings were, however, seen during the search over the various positions ascribed to the shoal, but on examination they appeared to be mere current rippings, the water being as deep there as elsewhere. The current was found to set generally to leeward.

Captain Ross was of opinion that the shoal was of small extent, and that the report of dry rocks on it is erroneous, as the swell at the time the *Discovery* was crossing it was high, and would have produced breakers on any very shoal parts; whereas no discoloured water was visible till in 10 fathoms, although the day was clear; but strong rippings broke on board the ship when in the vicinity of the shoal, which might be mistaken for breakers by persons unacquainted.

PALAWAN PASSAGE.

The following dangers lying in the fairway of vessels proceeding to the Palawan passage on their way to China, were (with the exception of the Louisa Shoal, examined by Captain Bate, H.M.S. *Royalist*, in 1850-54) surveyed in 1863 and in 1866 by Navigating Lieutenant J. W. Reed, commanding H.M.S. *Rifleman*.

The adjacent coast of *Borneo* has been described on pages 481 to 512, and Balabac Strait and the islands to the northward, including Palawan, in chapter xiii, pages 513 to 584. What follows will be a description of the outlying shoals, and of those lying on the edge of the Borneo and Palawan bank of soundings, which are passed in sailing through this channel to or from the China coast, commencing from the south-westward.

Caution.—Lieut. Reed, R.N. remarks, when engaged in the examination of the dangers the weather was remarkably fine—finer indeed than had been experienced in any previous season; little or no current was found, and the sea was in general so smooth that hardly a breaker appeared on the edges

of the dry reefs; this made it difficult to detect dangers, and it was only during the search for the Dhaulie Shoal that the weather was favourable for doing so. Up to the 8th of June, when the *Rifleman* arrived at Manila, the weather continued fine, with the exception of occasional light squalls of wind and rain, and on the 10th the first of the S.W. monsoon was felt, the weather still remaining very fine.

SOUTH LUCONIA SHOALS comprise a group of four coral shoals, the southernmost of which is about a mile in extent, and in the form of a horse-shoe, with the open part to the north-eastward; between the horns of the shoal are 26 fathoms. The general depths on the shoal are from 2 to 3 fathoms, but near the N.W. extreme is a rock nearly awash. The southern extreme of the middle part of the shoal is in lat. $4^{\circ} 59\frac{1}{2}'$ N., long. $112^{\circ} 39\frac{1}{4}'$ E., and bears from Barram Point W. by N. $\frac{1}{4}$ N., distant 81 miles.

The westernmost shoal of the group, lying about W. by N. distant 7 miles from the southernmost one, is nearly 2 miles long N.W. and S.E., and about three-quarters of a mile broad. The general depths over it are 2 and 3 fathoms, but near the S.E. extreme is a rock just below the surface of the water, and a similar one at the N.W. extreme; the latter is in lat. $5^{\circ} 2\frac{1}{4}'$ N., long. $112^{\circ} 31\frac{1}{4}'$ E.

Luconia Breakers.—A reef, nearly half a mile in extent, and upon which the sea breaks even in fine weather, lies on the eastern extreme of a shoal, over which are various depths under 5 fathoms. The shoal extends nearly 2 miles in a north-westerly, and about a mile in a south-westerly, direction from the centre of the breakers, which is in lat. $5^{\circ} 3' 24''$ N., long. $112^{\circ} 41' 36''$ E.

One mile north-eastward of the centre of the breakers is the South extreme of a narrow strip of shoal, with 2 to 3 fathoms water over it, which extends from thence about N. by E. for a distance of 2 miles. The North extreme of this shoal is in lat. $5^{\circ} 5\frac{3}{4}'$ N., long. $112^{\circ} 42\frac{3}{4}'$ E.

The whole of these shoals are steep-to.

There is good reason to believe that no dangers exist between the South Luconia Shoals and the coast of Borneo.* Many lines of soundings were obtained in the *Rifleman* from these shoals in directions between S.W. (round southward) and East, but no dangers could be discovered. The general depths were from 55 to 69 fathoms.

NORTH LUCONIA SHOALS.—Upon the old charts of the China Sea a

* The *Rifleman* steamed for three days over and about the reputed positions of two very doubtful dangers, named on the old charts of Horsburgh, Kirton Shoal and Euphrates Reef. The weather and other circumstances were extremely favourable for seeing shoal patches, but nothing was visible, nor could bottom with 600 fathoms be obtained on the position ascribed to the Euphrates Reef.

number of dangers were shown between the parallels of $5^{\circ} 20'$ and $6^{\circ} 2' N.$, and the meridians of $112^{\circ} 14'$ and $112^{\circ} 40' E.$; they were named Luçonia, Seahorse, George and Ambergrombie, and Friendship Shoals. These dangers were examined by H.M.S. *Rifleman*, and were found to consist of a mass of coral reefs and shoals, amongst which no vessel should venture. The above general name is now adopted as applying to the entire group, but the names given by the original discoverers have been retained for particular or conspicuous localities.

The southern extreme of the group is marked by two shoal patches, about 4 miles apart, but lying in the same latitude, $5^{\circ} 27\frac{1}{4}' N.$, and each of them is rendered conspicuous by rocks just below the surface of the water, upon which the sea breaks with the least swell.

The western patch, about a mile in extent East and West, and a quarter of a mile wide, has but 1 to 2 fathoms water over it, and near its western end, in long. $112^{\circ} 32\frac{1}{2}' E.$, are two rocks nearly awash, upon which the sea is generally breaking even in fine weather. About half a mile West of these rocks is a patch of 3 fathoms, on the eastern extreme of a coral bank, with 2 fathoms least water, which extends from thence—curving gradually to the north-westward—for a distance of 3 miles.

The eastern patch has, like the western patch just described, two rocks nearly awash at its western extreme, in long. $112^{\circ} 38' E.$, and upon which also the sea is generally breaking even in fine weather. The shoal patch upon which they lie has 2 fathoms water over it, and, about a mile eastward of the rocks, it forms the south-eastern extreme of a long, narrow coral bank, which extends from thence $6\frac{1}{2}$ miles, in a general direction about N.N.W., its average breadth being about a third of a mile. The general depths over this bank are 4 or 5 fathoms, but there are several patches of 2 and 3 fathoms, and a rather extensive patch near its north-western extreme, in lat. $5^{\circ} 32\frac{3}{4}' N.$, long. $112^{\circ} 35\frac{1}{2}' E.$, has as little as $1\frac{1}{2}$ fathom over it.

Seahorse Breakers, in lat. $5^{\circ} 31' N.$, long. $112^{\circ} 34' E.$, is the most conspicuous danger of the Luçonia Shoals. It is a reef of rocks and sand just above water, about a mile long, N. by E. and S. by W., and one-third of a mile broad. From these breakers shoals extended as far as the *Rifleman* was able to sound in 1863, viz., 18 miles North, 5 miles South, 5 miles East, and 13 miles West.

The northernmost of the shoal patches reached in 1863 was in lat. $5^{\circ} 48' 30'' N.$, long. $119^{\circ} 32' 15'' E.$ In 1866 the vessel was anchored near a $2\frac{3}{4}$ -fathom patch, in lat. $5^{\circ} 55' 15'' N.$, long. $112^{\circ} 31' 30'' E.$, on the northern edge of a coral bank, traced for 2 miles to the southward, but which no doubt extends to the northernmost patch surveyed in 1863, and just referred to; vessels should not pass between these positions.*

* Captain Bate in H.M.S. *Royalist* passed over the position ascribed to the George and Ambergrombie without finding it. He supposed that it and the Friendship were the same

Friendship Shoal is the northernmost of the Luçonia group; the *Rifleman* crossed it without getting less than $4\frac{1}{2}$ fathoms, although there appeared to be less depths in some places. The North part of the shoal is in lat. $5^{\circ} 59' 30''$ N., long. $112^{\circ} 31' 30''$ E., and though this position must be considered approximate, it is nevertheless near the truth. Lines of soundings were obtained in directions N.E., North, and N.W. from the North end of the shoal for a distance of 4 miles, but no shoal water was found. The survey of the Luçonia Shoals was not (October, 1867) completed to the northward and westward.

Caution.—No directions can be given that will enable vessels to pass safely through these reefs and shoals. Although not less than 2 fathoms were found upon those to the northward of the Seahorse Breakers, yet they should be avoided, as it is quite possible there may be knolls with less water upon them which have escaped the lead.*

Louisa Shoal, the S.W. rock of which is in lat. $6^{\circ} 19\frac{3}{4}'$ N., long. $113^{\circ} 18\frac{1}{2}'$ E., or $9^{\circ} 27' 12''$ East of Fullerton Battery, Singapore, by H.M.S. *Royalist*, in October, 1851, is a dangerous coral reef of quadrangular form, two-thirds of a mile in extent from East to West. The rocks on it are generally covered at high water, with the exception of two small clusters on its eastern and south-western extremes; the centre of the shoal is shallow. There are no soundings with 50 fathoms close to its outer edge, nor with 180 fathoms a quarter of a mile to the south-westward of the shoal, but within 20 yards of the S.W. rock there are 10 fathoms.

The *Tidal Stream* at the Louisa Shoal at noon, on the full and change days in the month of October, 1850, was setting to the W.N.W., and the maximum rise appeared to be about 4 ft.

VERNON BANK, discovered by H.M.S. *Vernon* in 1847, is a large coral shoal, having a dangerous group of rocks, named after H.M.S. *Fury*, upon one part, and a patch of $2\frac{3}{4}$ fathoms on another part of it. The bank lies between the parallels of $5^{\circ} 39'$ and $5^{\circ} 50\frac{1}{4}'$ N., and the meridians of $114^{\circ} 57\frac{1}{2}'$ and $115^{\circ} 7\frac{1}{2}'$ E., and is in form of an irregular triangle, having its base, 6

shoal; but the error was in the longitude of the George and Ambercrombie, which placed it too far to the westward. It exists, and forms part of the mass of shoals which extend continuously from the Seahorse Breakers to the Friendship.

* Captain Bate also passed over the position assigned in Horsburgh's chart, viz., lat. $5^{\circ} 54'$ N., long. $114^{\circ} 7'$ E., to the Cayo Marino, a 3-fathom shoal, without being able to discover it; nor could soundings be obtained when in the neighbourhood, with from 180 to 200 fathoms.

The Cava Shoal, placed in lat. $5^{\circ} 51'$ N., long. $114^{\circ} 30\frac{3}{4}'$ E., was searched for in vain by the *Rifleman*. On the spot mud bottom was obtained with 415 fathoms of line. She also anchored in 46 fathoms on the supposed position of a reef, on which the steamer *South-western* is said to have struck, in lat. $5^{\circ} 54'$ N., $115^{\circ} 4\frac{1}{2}'$ E., and sounded round it for miles, obtaining regular soundings. Commander Ward confidently asserts that the reef does not exist.

miles in length, to the S.W. and its apex to the N.W., extending in those directions about 12 miles.

The *Fury*, in 1858, crossed the western edge of this bank, and saw breakers about $1\frac{1}{2}$ mile in extent, which no doubt were on the Fury Rocks. This formidable danger is nearly 3 miles in extent, and consists of coral patches, with 2 to 3 fathoms water over them, and several detached rocks, one or two of which nearly uncover at low water. These rocks are pinnacle-shaped, with 4 to 6 fathoms around them, so that in fine weather there is seldom much break of the sea over them, and sometimes none at all probably. The centre of the rocks is in lat. $5^{\circ} 43\frac{1}{2}'$ N., long. $115^{\circ} 2\frac{1}{4}'$ E., and with the eye 18 ft. above the sea, the highest part of Labuan (303 ft.) is just visible, bearing S.S.E. $\frac{3}{4}$ E.

The soundings on the other parts of the bank are irregular, with several patches of but 4 and 5 fathoms, and on the West and N.W. sides of the bank is a sort of curved coral wall, convex to seaward, having $4\frac{1}{2}$ to 9 fathoms on it, 14 to 19 fathoms inside of it, and 20 to 30 fathoms close outside of it. As the Fury Rocks lie 2 to 3 miles inside the edge of the bank, the lead, if carefully attended to, will give sufficient warning to avoid them; but large vessels should on no account make free with this dangerous bank, and small vessels will do well to give it a wide berth, for the currents in the vicinity are very uncertain.

The $2\frac{3}{4}$ -fathom patch, near the N.E. extreme of the bank, is in lat. $5^{\circ} 49' 20''$ N., long. $115^{\circ} 5' 20''$. It is a small coral knoll, surrounded to some distance by soundings of 4 and 5 fathoms. This part of the bank should also be avoided.

Samarang Bank, its centre in lat. $5^{\circ} 35\frac{1}{4}'$ N., long. $114^{\circ} 53\frac{3}{4}'$ E., is an oval-shaped coral bank $6\frac{1}{2}$ miles long, E. by N. and W. by S., and $4\frac{1}{4}$ miles wide. The general depths on it are 4 to 6 fathoms, and the least water found was $3\frac{1}{2}$ fathoms. From the centre of the bank the highest part of Labuan (303 ft.) bears S.E. by E. $\frac{1}{4}$ E.

Saracen Bank.—H.M. surveying vessel *Saracen*, in 1854, on her passage from Labuan to Hong Kong, discovered an extensive coral bank, having generally from 2 to 4 fathoms water over it, with dry patches and several coral knolls with but a few feet water over them. The bank is 5 or 6 miles in diameter, and its centre is in about lat. $6^{\circ} 7\frac{1}{2}'$ N., long. $115^{\circ} 20\frac{1}{2}'$ E., bearing W. by S. $\frac{1}{2}$ S., distant 14 or 15 miles from Mangalum Island (page 505).

Dangers had been seen in this locality before, but their positions were quite uncertain. It seems very probable that other dangers may exist hereabout besides those known.

ROYAL CHARLOTTE SHOAL, of a nearly rectangular shape, is $1\frac{1}{2}$ mile in length, N.W. by W., and S.E. by E., and nearly a mile in breadth. On

its south-eastern side are stones 2 to 4 ft. above high water; the highest of them is in $6^{\circ} 57' 18''$ N., and $113^{\circ} 35' 30''$ E.; there are also one or two stones on its N.E. edge, which just show at high water. This shoal and also the Louisa, although lying off the coast of Borneo, may be said more properly to belong to Palawan, for they may be considered, both in their character and position, to form a suitable portal through which to introduce the navigator to this Channel.*

Swallow Reef and *Ardasier Shoal* are described hereafter.

Doubtful Dangers.—*Viper Shoal* is marked doubtful on the chart, in lat. $7^{\circ} 30'$ N., long. 115° E. The *Royalist* passed over its assigned position, and when on the spot could get no bottom with 500 fathoms, though the day was clear, and conditions good for detecting a danger. The *Saracen* subsequently passed over the same ground with a view to its discovery, and with the same result.

Ottawa Shoal.—This danger was reported by Mr. Gribble, commanding the Peninsular and Oriental steamer *Ottawa*, and supposed by him to be the Viper Rock. The following is an extract from the log-book of that vessel, dated December 6th 1860:—"Sighted from the mast-head broken water on the port bow, having every appearance of being a shoal about half a cable in extent from East to West, with no indication of shoal water near it. When abeam it was about 2 or 3 miles distant from the ship, and was then visible from the deck. Position of the shoal lat. $7^{\circ} 16'$ N., long. $115^{\circ} 5'$ E.

The *Rifleman* searched for this danger for three days, but could find no indication of it, nor could bottom be got with 1,000 fathoms of line. The area sounded over is comprised within the following limits:—8 miles East, 15 miles West, 5 miles North, and 5 miles South of the position given above.

North Viper Shoal or Seahorse, is shown on the chart as a shoal with rocks above water, 5 miles in extent, lying between the parallels of $7^{\circ} 59'$ and $8^{\circ} 4'$ N., and in long. $115^{\circ} 23'$ E. The position of this reputed shoal was not examined by the *Rifleman*. The *Saracen* passed near it without seeing any appearance of shoal water, but from the following account of a reef seen by Mr. Baird, this danger would appear to lie 17 miles N. $\frac{1}{2}$ E. of its ascribed position on the chart.

* SANDY ISLAND, reported in 1863 by Mr. W. Andrew, master of the barque *Thames*, to be in about $7^{\circ} 20'$ N., $114^{\circ} 10'$ E., was looked for in the *Rifleman*. At noon, from lat. $7^{\circ} 12'$ N., and long. $114^{\circ} 1'$ E., a course was shaped for the assigned position of the island; at 2^h 30^m p.m. the vessel was in the same latitude and 1 mile to the eastward of it; from thence a course was steered for the South Ardasier Shoal. No appearance of shoal water could be seen from the vessel on either of these courses, and certainly no island exists within 5 or 6 miles on either side of the lines passed over.

Commodore Reef.—Mr. Hugh Baird, commanding the ship *Commodore*, reports as follows:—Monday, December 22nd, 1862, at 8 a.m., saw what I took to be the Viper North Shoal, or Seahorse, the N.E. end bearing by compass N.N.W. 3 miles; it seemed to extend over 3 miles N.E. and S.W. Partly dry sand, and several rocks from 20 to 30 ft. above water, and heavy breakers all around it. At noon it bore W. by S., distant about 6 miles; lat. by observation $8^{\circ} 22' N.$, long. $115^{\circ} 31' E.$, placing the shoal 17 miles North of its position on the Admiralty chart.*

DANGERS ON THE WESTERN SIDE OF THE PALAWAN PASSAGE.

HALF-MOON SHOAL, having the Inclined Rock on its eastern side in lat. $8^{\circ} 51\frac{3}{4}' N.$, long. $116^{\circ} 16' 45" E.$, by H.M.S. *Royalist*, in July, 1853, is formed by a belt of coral even with the water's edge, of the average width of one cable's length, except at its S.W. extremity, where it is broader. It is of oblong shape, the long diameter being nearly 3 miles in a N.E. and S.W. direction, and the average width of the shoal one mile. On the eastern side, to the southward of the Inclined Rock, there are two breaks in the belt

* **ROGER BREAKERS.**—Heavy breakers were seen in about lat. $8^{\circ} 21' N.$, long. $116^{\circ} 25' E.$, from the Peninsular and Oriental steamer *Formosa*, commanded by Mr. Roger, on the 4th of January, 1858. There was a swell from the N.E., and the broken water, about 10 yards in extent North and South, was apparently caused by a rock a few feet under water. The vessel proceeded slowly, and soundings were occasionally tried for with 100 fathoms, no bottom. The weather was thick and rainy, but on clearing up observations and a bearing of the distant land confirmed the position of the breakers by dead reckoning.

Navigating-Lieutenant Reed, commanding H.M. surveying vessel *Rifleman*, remarks:—“This is another instance in which it was most desirable that a boat should have been lowered from the *Formosa* to examine the breakers and to find out if there was really any rock there or not. It was of the greatest importance to avoid placing a doubtful danger at the very entrance and in the centre of the fairway of the Palawan Channel. An hour or so would have decided the point beyond doubt, whereas several valuable days of the *Rifleman's* time were occupied in searching for the Ottawa Shoal and Roger Breakers without enabling us after all to decide the matter positively.”

Mr. Curling, commanding the Peninsular and Oriental steamer *China*, who has made many voyages by this route, asserts that the appearance of breakers where no real danger exists, is very common in the Palawan. This is further corroborated by the following extract from the log-book of the ship *Veloz*, Commander Mr. John Jones:—“At noon, 6th November, 1859, lat. $8^{\circ} 24\frac{1}{2}' N.$, long. $116^{\circ} 25' E.$ At 10h 30m a.m. the mast-head look-out reported breakers about a mile on the port beam. Lowered a boat, and sent the chief officer to examine the spot. It proved to be an extensive patch of seaweed, drift wood, and a great number of fish. No soundings at 50 fathoms. We were passing over the spot marked ‘Roger Breakers’ on the chart, but could not see any indication of it.”

forming channels into the basin, the southernmost of which has 4 to 9 fathoms in it, and is marked by a cluster of rocks, which generally show above water. Half-tide Rocks are interspersed over the belt, the largest of which is at the N.W. extremity of the shoal. The average depth in the basin is 14 and 16 fathoms, with numerous patches of coral scattered about it. From the shoal Balabac Peak (pages 522-3) bears S.E. $\frac{1}{2}$ S., distant 71 miles; Bulanhow Mountain (page 540) E. by S. $\frac{1}{4}$ S.; and the Elbow or nearest part of the bank of soundings fronting Palawan Island (page 656) S.E. $\frac{1}{2}$ E. 39 miles.

Tides.—It is high water at the Half-Moon Shoal, 5 days after full and change, at 10^h 45^m a.m., and the rise is about 4 feet.

ROYAL CAPTAIN SHOAL lies E.N.E. 23 $\frac{1}{2}$ miles from the Half-Moon Shoal, and N.W. $\frac{1}{3}$ W. from the edge or nearest part of the bank, contracting the channel, which is here the narrowest part, to 25 $\frac{3}{4}$ miles in width. Observation Rock, at its North extremity, which shows at half tide, is in lat. 9° 1' 45" N., long. 116° 39' 36" E.; from it Balabac Peak bears S. by E. $\frac{3}{4}$ E., distant 68 $\frac{1}{2}$ miles, Bulanhow Mountain S.E. by E. $\frac{1}{2}$ E.; and in clear weather the high land of Mantaleengahan (page 542) is visible. The shoal is elliptical, the length being 1 $\frac{3}{4}$ mile in a N.W. and S.E. direction, with a breadth of one mile. The belt, which is entirely covered at high water, and of irregular form in the inner rim, varies very much in width, the broadest part being at the S.E. extremity, where it is 2 cables. There are depths of 15 to 17 fathoms, sand and coral, with several coral patches, inside the basin. There is no entrance, but at high water a boat can cross the belt. The outer edge is steep-to, having no bottom with upwards of 100 fathoms, within half a cable's length of the reef. Only a few rocks on the belt show at low water.

Tides.—It is high water at the Royal Captain Shoal, 6 days after full and change, at 11.30 a.m.; the rise is about 4 feet.

BOMBAY SHOAL, on which the French frigate *Madagascar* was wrecked, in 1841, lies N.E. by N. 29 miles from the Royal Captain Shoal, and 27 $\frac{1}{4}$ miles from the nearest part of the bank of soundings. Madagascar Rock, on its N.E. extremity, is in lat. 9° 26' 7" N., long. 116° 56' 4" E., and from it Mantaleengahan Mountain bears S.E. $\frac{1}{2}$ E.; and Bulanhow S.S.E. $\frac{1}{2}$ E.

This shoal is in the form of an ellipsis, lying in a N.E. and S.W. direction one mile in length by three-quarters of a mile in breadth. The basin, in which there are 16 and 18 fathoms, sand, is completely enclosed by a belt, on which three or four rocks show at half tide, the most conspicuous being at the North extremity of the shoal. There are 30 fathoms outside the reef, within 20 yards of the S.W. and N.E. extremes; but beyond, there is no bottom in any direction with upwards of 150 fathoms line.

The Bombay is the northernmost and smallest of this description of shoals in the Palawan Passage.

Tides.—It is high water at the Bombay Shoal, 7 days after full and change at noon; rise about 4 feet. While the tide was rising, the current was observed setting to the N.E.

CARNATIC SHOAL is said to lie about N.E. by N. 47 miles from the Bombay Shoal, in lat. $10^{\circ} 6' N.$, long. $117^{\circ} 21' E.$, and to have as little as $3\frac{1}{2}$ fathoms over it. H.M.S. *Royalist*, in July, 1853, could not discover the shoal in the position assigned to it, or succeed in obtaining soundings with from 100 to 200 fathoms, when in the neighbourhood.

Other banks and dangers (outliers of the great prolific coral bed) are reported to exist to the north-eastward of this and the Bombay Shoal, by vessels which have deviated from the proper channel course, all which appear to have no soundings near them.*

DANGERS ON THE EASTERN SIDE OF THE PALAWAN PASSAGE.

Having described the dangers and shoals which limit the western boundary of the Palawan Passage, we shall now proceed with those on the eastern side, which lie immediately within the edge of the bank of soundings fronting the island. The coast has been described in pages 539 to 567. The S.W. part of the bank forms an Elbow on the parallel of nearly $8\frac{1}{2}^{\circ} N.$, from which Cape Buliluyan, the South point of Palawan, bears E. by S. $\frac{1}{4} S$, Balabac Peak, S.S.E., and Bulanhow Mountain E. by N. $\frac{1}{2} N.$ The bank also extends to the northward, fronting the Calamines group.

HEREFORDSHIRE SHOAL.—The ship *Herefordshire*, in 1815, struck upon a reef in lat. $8^{\circ} 35' N.$, long. $116^{\circ} 59' 19'' E.$, about 15 miles to the north-eastward of the above Elbow; an occurrence which might have been prevented had the lead been properly attended to, as the danger lies 4 miles within the edge of the bank. The position of this shoal was not fixed by H.M.S. *Royalist*.

NORTH REGENT SHOAL, N.E. by E. $\frac{1}{2} E.$ 5 miles from the Herefordshire, is a dangerous coral patch, 4 cables in extent, having in some places

* **HOLMES SHOAL.**—The *Rifleman* on leaving the Routh Shoal steered a S.E. $\frac{3}{4} S.$ course to pass over the doubtful position of Holmes Shoal; no bottom at 200 fathoms was obtained on its reputed position, lat. $10^{\circ} 32' N.$, long. $117^{\circ} 59' E.$, nor was any sign of shoal water seen in the vicinity; many others have reported to the same effect. It certainly does not exist where reported, and there are reasons for believing that the Fairy Queen Shoal, 18 miles to the westward, is the Holmes Shoal.

only 13 ft. water on it. It lies 6 miles within the edge of the bank, and $9\frac{1}{2}$ miles from the nearest shore, with the S.W. or Triple Hill S.E. $\frac{1}{4}$ E.; summit of Bulanhow Mountain a little open South of Caneepahan Hill, E. $\frac{1}{4}$ S.; and the Pagoda (page 541), E. by N. $\frac{1}{4}$ N.

N.W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles from the North Regent Shoal, and one mile inside the edge of the bank, is a coral patch, with 10 fathoms water on it; at $1\frac{1}{2}$ miles to the north-eastward of which, and 2 miles inside the edge of the bank, is another patch, 3 cables in extent, with only 5 fathoms on it. Also N.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from the latter, is a 4-fathom patch, 3 cables in extent; and a 7-fathoms knoll lies half way between the two. The soundings in the vicinity of the two latter shoals are 27 and 30 fathoms, sand and shells; the soundings near the former, which are within 2 cables' lengths of the 10 fathoms, being 60 fathoms, mud, with 74 and 77 fathoms between them and the edge of the bank. Between the North Regent and the above shoals the depths are from 30 to 45 fathoms, mud, and sometimes sand and broken coral.

BREAKER REEF, lying N.E. $\frac{3}{4}$ E. 5 miles from the North Regent, is 3 cables in extent, and of triangular form, with a few rocks showing at low water. It is 8 miles inside the edge of the bank, and 7 miles from Cape Seeacle, the nearest shore, and from it S.W. or Triple Hill bears S.S.E.; Caneepahan Hill, S.E. by E. $\frac{3}{4}$ E.; and the Pagoda, showing to the southward of a double hill on I-wi-ig range E. $\frac{3}{4}$ N.

Rocky Ground, where there are only $2\frac{3}{4}$ fathoms, extends $1\frac{3}{4}$ mile to the westward of this reef; also northward of it $3\frac{1}{4}$ miles there is a patch with $4\frac{1}{2}$ fathoms; and another N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from that, with $6\frac{1}{2}$ fathoms; the soundings in the neighbourhood being 30 and 40 fathoms, except to the south-westward of the latter, where there are 16 and 30 fathoms, coral, half a mile from it.

Paraquas Ridge begins at 11 miles N. $\frac{1}{2}$ W. from the Breaker Reef, and extends 8 miles to the N.E., parallel with and a mile inside the edge of the bank, when it then trends 2 miles to the eastward. It is a long irregular formed bank of coarse sand and shells, with a very narrow ridge of coral having gaps through it, and on which ridge the least water found was 5 fathoms; the average depth being 6, 7, and 9 fathoms, with from 20 to 30 fathoms on the bank. When on the extremes of the bank the bearings were as follows:—

	S. extreme in 26 fathoms.	N. extreme in 19 fathoms.
Bulanhow Mountain - - -	S.E. $\frac{1}{4}$ S. - - -	S. by E. $\frac{3}{4}$ E.
Caneepahan Hill - - -	S.E. by S. - - -	S. $\frac{3}{4}$ E.
Pagoda (Pagoda Cliff-) - -	E. by S. $\frac{3}{4}$ S. - - -	S.E. easterly.
Mantaleengahan Mountain -	E. $\frac{1}{2}$ S. - - -	E. by S. $\frac{3}{4}$ S.

The outer edge of this bank is steep-to, having in many places 60 and 70 fathoms within 2 or 3 cables' length of the ridge.

VANGUARD SHOAL is a coral patch 2 cables in extent, with only one foot water on it, lying E. by S. $5\frac{1}{4}$ miles from the shoalest part of the Paraquas Ridge, and 12 miles off shore, with Caneepahan Hill bearing S. $\frac{1}{2}$ E.; Bulanhow S. by E. $\frac{3}{4}$ E.; Pagoda S.E. $\frac{1}{2}$ E.; and Mantaleengahan E. by S. $\frac{1}{4}$ S.

Between this shoal and the Paraquas the soundings are irregular, varying from 30 to 50 fathoms. To the south-westward of the latter they are from 70 to 80 fathoms, mud, when on the edge; 20 and 30 fathoms, coarse sand and broken coral, a mile inside, and 40, 45, and 50 fathoms, mud, when fairly on the bank.

SCALEBY CASTLE SHOAL is a dangerous coral patch, 2 cables in extent, with 15 ft. water on it, and 32 fathoms close to its edge, lying in lat. $9^{\circ} 5' N.$, long. $117^{\circ} 17' 11'' E.$, N.E. by N. $7\frac{1}{4}$ miles from the North extreme of the Paraquas, and only $1\frac{1}{2}$ mile within the edge of the bank. From it Bulanhow bears S. $\frac{2}{3}$ E.; Pagoda S.S.E. $\frac{1}{2}$ E.; Mantaleengahan, a little open South of Illaan Hill, S.E. by E. southerly; Sharp Peak, a little open South of a high peak on the Mantaleengahan Range, S.E. by E. $\frac{3}{4}$ E.; and Eran Quoin E. $\frac{1}{2}$ S. It is distant $15\frac{1}{2}$ miles from Townsend Point, the nearest shore.

COLLINGWOOD SHOAL, lying N.E. by E. $15\frac{1}{4}$ miles from the Scaleby Castle, and 6 miles inside the edge of the bank, is half a mile in extent, and on it the least water found was 13 feet, with 26 and 28 fathoms close to its western or outer edge; the soundings in the neighbourhood being 40 and 45 fathoms, stiff mud. From this shoal Eran Quoin, the nearest land, bears S.E. $\frac{1}{3}$ S. 12 miles; Pagoda (which is very conspicuous on this bearing over the low land, and generally discernible when the elevated objects are obscured), S. $\frac{1}{3}$ W.; Mantaleengahan, S. by E. $\frac{3}{4}$ E.; and Gantung, a high notch peak (page 542) S.E. $\frac{1}{3}$ E.

To the N.N.W. of this shoal the edge of the bank projects a little beyond the general trend, and has on either side a less regular contour with bights, having soundings of 130 and 140 fathoms within a mile, and in some places only 3 cables' lengths from the coral patches.

Coral Patches.—From the Scaleby Castle Shoal to the parallel of $9^{\circ} 30' N.$, a distance of 35 miles, the coral patches on the edge of the bank of soundings are so numerous, that to give a description or bearings for each separately, would tend more to confuse than make clear the directions for the navigation of this part of the channel. Four fathoms is the least water that has been found on them, and they may generally be distinguished by an ordinary look-out from the mast-head. It is, however, recommended to avoid them, as it is impossible to say whether there may or may not be shoaler parts which have escaped detection. The average depth upon the

patches is from 6 to 7 and 9 fathoms, with 15 and 20 fathoms close to their edges.

York Breakers.—This is a dangerous coral shoal, in lat. $9^{\circ} 53\frac{1}{2}'$ N., long. $118^{\circ} 8' 26''$ E., on which the *Countess of London* is supposed to have been wrecked in November, 1816. It is 4 cables in extent, with less than 2 feet on it at low water, and, except in fine weather, generally breaks. It lies $6\frac{1}{2}$ miles inside the edge of the bank, and is steep-to, having 45 fathoms close to the edge, the soundings contiguous to it being 40 and 50 fathoms, mud. When on it, Victoria Peak bears S. by E. $\frac{1}{2}$ E.; Anipahan, the northernmost of two sharp peaks, over Long Point, S.E. $\frac{3}{4}$ E.; Mount Staveley E. by S. $\frac{3}{4}$ S.; Mount Peel E. by N.; and in clear weather Cleopatra Needle will be seen over Ulugan Bay, nearly in line with Carsoglan Hill E. by N. $\frac{1}{2}$ N. (See pp. 546, 547, 551.)

Coral Patches.—There is a coral patch, having only $3\frac{1}{2}$ fathoms on it, lying S.W. $\frac{1}{3}$ S. 4 miles from the centre of the York Breakers; and $1\frac{1}{2}$ mile westward of it is another, with 4 fathoms, the latter lying $3\frac{1}{2}$ miles inside the edge of the bank, with a bank of coarse sand intervening, on which the average depth is 18 and 20 fathoms.

The soundings in the neighbourhood of these shoals are from 40 to 50 fathoms, mud.

Middle Shoal.—From the York Breakers in the direction of Ulugan Bay, viz., E. by N. $\frac{3}{4}$ N., distant $16\frac{1}{4}$ miles, and at 12 miles off shore, is the Middle Shoal, 2 cables in extent, with $3\frac{1}{2}$ fathoms, coral, upon it, and 12 and 20 fathoms close to its edge. From it Mount Peel bears E. $\frac{1}{2}$ N.; Anipahan Peak S. $\frac{3}{4}$ E.; Mount Staveley S.S.E. $\frac{1}{4}$ E.; and the summit of Long Point S. $\frac{1}{2}$ W.

Directions.—To the northward of the parallel of $9^{\circ} 30'$ N., the soundings on the bank are more regular, and the coral patches lying near the edge of it, except in the neighbourhood of the York Breakers, have generally more water on them than those to the southward, seldom having less than 7 and 9 fathoms up to the parallel of $10^{\circ} 40'$ N., where they again begin to cluster, and have as little as 4 fathoms in some places. Vessels, therefore, bound to Ulugan Bay, or wishing to close with the land for the purpose of working up in shore, cannot do better than cross the bank about this parallel, with Mount Peel on an E. $\frac{1}{2}$ S. or E. by S. bearing, or where it is still clearer on a S.E. by E. $\frac{3}{4}$ E. bearing. The bank on this parallel extends 30 miles from the coast. The first soundings obtained on the edge will generally be 18 or 20 fathoms, coarse sand and broken coral, or perhaps a 9-fathoms cast on coral, when the bottom will be visible, after which the depth will be more regular, the 40 and 50 fathoms' casts being chiefly on a stiff muddy bottom; while in less water sand and mud, or sand and broken coral, will predominate. The nearer to the shore the fewer are the patches, and the more regular the soundings.

Crescent Reef, in lat. $10^{\circ} 40' N.$, long. $118^{\circ} 42' 26'' E.$, and upon which there are 4 fathoms, is a very narrow strip of coral, three-quarters of a mile in extent, in an E..N.E. and W.S.W. direction, lying $1\frac{1}{2}$ mile inside the edge of the bank, and 22 miles from the nearest shore. There are 40 and 44 fathoms within half a mile of its edge.

When on the centre of the shoal, Sangbowen, the North peak of Ulugan Bay, bears S. by E. $\frac{1}{4}$ E. ; Cleopatra Needle, S.S.E. $\frac{1}{2}$ E., ; summit of Cacunipa or High Island (page 552), S.E. by E. $\frac{3}{4}$ E. ; highest part of Boayan Island (page 552), E. by S. $\frac{1}{4}$ S., easterly; and Mount Capoas (page 554), E. by N. $\frac{1}{4}$ N.

The *Bank* immediately West of this shoal follows apparently the contour of the coast line, and takes a sudden trend in a westerly direction for about 10 miles, with soundings of 60 and 75 fathoms. To the northward of the shoal it trends nearly North for 9 miles, and then N.E. $2\frac{1}{4}$ miles.

South, $2\frac{1}{2}$ miles from the Crescent Shoal, there is a 7-fathoms patch, with soundings of 36 and 40 fathoms close to; and E.N.E. $2\frac{1}{2}$ miles from the same is another, 3 cables in extent, having only $4\frac{1}{2}$ fathoms on it, with 40 fathoms close to the edge. Between these shoals and the shore, the soundings vary from 30 to 50 fathoms, and the ground appears to be free from danger.

Capoas Cluster.—In the vicinity of the above patches, and between them and the Crescent Reef, the soundings are irregular, where also there appear to be several shoal spots of 5 and 6 fathoms, all lying from 1 to 6 miles within the edge of the bank. They are too closely grouped and too far off shore for bearings to be of any advantage to navigate between them.

N. by E. $10\frac{1}{4}$ miles from the Crescent Shoal is a 5-fathoms coral patch, one of the Capoas cluster, lying only 4 cables' lengths inside the edge of the bank, with upwards of 40 fathoms water close to it; and also a 6-fathoms patch $1\frac{1}{2}$ mile S.W. of it. From the former Mount Capoas bears E. $\frac{1}{2}$ S.-easterly, distant $32\frac{1}{4}$ miles; the northernmost of the Four Peaks on Cleopatra Range S.S.E. $\frac{1}{4}$ E., and the summit of Tapiutan Island (page 562) N.E. $\frac{2}{3}$ E.

N.E. by E. $8\frac{3}{4}$ miles from the 5-fathoms patch is a $4\frac{1}{2}$ -fathoms coral patch, apparently the northernmost of the Capoas cluster, 3 cables in extent, with 52 fathoms close to its western edge. It lies $1\frac{1}{2}$ mile inside the edge of the bank, with Mount Capoas bearing E. by S. $\frac{1}{3}$ S., Chinongab Peak (page 557) East-northerly; and the highest peak of Tapiutan Island N.E. $\frac{2}{3}$ E.

The least water that has been found on the Capoas cluster is $4\frac{1}{2}$ fathoms. The soundings in the immediate neighbourhood are 40 and 50 fathoms. Vessels should keep clear of this part of the bank.

The *Bank of Soundings* from the 5-fathoms patch above mentioned trends to the north-eastward for 9 miles, and then nearly North parallel with the line of coast.

From the northernmost of the Capoas cluster, the bank trends North a little westerly, preserving a distance of about 30 miles from the shore, to the parallel of $11^{\circ} 12' N.$, when it gradually takes a north-easterly direction, and does not approach the North point of Palawan nearer than 23 miles. The bank is steep-to, 40 and 50 fathoms being close to the 100-fathoms line. Here and there it has comparatively shoal ridges (15 to 20 fathoms) of coarse sand and broken coral, on which there are some $7\frac{1}{2}$ and 9 fathoms patches of coral lying close to the edge. The northernmost and shoalest of these that has been discovered, and on which there are 7 fathoms, lies $1\frac{1}{2}$ miles inside the edge of the bank, in lat. $11^{\circ} 28' 45'' N.$, long. $119^{\circ} 1' E.$ When on it the North Hill on Palawan bears E. by S.-easterly; West shoulder of the High Table Range (page 566) S.E. by E. $\frac{1}{2} E.$; Cadlao or Table-top Island (page 564) S.E. $\frac{2}{3} E.$; and the Horn on Matinloc Island (page 562) S.E. $\frac{1}{4} S.$ It is 26 miles distant from the nearest part of the island, and the depths in the vicinity vary from 20 to 40 fathoms.

The nature of the bottom near the patches is usually fine sand, but when fairly on the bank, especially off the North part of Palawan, stiff green mud predominates. The bank farther to the northward does not appear to be so steep as that abreast of the island, soundings with 160 fathoms having been found nearly 4 miles outside the 100-fathoms line.

The foregoing pages, relating to the shoals and dangers in the China Sea, contain descriptions of those which lie on the south-eastern verge of the main route, along the continental side, or those which form the north-western side of the Palawan route, which have been found by the recent examination to be free from danger.

In former times, the imperfect observations of passing vessels, and the too frequent very desultory notices of presumed discovery of dangers, caused the charts to be embarrassed with a multitude of reefs which have no existence, as has been shown.

But in the space between the two channels, as they may be termed, along the Asiatic side, and that parallel with Palawan, there still remains a labyrinth of clusters, shoals, and reefs, in many cases of doubtful existence, but in more of doubtful position, for this area has up to the present period been unsurveyed, and "*ought to be avoided by all navigators.*" This truth cannot be too strongly impressed upon all, for although it is possible that a ship might pass unharmed through this region of dangers, coralline, reefs, and sand-banks, yet the risk is very great, and the greatest caution will not be an excuse for venturing into such imminent danger.

The ensuing enumeration and description of shoals lying out of the proper track of ships, is therefore added with a view to making these remarks complete, rather as an object of utility.

SHOALS NEAR THE MAIN ROUTE.

The Bombay Castle, Orleana, Johnson, and Kingston Shoals of former charts, were found by Commander Ward, in H.M. surveying vessel *Rifleman*, to be patches on the edge of the Rifleman Bank, described on page 622.

OWEN SHOAL, in lat. $8^{\circ} 8' N.$, long. $111^{\circ} 59' E.$, was discovered in 1835, by Mr. Owen, commanding the ship *David Scott*, who had soundings of 5 to $4\frac{1}{2}$, and one cast of $3\frac{3}{4}$ fathoms in passing over it, a little past noon, steering S.S.E., and at 1 p.m. cleared the shoal, having then no bottom. The shoal appeared to be about 2 miles in extent, consisting of black and white speckled coral, in a state of rapid accretion, apparently by the vitality and energy of the madrepores, observed in recent formations of large pieces of coral brought up by the lead. The patches of speckled coral were bright and alarming while on the shoal, and although no breakers were perceived, as the sea was then very smooth, yet with a heavy swell, the sea probably rises in rollers over the shoal patches, when a large ship would be liable to strike on some of them.

AMBOYNA CAY was surveyed by Commander Ward, H.M.S. *Rifleman*, in 1864. It is in lat. $7^{\circ} 51\frac{3}{4}' N.$, long. $112^{\circ} 55' E.$, and is the dry portion of a small coral bank running N.E. and S.W. The cay is at the south-west extreme of the bank, and is 150 yards long, E.N.E. and W.S.W., 124 yards wide, and 8 feet above high water mark. It is surrounded by coral ledges, some of which dry at low water, but in no instance do they extend as far as 2 cables' lengths from high water mark; the sea breaks heavily upon these ledges in any swell.

About two-thirds of the rock forming the cay is covered with a rich coat of guano, and in some places 4 feet deep, the deposit of myriads of boobies, petrels, and other marine birds; the rest of the cay is comminuted coral. A large pile, composed of all the drift-wood to be collected on the cay, a few lumps of coral, &c., was erected in the centre, and can be seen as a sail at a distance of from 5 to 7 miles in clear weather.

The bank, to the north-eastward of the cay, forms a very narrow ridge a mile long by 2 cables wide. The soundings upon it are about 4 fathoms from a quarter of a mile from the reef until close to the end of the spit, when the water deepens rapidly from 9 to 17 fathoms, and then dips into 67 fathoms, no bottom; while at a distance less than a third of a mile, no bottom was obtained with 220 fathoms of line. There is no danger on the ridge if vessels do not get into less than 4 fathoms, although from the excessive clearness of the water the bottom looks alarmingly close to the ship's keel; the ledges surrounding the islet are steep-to.

Anchorage on the ridge in 5 fathoms, in the S.W. monsoon, was obtained

by the *Rifleman*, fairly sheltered from the prevailing wind. Fish appeared to be abundant, but only a few were caught.

Tides.—By observations at Amboyna Cay two days before neaps, the maximum rate of tide was 1.4 knots per hour, the flood stream setting about N. by W, the ebb West; flood commencing at 11 p.m., and the ebb at 6 a.m. Rise and fall doubtful.

LIZZIE WEBBER SHOAL.—Mr. Dallas reported that while returning in a small vessel, the *Lizzie Webber*, to the wreck of the *Fiery Cross* (in 1860), they struck upon a reef in lat. $8^{\circ} 4' N.$, long. $113^{\circ} 12' E.$ The reef, which was very little under water, is a narrow strip of sand and coral lying in a N.E. and S.W. direction.

This shoal is supposed to extend about 25 miles to the north-eastward of the above position, as reported by Mr. P. Orr, commanding the barque *Canada*, which was wrecked on it on the 24th December, 1864, at 12.30 a.m.

STAGS SHOAL, placed in $8^{\circ} 24' N.$, $112^{\circ} 57' E.$, was reported in 1802 by Mr. Trinder, commanding the brig *Amboyna*, as follows:—"The North end of the shoal extended S.E. and S.S.W. in form of a triangle, with rocks above water and breakers in various parts, the intermediate space apparently very shoal, and the southern extremity could not be discerned from the mast-head."

The *Rifleman*, from a position 5 miles North of that given above, was steered E.S.E. 12 miles, when she was in the latitude of the shoal, and 11 miles East of it, here no bottom was obtained at 200 fathoms; a West course was then steered for 21 miles, and again a S.E. by E. course until the longitude of the shoal was reached. Soundings, with 40 fathoms of line, were tried for, as quickly as possible, on the different courses, and on the spot assigned to the danger, bottom (dark oaze) was brought up from a depth of 1,085 fathoms.

The *Rifleman* had previously passed over the position, and H.M.S. *Reynard* also steamed about the locality, and it is certain from the result of these examinations that no shoal exists within 10 miles of the position assigned. The soundings obtained in the *Rifleman* in former years indicate that the shoal does not exist to the westward,—and it seems probable that the danger seen from the *Amboyna* was part of the *Lizzie Webber* or *Canada Shoal*,—25 miles E.S.E. of the position ascribed to the Stags,—and this is verified by the fact of the *Amboyna Cay* being found 11 miles farther West than reported by Mr. Trinder.

Pearson Reef, in lat. $8^{\circ} 56' N.$, long. $113^{\circ} 44' E.$, was seen in 1843 by Mr. Pearson, commanding the *Bahamian*, who reported that he passed about 3 miles to windward of an extensive shoal in the above position, about 2 miles long in a North and South direction, with some rocks above water on the southern edge.

Cornwallis South Reef is a doubtful danger, placed on the chart in lat. $8^{\circ} 50'$ N., long. $114^{\circ} 11\frac{1}{2}'$ E., and shown as being 3 or 4 miles in extent.

Ganges Reef is another doubtful shoal, 32 miles to the northward of Cornwallis South Reef, in lat. $9^{\circ} 22'$ N., long. $114^{\circ} 11'$ E.

Sin Cowe Island is reported by the fishermen to lie in lat. $9^{\circ} 41'$ N., long. $114^{\circ} 21'$ E. (approximate).

Fancy Wreck Shoal is a doubtful danger, 30 miles north-eastward of the Ganges Reef, in lat. $9^{\circ} 43'$ N., long. $114^{\circ} 41'$ E.

Cornwallis Reef, also doubtful, is shown on the chart as an extensive reef with rocks, 20 miles to the north-westward of the last-named shoal, in lat. $10^{\circ} 0'$ N., long. $114^{\circ} 23'$ E.

Pennsylvania, one of the many doubtful shoals, is placed in lat. $10^{\circ} 0'$ N., long. $115^{\circ} 10'$ E.; and about 20 miles N.N.W. of it, in lat. $10^{\circ} 18'$ N., long. $115^{\circ} 4'$ E. is another doubtful Ganges reef. About 14 miles N.N.E. of this latter, in lat. $10^{\circ} 32'$ N., long. $115^{\circ} 8'$ E., is *Ganges North Reef*, also a doubtful danger.

Third Thomas Shoal (1839) is placed on the chart in lat. $10^{\circ} 52'$ N., long. $115^{\circ} 55'$ E., and shown as being 3 or 4 miles in extent.

Flat Island, in lat. $11^{\circ} 1'$ N., long. $115^{\circ} 40'$ E., is said to be low and flat, surrounded with breakers, and having a reef projecting from its N.E. side. It is marked doubtful in the charts, but it is said that it has been seen by several ships. This is the northernmost danger in this part of the China Sea, and lies nearly midway between the North Danger Reef and the north-easternmost of the dangers bounding the Palawan channel.

SHOALS NEAR THE PALAWAN ROUTE.

Swallow Reef, seen by the *Swallow* in 1801, lies 28 miles N.N.E. from Charlotte Reef. It is formed of a belt of coral surrounding a shallow basin, is $3\frac{3}{4}$ miles long, E. $\frac{2}{3}$ N., and W. $\frac{2}{3}$ S., and $1\frac{1}{4}$ mile wide. At its eastern part are some rocks from 5 to 10 ft. above high water, the highest of which is in $7^{\circ} 23'$ N., $113^{\circ} 50' 23''$ E.; there are also one or two stones on the south-eastern side which show at high water; the West end terminates in a sharp point.

ARDASIER BANK, lying N.E. of Swallow Reef, is very extensive, and has only received a partial examination. It is probable that the South Ardasier, $7^{\circ} 34'$ N., $114^{\circ} 9'$ E., Gloucester, $7^{\circ} 50'$ N., $114^{\circ} 15'$ E., and North Ardasier Breakers, $7^{\circ} 56'$, long. $114^{\circ} 2'$, as also the breakers seen by Mr. Dallas in 1860, in lat. $7^{\circ} 38'$, long. $113^{\circ} 54'$ E., are shoal patches on different parts of one large bank. The south-eastern side, which forms one of the northern limits of the approach to the Palawan passage, has been surveyed in the *Rifleman*. The general direction of this part is N.E. by E. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W. for a distance of 20 miles, but the outline of the edge is

very irregular. Several shoal patches of 3 to 5 fathoms were found near the edge; the shoalest spot discovered had only $2\frac{1}{2}$ fathoms water; this last is in $7^{\circ} 36' 37''$ N., $114^{\circ} 10' 10''$ E., very close to the position ascribed to the South Ardasier Breakers.

INVESTIGATOR SHOAL, examined by Captain Crawford, of the Indian Navy surveying ship *Investigator*, in 1813, is very extensive; its western point being in lat. $8^{\circ} 5' N.$, long. $114^{\circ} 31' E.$, and its eastern extremity in lat. $8^{\circ} 10' N.$, long. $114^{\circ} 50' E.$ It is about 4 miles in breadth, North and South.

Cay Marino is a doubtful shoal, placed upon the chart in lat. $8^{\circ} 30' N.$, long. $114^{\circ} 21' E.$

S.W. and N.E. Shea Shoals were seen by Mr. Shea, commanding the *Buckinghamshire*, in 1833. The first shoal appeared to consist of two reefs of rocks, with high breakers, extending $1\frac{1}{2}$ mile E. by S. and W. by N., and half a mile North and South, the centre of which was found to be in lat. $8^{\circ} N.$, long. $114^{\circ} 55' E.$, by observations of sun, moon, and stars.

The other shoal, seen on the following morning, appeared to consist of two dry white banks, with a ridge of rocks extending from them to the westward about 2 miles, which was considered to be in lat. $8^{\circ} 30' N.$, long. $115^{\circ} 19' E.$

Glasgow Bank.—Mr. Baird, commanding the ship *Glasgow*, is said to have discovered a bank in lat. $8^{\circ} 39' N.$, long. $115^{\circ} 31' E.$ It apparently extended 3 miles to its N.E. edge, and was composed of sand and rocky peaks, in some places 21 to 32 ft. above the sea.

Alicia Annie Shoal.—Captain R. Kirby reports having seen a reef in lat. $9^{\circ} 25' N.$, long. $115^{\circ} 19\frac{1}{2}' E.$, of lagoon form, 3 miles in length, N.W. by N. and S.E. by S. There is a slight rise of sand hill at its N.W. end, and a reef of rocks at its S.E. extreme, with several detached rocks around. There was a portion of wreck on the S.E. end, and a junk with four boats close by; inside the lagoon there was a boat apparently fishing. Soundings were tried for at a quarter of a mile from the S.E. end, but no bottom with 100 fathoms of line. First Thomas Shoal was made the next day, and the chronometer showed it to be 2 miles West of its position on the chart.

First and Second Thomas Shoals appear by the chart to have been seen in 1839. The first is placed in lat. $9^{\circ} 18' N.$, long. $115^{\circ} 53' E.$; the second is shown as an extensive shoal, 9 or 10 miles long North and South, and 4 miles broad; its southern part is in lat. $9^{\circ} 41' N.$, long. $115^{\circ} 47' E.$

Investigator N.E. Shoal, in lat. $9^{\circ} 15' N.$, long. $116^{\circ} 24' E.$, is shown on the chart as having some rocks awash upon it.

Pennsylvania and Sabina Shoals.—One of the doubtful Pennsylvania Shoals is placed upon the chart about 17 or 18 miles northward of the N.E. Investigator, in lat. $9^{\circ} 31' N.$, long. $116^{\circ} 23' E.$, and there are three other

patches of that name, the first in lat. $9^{\circ} 47' N.$, long. $116^{\circ} 44' E.$, the second about 4 miles, and the third about 10 miles to the north-westward from it.

The *Sabina Shoal*, placed upon the chart in lat. $9^{\circ} 43' N.$, long. $116^{\circ} 34\frac{1}{2}' E.$, was discovered by Mr. French, commanding the *Sabina*, of New York, in 1836, who saw "rocks with the sea breaking tremendously over them." Mr. French thought it was one of the doubtful Pennsylvania Shoals, which in all probability it is.

Mr. E. Routh, commanding the *Bombay*, with the *Henry Clay* in company, sighted breakers which his observations placed nearly in the position of the Sabina Shoal.

Lord Auckland Shoal appears on the chart as a bank with 8 to 30 fathoms water over it. The 8-fathom part is in lat. $10^{\circ} 21' N.$, long. $117^{\circ} 17' E.$; close to the eastward of the bank there is no bottom at 100 fathoms.

OTHER PENNSYLVANIA SHOALS—BROWN SHOALS.—Another Pennsylvania Shoal is placed on the chart in lat. $10^{\circ} 24' N.$, long. $116^{\circ} 33' E.$; and another, the Pennsylvania North Reef, in lat. $10^{\circ} 49' N.$, long. $116^{\circ} 54' E.$ The positions of these are very doubtful, and it is probable that the shoals seen by Mr. Brown, commanding the *Arabian*, in 1838, were the same. The following is Mr. Brown's account of them:—

"On the 8th of January, 1838, on our passage to China by the Palawan, standing to the northward, wind N.E., at 10.30 a.m. passed close to windward of a coral patch, with apparently 5 or 6 fathoms water over it, blowing fresh and a good deal of sea; could not lower a boat to determine. It lies in lat. $10^{\circ} 30' N.$, long. $116^{\circ} 41' E.$

"Same day, lying up East on the port tack, at 3.30 p.m., came suddenly into shoal water. Saw the coral rocks very distinctly under the ship's bottom. Hove the lead over, first cast had 5 fathoms, and mark above water for a few casts. Put the helm up and run to the southward for a few minutes, until we gradually deepened to 30 fathoms, no bottom. We appeared to be on the southern edge of an extensive coral flat, extending N.E. and N.W. of us some miles. By sights taken immediately we came off the shoal; this part of it lies in long. $117^{\circ} 0' E.$, or 4' East of the Bombay Reef, which we left yesterday; lat. $10^{\circ} 35' N.$, which we observed at noon.

"The following day at 9 a.m., standing to the northward, with a fresh wind from N.E., and a heavy head sea, came again into shoal water; coral rocks seen very close to our keel, but before we could get the lead forward we had passed over the ridge into 28 fathoms. From 9^h to 11^h 30^m a.m. ran 8 miles on a N.N.W. course in irregular coral soundings, least water, by the lead, 11 fathoms, but at times we apparently had much less from the proximity of the coral rocks. We entered upon the flat in lat. $10^{\circ} 39' N.$, long. $117^{\circ} 24' E.$; came off in lat. $10^{\circ} 46' N.$, long. $117^{\circ} 19' E.$ The longitude computed from a series of sights before and after noon; the latitude by a good meridian altitude, four observers, and clear weather. In passing

over this bank the water appeared very shoal East and West of us, lying in ridges in that direction."

Amy Douglas Shoal.—The *Amy Douglas*, commanded by Mr. Pensberry—under the Siamese flag—on her passage up the Palawan, passed over a shoal in lat. $10^{\circ} 52' N.$, long. $116^{\circ} 25' E.$ On February 12th, 1860, at noon, had good observations, and noticed about that time the water discoloured for about a mile on each side of the ship. Dropped the lead over the side and found 14 fathoms. Mr. Pensberry is of opinion that the water was much more shallow to the westward of the ship.

Fairy Queen Shoal, having 9 fathoms water over it, is placed on the chart in lat. $10^{\circ} 39' N.$, long. $117^{\circ} 38' E.$

Coral Bank.—H.M.S. *Rifleman*, when proceeding from Loai-ta Island (page 628), round the northern edge of the Archipelago, obtained soundings of 47 fathoms on a coral bank in lat. $11^{\circ} 28' N.$, long. $116^{\circ} 46' E.$; steering E. by S. $\frac{1}{4}$ S. 3 miles farther had 44 fathoms, and shortly afterwards 12 fathoms on a small coral patch in lat. $11^{\circ} 26' N.$, long. $116^{\circ} 53' E.$ Continuing the same course, the depths were 42 fathoms for a distance of 5 miles; at 8 miles 125 fathoms, and at 14 miles 175 fathoms. A few miles farther on no bottom was reached with 200 fathoms of line.

SEAHORSE or ROUTH SHOAL was examined by the *Rifleman*. It lies at the N.E. angle of the archipelago of reefs, and forms the N.E. limit of the Palawan Passage. It is a pear-shaped coral bank, 8 miles in length, N.N.E. $\frac{3}{4}$ E. and S.S.W. $\frac{3}{4}$ W., $4\frac{1}{2}$ miles in breadth at the North end and 3 miles at the South end; it is not dangerous, the least water upon it being $4\frac{1}{2}$ fathoms, which was found on a 5-fathom patch, about three-quarters of a mile in extent, at the North extreme of the bank in lat. $10^{\circ} 50' N.$, long. $117^{\circ} 46' E.$ Nothing less than 6 fathoms were obtained on any of the other patches surrounding the lagoon; the depths in the lagoon vary from 17 to 19 fathoms at the shoal edges to 35 fathoms in the centre.

The northern part of this shoal was passed over by the *Seahorse* in 1786, and the southern part by Mr. Routh, commanding the *Bombay*, in 1835.

A Sandy Shoal is placed upon the chart in lat. $11^{\circ} 2' N.$, long. $117^{\circ} 37' E.$

Templer Bank.—The *Minerva*, commanded by Mr. Templer, passed over a bank to the north-westward of the Seahorse Bank, in November, 1835, having from 10 to 17 fathoms water on it. The bank appeared to extend about 4 miles North and South, and as no discoloured water was seen to the eastward, but several apparently shoal patches were perceived to the westward, it is supposed that the ship passed over the eastern part of the bank. The centre of the bank is in lat. $11^{\circ} 7' N.$, long. $117^{\circ} 13' E.$

PART III.

THE EASTERN PASSAGES.

THE descriptions and directions given in the foregoing pages have been devoted to those coasts and channels leading towards the Coast of China, which lie to the *westward of Borneo*, and which are approached by the Straits of Malacca and Sunda, and are therefore generally known as the WESTERN PASSAGES.

The EASTERN PASSAGES, which remain to be described, are those to the *eastward of Borneo*, and may be taken either by the Strait of Sunda, and passing eastward through the Java Sea, or else by one or other of the straits between the islands East of Java.

In earlier times these various routes were known by different names, of which PITT'S PASSAGE, or that which passes East of Gilolo, between it and the West end of New Guinea, may be cited as the most generally known, and this for a reason happily non-existent now—that it avoided those straits and islands subject to the Dutch.

Our charts of these passages are very much more imperfect than those of the portions of the Indian Archipelago to the northward and westward, and this consideration should have much weight with the commander in the choice of a route.

Till recent years the British charts in general use, such as those drawn up by the late Captain Horsburgh, were very unsafe guides, and it was maintained by the Dutch in Java that they caused many disasters. This obloquy is now in a great measure removed; for, however imperfect the charts of the eastern parts of the Archipelago may still be, the labours and observations of many British and Dutch officers have been combined for their improvement, although no proper and systematic survey has been made of the entire area. Prominent among these stands the "Netherlands Commissie tot het verbetering der Zeekarten in de Oost Indie," with which the name of the late Lieutenant Peter Baron Mellvill van Carnbee, may be associated. These have given to the nautical world a very much more perfect representation of

the navigation of the south-eastern portion of the Indian Archipelago than was formerly attainable.

These charts were published chiefly by the respected and ancient firm of Wed. G. Hulst Van Keulen, of Amsterdam, and have since been copied and improved by our Admiralty and others.

In the future descriptions of the channels leading towards China, we commence with the great island of Java, which stands as a rampart between the Indian Ocean and the Archipelago, and then proceed with the islands and straits to the eastward and northward, in due order, as far as the irregular distribution of the islands will permit.

CHAPTER XVI.

JAVA, AND THE JAVA SEA.

JAVA.

THE Island of Java is beyond all comparison the most important portion of the Indian Archipelago. Its fertility, its population, their civilization and industry, place it far in advance of all surrounding islands.

It is about 575 miles long, with a breadth varying from 48 to 117 miles, the area being computed at 37,029 square geographical miles, or about one-third larger than Ireland, but it supports a population twice as numerous. It may be compared in form, size, and position to Cuba, but then it has ten times the number of inhabitants.

It is the principal colonial possession of the Dutch nation, and its governor is paramount over all other of the Dutch possessions in the East. It claims the singular merit among Oriental countries under European subjection of producing a considerable revenue to the Netherlands Government. Whatever opinions may be held concerning the restrictive and engrossing policy of the Dutch, the facts of the great increase of the productiveness, the exports, and the population, stand as an evidence that the systems there carried out have been beneficial to the inhabitants and to the home government.

A century ago the population of Java and the adjacent island of Madura was estimated at 2,000,000. At the end of the last century it had risen to 3,560,000. In 1815, during the temporary occupation by the English, the census gave 4,615,270 inhabitants. The Dutch have, since the restoration of the island, made many enumerations, and each census has shown a large and steady increase. In 1845 the population of both islands was 9,530,781. On December, 31st, 1872, the census gave 17,298,200 as the number of inhabitants in Java and Madura. This included 28,926 Europeans, and 185,758 Chinese settlers. It is thus one of the most densely populated countries in the world, and this is more apparent if the large area occupied by its lofty and inaccessible mountains is taken into account.

The material prosperity of its people has also advanced with the increase of their numbers, and the great exports of coffee, sugar, rice, &c., subject to a heavy export duty, brings in, as before said, an ample revenue for its local government, and also leaves a large amount for the home exchequer. Java is therefore much more important to Holland than India is to the British nation; and it is looked upon as their promised land; "Java is ons Kanään" has been said of it by a Dutch writer.

A ridge of lofty mountains runs from West to East throughout its entire length. The more lofty of the conical peaks are generally visible from sea, and of these there are about 33 which rise above 5,000 ft. above that level. Of these, *Salak*, 7,200 ft., and *Pangeranga*, 9,663 ft., in the rear of Batavia; *Gedee*, or *Tagal Peak*, 11,300 ft., between Tagal and Pekalongan; *Soembing*, 11,000 ft.; and *Merapie*, 9,290 ft., near Samarang; *Japara Peak*, 4,600 ft.; *Lawoe*, 10,700 ft.; *Ardjoena*, 12,000 ft.; and *Semiroe*, the loftiest summit, 12,400 ft., near the Strait of Madura, are the most noticeable for their elevation. They all appear to have been formed as active volcanoes, and the hidden fires are in some cases scarcely extinct, but none are now in activity.

The heights of these mountains have been observed by Lieuts. Rietveld, Escher, Eschauzier, Staring, Brutel de la Rivière, and Melvill van Carnbee, of the Dutch navy.

They are a continuation of that volcanic band alluded to in an early part of this volume as encircling that vast area limited by Malaya, Sumatra, Java, and the islands East of it, Celebes, the Philippines, Japan, Kamtchatka, along which volcanic agency is more or less evident or active.

The South coast of Java is abrupt and iron bound, affording but very little shelter, and being a lee shore, beaten by the whole force of the waves from the Indian Ocean, is carefully to be avoided; but it is free from storms. The chief ports and settlements are on the northern side, along which are large plains of unsurpassed fertility, between the mountains and the sea.

At the principal ports the Government have established very ordinary means for refitting. The *open ports* (1870) in the island for import and export trade are Batavia, Samarang, Sourabaya, Cheribon, Passeroean, and Tjilatjap. For export only, the following ports are open in Java, Anjer, Bantam, Indramayoe, Tagal, Pekalongan, Rembang, Probolingo, Bezoekie, Panaroekan, Banjoewangie, Pangool, Patjitan, and Wyncoopsbay. There are railways running inland from Batavia and Samarang, and along the entire length of the island is a fine road, 800 miles in extent, made by General Daendels. There is electric telegraphic communication throughout the island and with all parts of the world, as described with Batavia hereafter.

The island lies between the wind systems of the two hemispheres, and thus enjoys an immunity from those storms and cyclones which devastate the countries in higher latitudes; but it is very moist, and to this fact it probably

owes much of its fertility. Formerly it was considered to be very unhealthy, but later experience and an improved mode of living, adopted by Europeans, have shown that it is not more deleterious to the white man than any other tropical country, and it has besides the advantage of affording lofty sites for residence and sanatoria.

Although no very systematic and minute survey of its coast has been made by the Dutch Government, yet the zeal of the officers in its large fleet, well directed by the Commission for the improvement of the Indian charts, have given us tolerably perfect delineations of its shores and harbours. The work was carried on under the orders of Rear-Admiral Lucas, the commandant of the Dutch navy, by the officers before mentioned. The first chart was published in Amsterdam, in 1842, under the authorship of the late Mr. Jacob Swart and Lieut. P. Baron Melvill van Carnbee. To accompany this chart, they drew up the "*Zeemans-Gids voor de Vaarwaters rondom het Eiland Java,*" from which the following directions are derived, as translated into English by Lieut. G. Tichelman.

A ship bound to Batavia, being abreast of St. Nicholas Point, ought to steer E. $\frac{1}{2}$ S., or E. by S., to pass Bantam Bay, mid-channel between Babi Island and the reef which projects from Pontang Point; with this course, Menscheneter Island and Great Kombuis will be seen ahead, and the Hoorn Islands in a N.E. or E.N.E. direction, visible in clear weather at the distance of $3\frac{1}{2}$ or 4 leagues. The best track in the night is to keep in 14 or 15 fathoms, taking care not to borrow under 11 fathoms toward the Java shore, nor to deepen beyond 18 fathoms in the offing. It would, however, be rather imprudent for strangers in these waters to keep under sail all night; it would be better to anchor, as moderate depths are found from here to Batavia Roads. The tides set generally East and West along this part of the coast.

Pulo Babi lies due North from Pontang Point, and according to the trigonometrical survey of Lieutenant Staring, D.R.N., in 1841, the centre of the island is in $5^{\circ} 48' 45''$ S., and $106^{\circ} 16' 13''$ E. It extends $2\frac{1}{2}$ miles East and West, and a mile North and South; it is steep-to on all sides, except on the E.S.E., where a reef projects to a distance of 3 cables' lengths, and off the West point, at a distance of $1\frac{1}{2}$ cables' lengths, are some rocks. Half a mile West of the island there are from 17 to 15 fathoms; along the South side 24 to 17 fathoms; on the East side 20 fathoms; and along the North side from 25 to 11 fathoms water. In some old charts a rock is placed 4 miles S.E. from Babi, called Cheribon, but apparently does not exist, as Lieutenant Staring carefully examined the place without finding it; and the native fishermen also, who are very well acquainted with the existing dangers, declared that they knew of no such rock.

The **BAY** of **BANTAM** is about 8 miles East and West, and 6 miles North and South, and contains one large and several small islands, but no

hidden dangers, consequently there is no difficulty in navigating it. *Paniang* or *Panjang*, the name of the large island, is 2 miles in diameter, and lies in the western part of the bay. The island is bold to approach on all sides, except off the South point; the passage on the West side of Paniang is also navigable, and is $1\frac{1}{2}$ mile wide, and has variable depths from 5 to 9 fathoms. South by West from its S.W. point a small rock lies at a cable's length off, with 6 ft. water. S.E. of Paniang, and very near it, there are two small islands, the reefs from which project to the southward half a mile, and consequently ought not to be approached within that distance. W.N.W. from the North side of Paniang, close under the Java shore, there are two small islands, of which the largest is called *Pulo Kalie*; and more toward St. Nicholas Point, $1\frac{1}{4}$ mile E. by S. from it, lies a third island, called *Saliera*, sometimes called *Robben Island*, and in old charts *Notendop*, between which and the two former may be found the place called *Pangorian*. S.W. of Paniang, in Bantam Bay, there are three small islands, under the Java shore, the northernmost of which may be approached very near, there being at a distance of 2 or 3 cables' lengths 4 and $4\frac{3}{4}$ fathoms at low water, and this same depth will be found near the two southernmost islands at the distance of 5 or 6 cables' lengths, shoaling to $3\frac{1}{2}$ and 2 fathoms when approaching them. South of Paniang, 2 or $2\frac{1}{2}$ miles distant, lies a group of islands, called *Koebor*, *Karang-Padang*, *Lima-jamboe*, and *Lima-klappa*, in old charts called the *Dutch Churchyard*. These islands are surrounded by reefs of 1 and 2 cables' lengths in extent; and between them, as well as West from them, and close in-shore, there are several coral banks, for which reason it is advisable, when entering the bay by the West channel, and having passed Paniang, to steer about S.E. in 7, 5, and $4\frac{1}{2}$ fathoms, along the North side of the northernmost island of this group, to the anchorage. Eastward of Paniang there are two islands, called *Mujang Besar* and *Mujang Ketjil* (or *Pamoejang*, or *Madu*), with a free passage on both sides; but that between these islands and Paniang is preferable, having regular depths from 9 to 5 fathoms, and shoaling towards the anchorage to 4 fathoms. Both the *Mujang* Islands may be approached very near, being clear of danger; and when passing to the eastward of them, the best way is to keep closer to them than to the Java shore, within a mile of which, in some places, there are but 3 fathoms at low water, while in the other channels from $3\frac{1}{4}$ to 5 fathoms will be found.

BANTAM, once the native emporium of these seas, has been reduced from its former importance to an insignificant place. It is now an open port for exports only. The Dutch Government, gradually increasing in their power and authority over the province whose name it bears, finally deposed the last of its kings in 1843, and banished him to Surabaya.

The anchorage for large ships is W.S.W. or S.W. from *Mujang Ketjil*,

and South from the East point of Paniang in $3\frac{3}{4}$ to $4\frac{1}{4}$ fathoms depth at low water, and small vessels will find a good road in 3 fathoms, a mile distant from the beach, and half a mile East of Lima-klappa Island. Very near the shore are the two *Dua Islands*, with the depth of 2 or 3 fathoms near them. The flagstaff of the fort is in $6^{\circ} 1' 39''$ S., and $106^{\circ} 8' 48''$ E., according to the trigonometric survey of Lieutenant Staring, in 1841. The mouth of the river is closed by a mud-bank, upon which there are 2 fathoms water at the distance of a mile, and 1 fathom at the distance of 2 or 3 cables' lengths from it. In a S.S.W. direction from the centre of the bay stands the conspicuous hill of *Pinang*, or *Mount Bantam*, which is a good mark for vessels entering the bay. The mean rise and fall of tide is 2 or 3 ft., and at springs 5 ft., but with neap tides no rise is perceptible.

PONTANG POINT, forming the East side of Bantam Bay, is bluff, but a reef projects from it $1\frac{1}{4}$ mile. This reef, which has been represented in former charts much too large, is steep-to, as the depths decrease speedily from 8 and 9 to 3, $1\frac{1}{2}$, and 1 fathom, and stretches farthest in a N. by E. direction from Pontang Point, where the limit of 3 fathoms lies about East from the North point of Paniang Island. When passing along this point it is advisable not to come nearer than 12 or 11 fathoms, before the East point of Babi Island is well to the westward of N. by W. $\frac{1}{2}$ W. The northernmost point of the reef of Pontang lies 3 miles N.E. by E. from the point itself, and S. $\frac{3}{4}$ E. from the East point of Babi.

Between Pontang Point and Kaik Point the coast forms a bight, and in the middle of this bight are situated the village and the river of *Tanara*, from whence a reef with a tongue, projects 3 miles off. Outside of this tongue the depths of 2 and 3 fathoms increase speedily to 7 fathoms and more; and the northernmost point of the tongue, in 3 fathoms, at low water, bears E. $\frac{3}{4}$ S. from Pontang Point, and W. $\frac{1}{4}$ S. from Menscheneter Island. In this bight, close in-shore, lies the small island of *Tiankier*, in a N.N.E. direction, from which, at half or 1 mile distance, there are two coral banks above water.

MENSCHEN-ETER ISLAND (Man-eater, or Cannibal) is 3 miles northward of Tanjong Kaik, and on the West side of the reef which projects from it. The island is low, covered with trees, and little more than one-third of a mile in diameter. It is surrounded by a narrow reef which is very steep-to, and between it and the end of the reef, there is a very narrow channel, fit for proas, with soundings from 4 to 11 fathoms.

A *lighthouse* is proposed on Menscheneter Island. It will show a flashing light, visible 16 miles off.

Menscheneter Reef projects North of Kaik Point, and its northern edge consists of a steep sand-bank with rocky patches, called by the natives *Karang Walla*. Off the North end of the reef, in 5 fathoms water, and only 2 cables North of a depth of 2 fathoms, is placed a *white* buoy, surmounted by a ball,

N.E. by E. $\frac{1}{4}$ E., 7 cables from the North end of Menscheneter Island, and N. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles from the extremity of Kaik Point. Vessels should keep well outside the position of this buoy at night, as the depths decrease so suddenly from 7 and 5 fathoms.

Cheribon Rock, mentioned on page 672, is now placed on the charts $4\frac{1}{2}$ miles from the East end of Babie Island.

Struisvogel, or Ostrich Bank, consists of five different coral rocks, stretching North and South about a mile, and East and West a little more than half a mile; on the shoalest place there are 2 fathoms at low water, but close to the bank 13 and 17 fathoms; and therefore it should be approached with great caution. It bears N.W. $\frac{3}{4}$ N. from the middle of Menscheneter, and S. $\frac{1}{2}$ W. from the West point of Great Tidong, the westernmost of the Hoorn Islands. A white Herbert's buoy, surmounted by a *globe*, is placed on Karang-Poerak, the North end of the reef; and an *iron beacon*, with a *cone*, stands on Karang-Bezoar, the South end of the bank.

Tangara Rock rises suddenly out of 13 and 14 fathoms, mud, having upon its shoalest spot, 3 fathoms, a *beacon* with a *triangle*, bearing N. $\frac{7}{8}$ E. from the middle of Menscheneter, and W.N.W. $\frac{2}{3}$ W. from the middle of Great Kombuis. Halfway between Struisvogel and Tangara, or $1\frac{1}{2}$ mile N.W. $\frac{1}{4}$ W. from the latter, there is another small coral rock, called the *Laut*; the least depth upon it is $3\frac{3}{4}$ fathoms at low water, and close to it from 12 to 17 fathoms, soft ground.

The CHANNELS which lead towards Batavia from the westward are two in number, the *Inner Westerly Channel* (het Westelijk Binnen-Vaarwater), and the *Outer Westerly Channel* (het Westelijk Buiten-Vaarwater).

The INNER CHANNEL, which appears to be most used, passes between the North end of Menscheneter Island and reef and the Kombuis Islands, then between Middelburg Island and the Ontong Java Reef, and westward of Onrust and Kuiper Island.

The OUTER CHANNEL runs to the northward of the Kombuis, Middelburg, and Amsterdam Islands, and then between Rotterdam and Haarlem, and afterwards between the white buoy on Rynland and the black buoys on Neptunus, Pas-op, and Pipa Reefs.

The INNER or Dutch Channel may, with a good look-out, be considered as free from dangers. To proceed through it, a ship should pass between Menscheneter Island and the Great Kombuis, due attention being paid to Struisvogel, Laut, and Tongara Rock, and not to borrow too much on the Java shore toward the buoy off Menscheneter Reef. A good berth should also be given to the Great Kombuis, as *Pedynab Reefs* project to a considerable distance from its western point. Upon the western point of these reefs is a *black buoy*, with a *ball*, from which the South point of Great Kombuis bears S.E. by E. $\frac{3}{4}$ E., and its N.W. point E.N.E. $\frac{1}{2}$ E., about a mile distant. Between this reef and that of the Menscheneter the channel is, in its narrow-

est part, 2 miles wide, with depths from 8 to 12 fathoms. Between Kaik Point and Ontong Reef there is a bight, in which the depths decrease regularly towards the Java shore, except near a rocky shoal off Serang Point, stretching East and West 1 mile, and having in some places $2\frac{1}{4}$ and 2 fathoms water; this shoal bears South from Groote (Great) Kombuis, E. by N. from Kaik Point, and S.E. by E. from Menscheneter Island, the depths increasing speedily toward the offing to 7 and 9 fathoms.

Loembing Rock.—Between the Great and Little Kombuis lies the dangerous *Midden* or *Loembong Klip*, a rock only a ship's length in extent, and carrying only $2\frac{1}{4}$ fathoms at low water. On the middle of it stands a *black* beacon, with a *cone*, bearing W.S.W. from the South point of Little Kombuis, and S.E. by E. $\frac{3}{8}$ E. from the South point of Great Kombuis. To the southward, a little more than a mile from Kleine (Little) Kombuis, there is *Tiga Shoal*, with $3\frac{1}{2}$ fathoms at low water; this is marked by a *black* buoy, surmounted by a ball, and from which the North point of Middelburg bears E. $\frac{1}{2}$ S.

Meinderts, Manders, or Mynder Shoal, is $1\frac{1}{2}$ cable's length in diameter, and has 2 fathoms depth upon its shoalest part. It is marked on its North and South sides by two *black* buoys, surmounted by *globes*. The northern of these bears S.E. $\frac{1}{3}$ E., 2 miles from the East end of Little Kombuis, and W. $\frac{3}{4}$ N. from the North side of Middelburg Island. S.E. of Mynder Shoal lies another small but dangerous shoal in the common track, discovered in 1840 by Lieutenant Staring, D.R.N. This shoal, called *Tanna Kenappan*, or *Ketapang*, has $2\frac{1}{2}$ fathoms on it at low water, and close around it 6 fathoms, which quickly increases to 7 and 9 fathoms. A *black* buoy, with a *ball*, has been placed on this shoal, from which the beacon of Ontong Reef bears S.E. by E. $\frac{3}{8}$ E., distant a little more than a mile; the South point of Amsterdam, just opening clear of the South point of Middleburg Island, E. $\frac{1}{2}$ S.; and the North point of Middleburg E.N.E. $\frac{1}{3}$ E. Besides this shoal, there are some others to the westward of Middleburg, but none of them in the common track of ships. Upon two of them, however, there are *beacons*. A ship beating up along the South side of the above-mentioned dangers should consider it as a fairway mark, not to bring the South point of Middleburg Island to the southward of E. $\frac{1}{4}$ N., and to keep the South point of Amsterdam always well open South of Middleburg.

The passage between the beacons on Middleburg and Ontong Reef is very narrow (not quite half a mile), in 8 or 10 fathoms water. The reef which borders the South coast of this island is very narrow, and carries a beacon, with a *cone* at its extreme end.

MIDDLEBURG ISLAND, 2 miles N. by E. from Ontong Java, forms the North side of the Inner Channel. It is surrounded by a reef, on the S.E. point of which is a *black* beacon, with *cone*; and $2\frac{1}{2}$ cables westward of the beacon is a black buoy, surmounted by a ball, on the South side of the shoals.

A red light is *proposed* to be established on the S.E. extreme of Middleburg Island, as it is the turning point into the Batavia Roads.

Amsterdam Island, to the eastward of it, is also surrounded by a reef, quite steep-to, but having a narrow 9-fathom channel between it and Middleburg.

BATAVIA.

The capital of the Dutch East India Possessions was first built on the low shore of the bay, called the *Reede van Batavia*, when that nation established itself in the East. In 1610 a fort was built and named Batavia, on the site of the present one, but at that time it stood on the edge of the sea, which was deep nearly up to its walls. The town was founded in 1619, on the ruins of the native one of Jacatra, and the Dutch, true to their home instincts, built their streets on the sea level, with straggling canals intersecting them. This arrangement, convenient and good in Holland, was most pestiferous within the tropics, and the place, up to recent times, was proverbial for unhealthiness.

In 1699 a series of earthquakes brought down a vast quantity of earth, which blocked up the previous channels, and obstructed the two piers which had been carried out along the course of the river. A large bank was formed off this entrance, and these piers were gradually extended as the land subsequently increased with the drifts brought on to it by the prevalent currents.

In 1753 the coast line had advanced to one-third of a mile from the walls of the Kasteel or Fort, and at 90 years later the shore line was a mile seaward of the fort. At present the piers are carried seaward $1\frac{3}{4}$ mile from the shore line at the time of the first establishment of the fort. The pestiferous canals were filled up in 1809—1817 by Marshal Daendels, under the vigorous administration of the French rule.

The population of Batavia, as ascertained by the first correct census by the British Government in 1814, was 47,217. Twenty years later it had risen to 118,000, and in 1850 it was ascertained to be 348,325—a marvellous increase. It is now about 650,000.

The railway between Batavia and Buitenzorg, about 30 miles in length, was opened in Jan., 1873. It is a great boon to the inhabitants, enabling them to easily reach the high and healthy land of the interior. The goods traffic is gradually increasing, quantities of tea, rice, coffee, and other productions being transported from the interior to Batavia.

Batavia is connected with all parts of the island by *electric telegraph*, and also with all parts of the world. Messages for Europe and China are sent by way of Singapore. A cable is laid to Padang, on the West coast of Su-

matra, and another from Banjoewangie, on the South coast of Java, to Port Darwin, thus bringing the Australian lines into the system. The rates, in 1874, were, to Europe £6 7s., and to Singapore £1 3s. For Australia the rates were, in, 1872, to Port Darwin, 20 words, 48 florins 75 cents; to Melbourne 50 florins, and to Sydney 52 florins.

As may be supposed, the low fore shore affords no facilities for commerce, and it is by the piers and the proas that come out to the shipping in the roads that commerce is carried on. There is no private establishment for repairing ships, and only vessels of very small tonnage can be taken into the river and careened. A project for the erection of docks, &c., was afoot in 1870, but since that time nothing has been done. The only place for repairs in Java is at Sourabaya. The naval establishment is at the island of Onrust, $5\frac{3}{4}$ miles north-westward from the pier-heads.

The **BAY of BATAVIA**, between the point, Ontong Java on the West, and Krawang Point on the East, is 21 miles in width, and between the lines joining those points it is 8 miles in depth. The bottom consists of soft mud, but in the vicinity of the shoals, rock. The soundings are from 10 to 4 fathoms, regularly shoaling towards the shore; and generally throughout the bay at a mile distant from the beach there will be found 3 fathoms. Except in a few places, the road is sheltered by a chain of islands, by which ships are always protected against a dangerous swell setting in. The road may be considered as very safe, for although ships roll considerably in the strength of the western monsoon, and are consequently compelled to strike their top-gallant masts and yards, no danger is to be apprehended of driving, from the excellence of the holding ground.

Most of the islands and shoals lying near the road consist of coral with white sand above water, and are covered with various kinds of trees; they are steep-to, and it would seem that some of them increase in extent, so that it will be necessary to re-examine the depths from time to time; and the more prudence is recommended to those who try to pass over shoals, on which but just sufficient depth is indicated. The coast of Java is generally flat, but 30 miles inland from Batavia the Goenong Gedeh, or the Blue Mountains, rise to a considerable height. Lieut. Melvill Van Carnbee found, in 1841, by angular measurement, the height of these mountains above the surface of the sea, viz.: Pangerango, 9,954 ft.; Salak, 7,322 ft.; Karang, 6,014 ft. In the western monsoon their peaks may be seen from the road in the morning, but are seldom visible during the eastern monsoon. From the common anchorage near Rynland Shoal, the highest peak of these mountains, called Pangerango, bears S. by E. $\frac{1}{4}$ E., the highest or easternmost peak of Salak S. $\frac{1}{2}$ W., and Mount Karang, in the Bantam residency, W. by S. According to the trigonometrical survey these peaks are in lat. $6^{\circ} 45' 15''$, $6^{\circ} 42'$, and $6^{\circ} 15' 45''$ S., and in long. $107^{\circ} 1' 45''$, $106^{\circ} 47'$, and $106^{\circ} 6' 45''$ E.

Beacons.—In 1855-6 a system of beaconage was adopted by the Marine Commission for Batavia Roads, by which the limits of the three principal channels leading towards Batavia were clearly marked. *Two* descriptions of beacons only (both painted *black*) were used; the one surmounted by balls or globes, and the other by cones. The beacons with *globes* to be left to *starboard*, and those with *cones* to *port*, on entering. The situation and use of these beacons will be described hereafter in their respective places. With these, and the new lighthouse on the pier-head at Batavia there will be no difficulty in entering. In recent years *buoys* on the starboard side of channels are generally painted *white*.

ONTONG-JAVA REEF which forms the western limit of Batavia Bay, is steep at its northern end, and consists there of a hard sand bank with some rocks, with only half a fathom at low water; the beacon with a globe, which stands upon its northern edge 20 ft. above high water, ought not to be approached nearer than in 8 or 9 fathoms. At the eastern side, abreast of the island Schiedam, Ontong Reef is more sloping, and may be more nearly approached if the lead be kept briskly going. A ship, after passing Middleburg, should steer S.E., S.E. by S., and S.S.E., edging away for Onrust Island. *Kelor Rock*, or the *Steen* (Stone) of Onrust, is the westernmost of several small coral rocks which lie off the North point of Onrust; they are small and steep-to; and on the shoalest place there are $2\frac{1}{2}$ fathoms near the beacon with a *cone*, which stands on its north-western extremity, about 4 cables' lengths N.W. from Onrust, and which must be passed on its western side. The *Mathilda Rock* lies less than half a mile W. $\frac{1}{2}$ N. from the former, and carries a *beacon* with a *globe*, on its N.E. side in 3 fathoms depth, but at low water there is no more than 2 fathoms upon its shoalest spot. The channel runs betwixt these two last-mentioned rocks, and it is advisable not to pass to the eastward of Kelor Rock, nor between the islands of Onrust, Kerkhof, and Purmerend, on account of the numerous shoals in that space. If a vessel should be working between Schiedam and Onrust, she will have to look out for a small rock, discovered, in 1846, by Lieutenant Tengnagel, D.R.N., from whence Onrust bears South, easterly, and Mathilda Rock beacon S.W. $\frac{1}{4}$ W. It carries 3 fathoms at low water, but there are $6\frac{1}{2}$ fathoms all round it and close to.

ONRUST, a small islet, not more than 400 yards in length, is the arsenal of Batavia, and has every convenience for refitting a ship. There is 24 ft. alongside the jetty, and the place is excellently managed.

There is a *dry dock* 400 ft. long, at which, previous to 1866, vessels could be repaired, but since that date only in very urgent cases are merchant vessels admitted.

The flagstaff upon the island of Onrust is in $6^{\circ} 2' 20''$ S., and $4^{\circ} 27'$ W., from the Time-ball at Batavia, or in $106^{\circ} 43' 40\cdot5''$ E of Greenwich.

Kuiper Island is a quarter of a mile South of Onrust. It is bold-to on the

S.W., but a reef surrounds it on the other sides. On the north-western point of the reef a *black* beacon with *cone* marks the North side of the Inner Channel. The powder magazines for merchant shipping are on Kuiper Island.

When past the Kelor, or Stone of Onrust, steer to the westward of Onrust and Kuiper Islands, giving a proper berth to a reef which projects 1 or $1\frac{1}{2}$ cable's length from the N.W. side of Kuiper, and of which the limits are indicated by the *beacon* with a *cone*. The S.W. side of Kuiper Island may be approached without danger; but do not keep too much to the Java side, on account of a small rock, called *Karang Kuiper*, which bears S.S.W. half a mile from the island, with $2\frac{3}{4}$ fathoms on its shoalest part, at low water. It has a *white buoy* with *globe* on its North side, and marks the starboard side of the Inner Channel. A little way farther to the S.S.W. from this beacon there is a *sandbank* with 1 fathom water upon it.

Soon after having rounded Kuiper steer S.E. by E. towards the lighthouse on the West pier in Batavia Road, and the white buoys with balls on *Reigersdaal* and *Rynland* Shoals will be seen ahead; pass between them in 6 to $7\frac{1}{2}$ fathoms right toward the shipping in the road, and anchor in 6 or 5 fathoms, mud, South from Rynland buoy. The western passage between Reigersdaal and the main is not to be recommended, on account of two shoals bearing S.W. from it, upon one of which there are $3\frac{1}{4}$ fathoms water.

The OUTER CHANNEL.—That which is called the Outer Channel leads along the North side of the Struisvogel Rocks and the Great and Little Kombuis, as a ship coming from the westward may pass on either side of these. Between the Struisvogel Rocks and the Hoorn Islands, it is 5 miles wide; and these islands may be approached from the southward to within half a mile, as their reefs do not reach farther off than $1\frac{1}{2}$ cable's length. To the westward, however, there is a rock called *Karbouw*, about a mile W. $\frac{2}{3}$ N. from the West point of *Tidong*, the westernmost of the Hoorn Islands, on which there is 1 fathom at low water. A leading mark to pass to the northward of Struisvogel Shoal, and of the Laut and Tangara Rocks, is to keep the Little Kombuis well open to the northward of the Great Kombuis. A ship may pass also to the southward of the Struisvogel between it and Tangara Rock beacon, but in this case the latter must be approached within 1 mile distance, on account of the Laut Rock, before described. The passage between Tongara Rock and Great Kombuis is also safe, only taking care to remain full a mile from the West point of that island, on account of the small coral rocks which project therefrom.

The HOORN ISLANDS (or *Het Wapen van Hoorn Eilanden*) are four in number, stretching W. by N. and E. by S. 4 miles; the two westernmost are called the Great and Little Tidong, and the two easternmost, bearing North and South of each other, are called Pajang Islands. Each of these groups is surrounded by reefs, which fall partly dry at low water, and which are

very steep-to at the outside. The reef round the Tidongs projects but very little to the southward; to the northward about $1\frac{1}{2}$ cable's length, and to the eastward about 3 cables' lengths, while that which surrounds the Pajangs projects North and South about 1, and East and West 2 or 3 cables' lengths. The soundings to the southward of the Hoorn Islands are, very near them, 30 and 40 fathoms, and, in the channel between them and the Angeneita Islands, which is full 2 miles wide, 35 to 50 fathoms.

The Angeneita Islands are a little more than 4 miles North of the Kombuis Islands, and are all very small islands, *Pulo Parrie* being the largest and easternmost; they are connected to each other by reefs, partly visible above water and extending in some places three-quarters of a mile. One mile East from *Pulo Parrie* are two small shoals very near each other, called the Jonks, one of which shows above water, and upon the other there are 2 fathoms at low water. The fairway of the Outer Channel, between the Angeneita and the Kombuis Islands, is close along the North side of the latter, in order to avoid five heads of rock which lie on the North side of the channel. The southernmost and easternmost of these is the *Serassa Rock*, marked by a *black buoy* on its western side, from which Little Kombuis Island bears S.S.W. $2\frac{3}{4}$ miles; *Pangan Rock*, of $3\frac{1}{2}$ fathoms, W. by N. half a mile; *Tanda Po Lakki Rock*, of $4\frac{1}{2}$ fathoms, West three-quarters of a mile; *Panyangdi Laut Rocks*, a dangerous patch one-third of a mile in extent, N. by W. 1 mile; and about midway between the buoy and the East end is *Parrie Island*.

Being so far advanced that Little Kombuis bears S.S.W. and *Serassa* buoy North, steer N.E. or N.E. by E. till *Dapoer Islet* bears E. by S., and then make right for it, because a straight course from the Little Kombuis toward *Dapoer* would lead among the coral rocks which lie North and N.W. from Middleburg, on some of which there are not more than $2\frac{1}{2}$ to 3 fathoms at low water. The northernmost of these rocks lies $2\frac{1}{2}$ cables northward of a line joining the Little Kombuis and *Dapoer*. It is marked by a large *white* Herbert's buoy, from which *Dapoer Island* bears E. $\frac{1}{2}$ N., distant $2\frac{1}{4}$ miles; Little Kombuis W. by S. $\frac{1}{2}$ S., $3\frac{1}{2}$ miles; Middleburg Island, East end S. by E. $\frac{1}{4}$ E., $2\frac{3}{4}$ miles; and *Serassa Rock* buoy N.W. by W. $\frac{1}{4}$ W. $3\frac{1}{4}$ miles.

A ship coming from the Little Kombuis may also pass between the shoals N.W. of Middleburg, and along the North side of this island as well as of Amsterdam; but she ought to have a steady breeze, for fear of being taken aback between the reefs, and it will always be prudent to have a boat ahead sounding. If a boat cannot be spared, and if she has a leading wind through this channel, she will avoid the shoals by steering (as soon as Little Kombuis bears S.S.W.) a S. by E. course until Little Kombuis bears W. by N., and is in line with the South end of Great Kombuis; keeping it

so will lead over a $4\frac{3}{4}$ fathom patch, lying N.W. by N. $1\frac{1}{4}$ mile from the N.W. end of Middleburg Island, and $3\frac{1}{2}$ cables northward of a $3\frac{3}{4}$ -fathom patch, which lies N $\frac{1}{2}$ E. 4 cables from the N.E. end of Middleburg Island.

From a position a mile N.E. of Amsterdam a south-easterly course may be steered for the Middle Channel.

Dapoer Island is surrounded by a reef, and 2 cables' lengths N.E. and S. by E. from it lie two separate dangerous coral banks, the former extending to a distance of 4 cables from the island, and the latter a $2\frac{3}{4}$ -fathom patch, at the distance of $3\frac{1}{2}$ cables—for which reason Dapoer should not be approached within a mile distance on these bearings.

A *lighthouse* has been proposed on *Edam Island*, but is not likely to be established. North of Edam, at three-quarters of a mile distance, there is a coral reef of considerable extent, with not more than half a fathom of water.

Monnikendam Reef lies E. by S. from Haarlem Islet, and N. by W. from Hoorn; it falls partly dry at low water, but has in some places 2 and 3 fathoms. A *white* Herbert's buoy marks the North side of the reef, and superseded the beacon existing here previous to 1872.

Middle Channel.—To take this channel, the vessel should not borrow too much on the eastern shore of Amsterdam, as a reef projects from that side 2 cables' lengths. Two and a half miles further, mind the small rock, called Obie, marked by a *white* buoy surmounted by a *globe*, lying half a mile East of Rotterdam. The channel leads to the eastward of this rock, between it and *Ayer Bank*, which has $2\frac{1}{2}$ fathoms water upon it at low water, and is indicated by a *black buoy* with ball, which bears West from the North point of Hoorn Island at $2\frac{1}{2}$ cables' lengths distance. Between Rotterdam and Kerkhof there are several small coral rocks with $1\frac{1}{4}$ to $3\frac{3}{4}$ fathoms upon them, for which reason a ship should not borrow too much towards that side of this channel. The easternmost of these rocks bears N.N.E. from Kerkhof, S.E. from Rotterdam, and S. by E. from Obie buoy. The *Wapen of Purmerend*, or *Ialan Rock*, is about 2 cables' lengths in extent, consisting of large rocks with 2 and 3 feet water upon them, and close to 8 fathoms; it has a white buoy with a *ball* at its N.E. point, which bears E. $\frac{1}{2}$ S. from Purmerend, and S. $\frac{3}{4}$ W. from Hoorn.

Saket Reef bears S. by E. half a mile distant from Purmerend Island; it is 2 cables in length, and carries 2 fathoms water on its shoalest part at low water, as well as a *beacon* with a *cone* on its S.W. point. There are two other reefs hereabout, one 2 cables' lengths to the East, and the other half a mile S.E. from Purmerend, upon each of which, at low water, there is but half a fathom patch.

The **EASTERN CHANNELS** leading to Batavia Road are very safe and convenient, and, like the western channels, the chief dangers are marked by beacons in the southern entrance. Those between the islands of Edam, Alkmaar, Enkhuizen, and Leiden, have soundings of 14, 12, 11, and 10

fathoms; the channel to the southward of Leiden is also safe, if attention is paid to the shoals which lie between it and the main, and to a small coral rock, $2\frac{1}{2}$ cables' lengths East of Leiden, upon which the Dutch ship *Amstel* struck in 1842. It is marked by a *black Herbert's buoy* surmounted by a *ball*. The rock was surveyed by Lieut M. L. Kool, D.R.N., who found it to be two ships' lengths in diameter, carrying $1\frac{1}{2}$ fathom, and speedily deepening to 3, 5, 7, and 9 fathoms. From the shoalest spot, the North point of Leiden was in one with the middle of Hoorn Island; the South point bore W. $\frac{3}{4}$ S., the West point of Edam, just behind the West point of Alkmaar, and the East point of Edam open to the eastward of Alkmaar. The rock is 218 yards from the reef round the island, and between them there is 7 fathoms depth.

Vader Smit Shoal.—The first shoal between Leiden and the Java shore is Vader Smit, a coral reef above water. It has a beacon and *globe* on its South point, which bears S. $\frac{3}{4}$ E. from Leiden, and N.W. $\frac{2}{3}$ N. from Priok Point. There is also a *white* Herbert buoy off its N.E. extremity. A depth of only 3 fathoms is found at half a mile West of the buoy, and the same distance N.W. of the beacon.

One mile East from Vader Smit, and S.E. by S. from Leiden, Lieutenant Eschauzier, D.R.N., discovered, in 1840, another rock, with $2\frac{1}{2}$ fathoms at low water. This rock was very dangerous to ships proceeding through this channel, and to avoid it they passed $1\frac{1}{2}$ or 2 miles to the eastward of Vader Smit, but it is now marked by a beacon with a *globe*. There is a depth of only $3\frac{3}{4}$ fathoms at 3 cables W.N.W. of the beacon. About a mile N.W. from Priok Point there are also two other patches of coral rocks, in 3 and $3\frac{1}{2}$ fathoms water. The best channel is to the southward of the beacons and the shoal East of Vader Smit, in $5\frac{1}{2}$ and 6 fathoms. The coast of Java, to the eastward of Priok Point, may be approached safely by the lead to 6 fathoms, as the soundings decrease regularly; though off Krawang Point it is better not to borrow nearer than 8 fathoms, as the depths decrease there very quickly to 3 fathoms.

Nierstuk is a rocky shoal of about 2 cables in length, usually covered by breakers, having 2 ft. depth at low water. It was very easily discovered by a discoloration of the water, or by the breakers which show with the least wind, but now it is marked by two white buoys 4 cables apart, one off its North and the other off its South end. It bears W.S.W. $\frac{1}{2}$ W. from Vader Smit, and about S.S.W. from Leiden. The passage between it and Vader Smit is more than a mile wide, with 6 and 7 fathoms depth. The passage between Nierstuk and the shoals of Neptunus, and Pas-op, is more than half a mile wide, with 6 and 7 fathoms depth.

The Neptunus consists of large rocks with 2 feet water; it is 1 or $1\frac{1}{2}$ cable's length in diameter, and is marked by a *black* buoy surmounted by a *ball* off its N.W. extreme, and by a *black* buoy off its S.E. end.

Pas-op Shoal is very small, with 14 feet on its shoalest place, and 5 and 6

fathoms close to it; it bears E. $\frac{1}{2}$ N. a full mile from Rynland Shoal. It is marked by a *black buoy* surmounted by a *ball* on its North side. This buoy lies $4\frac{1}{2}$ cables S.S.W. of the buoy on the N.W. extreme of Neptunus Reef, a depth of 6 fathoms' water being found between them.

Karang Pipa is marked on its western side by a *black buoy* surmounted by a *ball* which lies S.S.W. $\frac{1}{2}$ W. a quarter of a mile from the buoy on Pas-op and a mile E. $\frac{3}{4}$ S. from the Rynland Shoal buoy. It is a small coral rock with $2\frac{1}{2}$ fathoms at low water, and close around 5, 6, and 7 fathoms.

The three buoys surmounted by balls on the western side of Neptunus, Pas-op, and Pipa Reef are nearly in line N. by E. $\frac{3}{4}$ E. from the lighthouse on the western pier at the distances of $1\frac{3}{4}$, 2, and $2\frac{1}{2}$ miles.

Rynland Shoal is very small, and has 15 feet water on its shoalest part. It is marked on its North side by a *white buoy* surmounted by a *ball*, bearing N. by W. $\frac{3}{4}$ W., $1\frac{1}{2}$ mile distant from the end of the pier of Batavia River. The channel between Rynland and Pas-op Shoals is a mile wide, and 6 to $8\frac{1}{2}$ fathoms in depth.

BATAVIA.—The piers which confine the river run in a N. by W. direction from the observatory and time-ball, toward the Rynland Shoal. They extend for a mile beyond the line of shore into 18 feet water.

A LIGHTHOUSE, showing a bright *fixed light*, elevated 54 feet, stands on the West pier 4 cables lengths from the head, and is shown from a lens apparatus of the 4th order, and may be seen at more than 14 miles off according to the elevation. A small lamp light is shown on the pier-head.

The best positions for anchorage by night are with this light between S. $\frac{3}{4}$ W. and S. $\frac{3}{4}$ E. when to the southward of the Rynland, Pipa, and Nierstuk Shoals. Entering the roads by the western channel, and having passed the beacon on Karang Kuiper, steer S.E. until the light bears South, and then anchor. Two white buoys, in $4\frac{3}{4}$ fathoms depth, lie S. by E. and S. by W. of Rynland Shoal, and mark the South limit of the anchorage.

Batavia Observatory, where a time ball has been exhibited since 1839, stands East, 3133 yards from the boathouse near the river, or a little more than a mile and a half from the lighthouse on the pier-head. The geographic position of the time ball is in lat. $6^{\circ} 8' S.$, and the assumed longitude $106^{\circ} 48' 7\frac{1}{2}'' E.$, $6^h 51^m 58^s$ in time.

The Time Ball is hoisted every day at 5 minutes before noon, Batavia mean time, half-way up the pole; at 2 minutes to mean noon it is hoisted to the top, and precisely at Batavia mean noon it falls. For those ships that wish to rate their chronometers according to Greenwich mean time, the moment of 6 o'clock a.m., Greenwich mean time, is indicated in the same way; the ball being hoisted half-way up at $46^m 58^s$ p.m., Batavia mean time; and at $49^m 58^s$ to the top; and exactly at $51^m 58^s$ p.m., Batavia time, which corresponds to 6 o'clock a.m. Greenwich time, it falls.

The usual place for large ships to anchor is in 5 or 6 fathoms on a mud

bottom, about a mile distant from the pier-head, and between S.S.W. and S.E. from Rynland Shoal. They seldom moor, as the anchors generally bury themselves in the soft mud, for which reason it is advisable to sight the anchor sometimes during a long stay. Small vessels may anchor nearer to the pier-head, in 4 or $3\frac{1}{2}$ fathoms. There used to be a bar just outside of the middle mouth of the river, with only 2 or 3 feet depth at low water upon it; but since the pier was lengthened, and the river shut off by a dike to turn the current, this bank has disappeared. In the western monsoon there is sometimes such a heavy swell which breaks at the mouth of the river, that proas are unable to get out, and ships' loats may be exposed to great danger sent on shore after a blue warning flag is displayed at the boathouse.

Tides.—By accurate observations, made in 1839 at Onrust, it seems that the tides and the rise and fall of water are not subject to fixed rules. In the eastern monsoon, it appeared to be high water there in the evening; and in the western monsoon in the forenoon; the time of high water at full and change being generally 10 o'clock p.m. in the eastern monsoon, and at 10 a.m. in the western. The mean rise and fall was 2 feet, and the maximum and minimum 4 feet, and scarcely an inch.

Whenever the weather is so boisterous, especially during the western monsoon, that any attempt to land at the jetty, at Batavia, or along the shore, would be attended with danger, a blue flag will be hoisted at the Mizzen of the Guard Ship, and similar flags will also be shown at the Observatory, as well as at the palace of Wettereden. The signal "There is too much surf to land" will likewise be displayed at the Observatory.

The variation of the compass is at present $0^{\circ} 45'$ E. In 1847 it was $1^{\circ} 45'$ E., as computed from a great number of observations on board H.N.M. ships; thus showing that when compared with former years, it has changed from West to East, and is again decreasing in the latter direction. The mean height of the mercury in the barometer is 29.67 inches. The influence of the weather upon the barometer is very small, it being seldom raised by continued dry weather, or depressed by a boisterous moist temperature, more than from 1 to 3 lines above or below the mean. The mean temperature in the morning and evening is from 70° to 74° , and at noon from 84° to 86° Fahrenheit; although it occasionally rises to 90° or 95° . Batavia Road is rendered unhealthy by the pernicious influence of the noxious vapours generated along the marshy coast and the shoals at low water, which are uncovered, and it seems to be chiefly in the shifting months of the monsoons that the Batavia fever is most frequent. Ships, therefore, intending to make a long stay should not anchor too near the shore.

There is at Batavia an excellent establishment for purifying the water for the shipping in the road; this water is conveyed on board, at fixed and moderate prices, in whole or half leaguers, or in proas fitted with tanks. Artesian wells have also been recently sunk (1875).

Krawang Point is 16 miles N.E. by E. from the Batavia lighthouse. The shore bank around the point stretches off for 2 or 3 miles, and therefore it should not be made too free with. There are no detached dangers in the eastern portion of Batavia Bay, and therefore a vessel may safely anchor in any part of it.

The islands and dangers which lie in the Java Sea to the northward of those which lie across the mouth of Batavia Bay, will be described presently.

The **NORTH COAST** of **JAVA** is in general flat, covered with large trees to the beach, and a little way up the country there are several high peaks, which may serve as sea guides. Some of these are 10,000 and 11,000 ft. high, and their positions accurately laid down in the charts. It occurs often that they, especially in the eastern monsoon, are concealed by clouds or by the hazy state of the atmosphere, but in the western monsoon the highest of them may be seen more than 26 leagues. In October, 1842, Lieut. Melvill van Carnbee saw the Pangerango, or Blue Mountains, at the distance of 37 leagues. The soundings along the coast are regular, so that in most places the land may be approached to 8, 7, 6, and 5 fathoms, mud; but, in some places extensive shoals project from the shore; and there are a few dangerous rocks and shoals in the offing.

The **Eastern Monsoon** prevails along this coast while the sun is to the northward of the equator, and the western monsoon when the declination is South; their general tendency being towards that parallel where the sun is in the zenith. The former is in its greatest strength in the months of June, July, and August; and the western monsoon in December, January, and February. As in most intertropical countries, land and sea breezes will be found within a certain distance from the shore, and may be very advantageously employed in an adverse monsoon. These land and sea breezes, however, are not regular, as in the strength of the western monsoon the wind does not at all deviate from its common direction, and in the middle of the eastern monsoon seldom more than one or two points.

Ships passing between Batavia and Sourabaya and back must steer different courses in different seasons, in order to make a speedy passage; and although the rules prescribed here are not submitted as fixed laws, yet they should be followed as nearly as possible, according to circumstances.

Vessels going in the western monsoon from Batavia to Sourabaya ought to run out from the Rynland Shoal between N. and N.E., till Edam bears North. Then steer N.E. by E. 16 miles, and E.N.E. 20 miles, till in about $5^{\circ} 42' S.$, and $107^{\circ} 24' E.$, when they will be clear of the reefs of Sedarie; then steer East 36, and S.E. or S.E. by E. 28 miles, passing between the rock of Pama-noekan and Boompjes Islands, after which a direct course may be steered

for the point of Indramayoe. When they have verified their reckoning by one of these points the course will be East for 49 leagues, along the South side of Carimon Java Islands, till Mandeliké Island bears South; from thence steer S.E. by E. and E.S.E. to make Ouwer Point (in about long. 112° E.) care being requisite not to bring Mandeliké to the northward of West till clear of Taio Bank. From Ouwer Point the course is E. and E.S.E. along the shore, having a good mark in the Doodkists (coffins) to make Panka Point. In this monsoon it is of the highest importance, when past Mandeliké, not to keep too much in the offing, as the easterly currents will carry a ship speedily past Sourabaya Strait, in which case the hills upon the island Madura, called the False Doodkists, will be mistaken for those which lie near Panka Point. In such circumstances, a ship would have the greatest trouble to beat up against the westerly winds and contrary currents in order to fetch Sourabaya Strait, a case which has often happened.

Ships bound from Sourabaya to Batavia in the western monsoon have a difficult task to perform, when the wind blows with violence, and for a ship that sails indifferently it will be impossible.

It is always a safe rule to take advantage of every little veering of the wind which will give the most westing. Should it draw to the southward of West, work up with short tacks under the Java shore, to avoid the disadvantage of a high sea and easterly currents. If it comes to a gale with a high head sea, it would be advisable to bear up for one of the harbours, and wait a change in the weather, as in general such weather does not last long. Most of the roads along the North coast of Java are unsafe in this monsoon, such as those of Japara, Samarang, Pekalongan, Indramayoe, Tjassem, and Pamanoekan, being exposed to much sea, and some are difficult to enter. Cheribon Road affords good shelter from westerly winds; but in most instances it will be better to return and anchor behind Panka Point, for, if the wind comes to N.W. or N.N.W., a vessel might be much hampered by the Java shore, causing great trouble to get off, especially if in the Bay of Samarang. In the western monsoon, tolerable good shelter will also be found near or in Joana Road, or behind Cape Boegel and the Taio Bank.

Ships bound from Sourabaya to Batavia in the eastern monsoon should steer from Panka Point W.N.W. or W. by N. till past Mandeliké Island, and then about West from Indramayoe Point, which should be seen. From thence a westerly course for 8 or 9 leagues will carry them in sight of Pamanoekan Point, but not too far in the offing for fear of Pamanoekan Rock. When certain of having passed that rock, steer about N.N.W. till at least 8 miles to the northward of Sedarie Point, to avoid the Sedarie Reefs, and then try to get sight of the land near Krawang Point with a S.W. or W.S.W. course, after which make Edam Island, and passing between it and Krawang Point with a S.W. course, run into Batavia Road. When the ship has arrived off Sedarie Point, if becalmed there, seeing the land, mind the westerly current,

which might carry her much more to the westward than the reckoning would indicate, and might entangle her among the Nassau ledges and other dangers thereabout. H.N.M.S. Schrikverwekker, coming from the eastward to Batavia, was carried so far by the current in the night of the 17th of May, 1800, and was wrecked upon one of the reefs near Angenita Islands. And the Admiral Zoutman, Captain Heykop, which ship struck in March, 1839, upon a coral rock, bearing (by account) $16\frac{1}{2}$ miles N.N.W. $\frac{1}{4}$ W. from Krawang Point, and carrying 18 feet water. This rock seems to have been the Nassau Ledge. The captain remarks that long experience had taught him that if a ship be more than 7 or 8 leagues distant from this part of the coast, it is prudent to anchor, even in 25 fathoms, if the weather is not too threatening, as the lead is no proper guide in such a situation.

A vessel from Batavia to Sourabaya in the eastern monsoon ought to take every possible advantage of the land and sea breezes, and therefore should not stand too far into the offing. If she leaves Batavia Road in the evening, or in the night, and arrives abreast of Edam on its eastern side, a north-easterly course will carry her to about latitude $5^{\circ} 42'$, where she may expect the sea breeze. From thence she will get sight of the Points of Pamanoekan and Indramayoe with S.S.E., S.E., or E.S.E. courses, taking care to give a good berth either North or South to Pamanoekan Rock. Then let her try to get so much easting with the land wind that the next tack in-shore will allow her to stand along Cheribon Reef. When this succeeds, and on this tack Brebes Point, or Tegal, is made, the coast should not be approached from thence to Samarang, nearer than 10 miles, in order to avoid the Pemoelang and Korowelan Rocks, nor should she stand too far off on account of the Bappang Reef. If not bound to Samarang, when making long tacks off and the short boards in-shore, she will get sight of the Japara Mounts, and may try to gain so much easting as to weather with the sea breeze Mandeliké and Taio Bank. Take care, however, not to borrow too much on this bank, and therefore Mandeliké should not be brought to bear to the northward of West before Cape Boegel is distant 8 miles. From thence beat up with short tacks in the offing and long ones in-shore, along the coast toward Panka Point, in order to get sight of the Loodkist or Coffin Hills. In the night the small Mount Koekoesan, near the Coffins, is a good mark for bearing away towards Panka Point.

KRAWANG POINT, in $5^{\circ} 57' S.$, and $107^{\circ} 1' 7'' E.$, forms the N.E. boundary of Batavia Bay, as before mentioned. When bound to the eastward, pass this point at a distance of 4 miles in 15 fathoms; for though it may be approached to 2 miles in 10 fathoms, it is better kept at a greater distance, as to the eastward of this point the bank trends to the northward till it reaches an offing of nearly 3 miles.

Sedarie Reefs.—From Krawang Point steer E. by N. or E.N.E. to avoid the Reefs of Sedarie. The coast between Krawang and Sedarie Points

stretches about East and E. by S., forming two bights towards Sedarie Point, which is a low round projection. Its woody north-easternmost part is in $5^{\circ} 59\frac{1}{2}'$ S., and $107^{\circ} 24\frac{1}{4}'$ E., and about 4 miles to the eastward of the mouth of Sedarie River. Sedarie Reefs consist of some dry patches or shoals detached from the shore, with narrow channels between them. Upon the two northernmost of these patches $3\frac{1}{2}$ and $4\frac{1}{4}$ fathoms is the shoalest water, and altogether they extend 2 miles N.W. and S.E., and 1 mile across; and are composed of black sand with shells. The northernmost bank bears N.E. from Sedarie Point, 6 miles distant. The depths outside increase rapidly from 5 to 7 fathoms, and at the distance of 2 miles to the northward, to 10 fathoms, inside of which it is not advisable to pass; and there the low land of the point is just discernible. Upon the southernmost of these shoals, which consists of three small patches of sand with shells, near each other, the least water is $2\frac{1}{2}$ fathoms. Between the North and South patches there is a channel of 1 mile in breadth, lying N.W. and S.E., with 8 to 10 fathoms water, but decreasing to the eastward to 6 fathoms. Between the South patch and the main, a channel 1 mile wide and 4 fathoms deep, over mud, stretches 2 miles along the coast. It is best to pass to the northward of all these dangers.

Near the northernmost of these shoals, Lieutenant Escher took the following bearings: Mount Salak S.W. $\frac{1}{2}$ S., the Pangerango S.S.W. $\frac{1}{2}$ W., the Panimbang S. by W. $\frac{1}{3}$ W., the highest top of the Craggy Mountains S. $\frac{1}{2}$ W., the highest top of Tankobang Mountains, 6,427 feet, S. by E. $\frac{3}{4}$ E., the Tampomaas S.E. by S., and Cheribon Peak (just visible) S.E. From the outer edge of the Sedarie Reef the course is between S.E. and E.S.E. towards Pamanoekan Point, which lies in $6^{\circ} 12'$ S., and long. $107^{\circ} 49\frac{1}{2}'$ E., or $57^{\circ} 30'$ from Batavia. The shore may be approached to within 8 fathoms, and from 10 to 14 fathoms is a proper track in the night, in order to pass within the Pamanoekan Rock, on which the *Waerden Castle* was lost.

The **PAMANOEKAN ROCK** is very dangerous. Its position, and even its existence, was doubted, but numerous disasters hereabout showed that it certainly did lie somewhere in the vicinity. In the ancient sea atlas, by the celebrated J. Van-Keulen, the rock is marked nearly in its position and true character. It was surveyed in 1802 by Lieut. N. Doekes, and said by him to bear N.E. by N., a little easterly from Pamanoekan Point from 13 to 18 miles; the adjacent depth being 17 to 19 fathoms. According to his survey the rock is 109 yards in extent, with $2\frac{1}{2}$ fathoms water upon it, and Pamanoekan Point just visible, appearing as an island.

It has been many times sought for since without success. But on August 7th, 1848, the Netherlands barque *Celebes*, Capt. J. R. N. J. Biji, struck on it, and was fixed there for some time. Her draught was $15\frac{3}{4}$ feet English, and when aground Mount Tampomaas bore S. $\frac{3}{4}$ E., and Pamanoekan Point,

S.S.W. $\frac{1}{2}$ W. By a good chronometer observation the longitude was found as $107^{\circ} 50' 7''$ E., lat. $6^{\circ} 3'$ S. By these data it is only 10 miles from Pama-noekan Point, if the charts be correct. It is very small, as at less than half a ship's length all around the vessel, there was from 8 to 20 fathoms.

A *Fifteen-feet Patch* is marked on the charts at $9\frac{1}{2}$ miles eastward of Pama-noekan Rock, 20 miles N.W. by W. of Indromaya Point, and 19 miles W.S.W. of Rackit Island light.

Near Pama-noekan Point, about 2 miles distant W. $\frac{1}{2}$ S. from it and N.N.E. from the mouth of Tjassem River, good anchorage in the East monsoon may be taken in 4 fathoms water; but it is an open anchorage, and unsafe during the N.W. monsoon. From this anchorage the course of N.E. by E. leads clear of a reef which projects nearly to the distance of a mile from the point. Between the *Sadoelang Islands*, which lie from 8 to 16 miles to the westward of Pama-noekan Point, there are some shoals, which it is advisable not to approach. From Sedarie to to Indramayoe Point the coast is low, with some high land in the interior; it may be approached safely to 8 fathoms, but not nearer.

THE POINT OF INDRAMAYOE, in $6^{\circ} 12'$ S., and $1^{\circ} 29\frac{1}{2}'$ E. from Bavia, is of moderate height and woody, and at some distance has the appearance of an island; at its western side there is a good anchorage in 4 or 5 fathoms, but to the northward it should not be approached within 7 fathoms, as the reef projects there nearly a mile. Indramayoe is an open port for exports only.

RACKIT or BOOMPJES ISLAND, in $5^{\circ} 54'$ S., and $108^{\circ} 20'$ E., is full 6 leagues N. $\frac{1}{2}$ E. from Indramayoe Point. According to Lieutenant B. H. Staring, D.R.N., who surveyed it in 1840, Rackit Island is about a mile East and West in extent, and lies in the track of 25 fathoms.

LIGHT.—A *revolving white* light, showing a flash of 24 seconds duration, preceded and followed by an eclipse of 36 seconds, is shown from the S.E. point of Rackit; it is elevated 116 ft. above the sea, visible 23 miles off. The tower, of open ironwork, is painted white.

About N.N.E. from Rackit lies *Middle Patch*, a collection of rocks, close to each other, and partly visible above water; and still farther N.N.E. the *North Outer Patch*, in $5^{\circ} 46\frac{1}{2}'$ S., and $108^{\circ} 22\frac{3}{4}'$ E., the passages between these shoals and the island are each of them 3 miles wide, with 25, 26, and 27 fathoms depth, and are both safe. Vessels, however, should keep in the mid-channels, as the reefs project a little distance under water. Close to the northward of the Outer Patch there are 27 fathoms, and 4 miles N.N.E. of it 30 fathoms blue mud. When working through the channel, between Rackit Island and Indramayoe Point, in the night, do not approach the island nearer than 20 fathoms, nor the point nearer than 10 fathoms. The depth in the channel was found to be greater than the chart of 1841 showed; it is from 24 to 25 fathoms.

CAPE TANNA and Reef.—From Indramayoe Point the coast runs S.E. by E. 7 leagues toward Cape Tanna, in $6^{\circ} 30'$ S., and thence S. by E. 14 miles toward Cheribon, the flagstaff of which on the eastern side of the river lies in $6^{\circ} 45'$ S., and $108^{\circ} 34'$ E., or $1^{\circ} 46'$ E. from Batavia. The reef was surveyed, in 1802, by Captain Busscher, D.R.N., and, in 1841, by Lieut. Groll. Both the surveys show that the reef projects nearly 4 leagues to the eastward, with $3\frac{1}{2}$ fathoms on its extreme end, and $2\frac{1}{2}$ and 2 fathoms farther in; in some places it consists of hard sand, in others of softer ground, and part of it is sometimes covered with breakers.

CHERIBON.—The chief town of the important province of the same name, and an open port, is 16 miles southward of Cape Tanna, and the same distance S.W. of the East end of the Tanna Reef. It is the outlet of the remarkably fertile province, which, consisting chiefly of volcanic soils, produces abundance of coffee, indigo, teak-timber, &c. It had a bad reputation for unhealthiness, a third of its inhabitants having perished from a pestilence at the commencement of the present century. It is the residence of a Dutch governor and staff, and on the South side of the river is a fort for its protection, the flagstaff of which is a mark.

Light.—Since July 1st, 1867, a bright *fixed* dioptric light has been shown from the extremity of the northern mole of the harbour, elevated 26 feet above high water, and visible 8 miles off. It is merely intended as a guide to the roadstead at night.

The South prong of the Tanna Reef and Cheribon Peak, and the flagstaff, are in one, on the bearing of S.W.; the proper mark, therefore, to avoid that South prong is to bring the mount well to the westward of S.W., and to round the reef in 6 or 7 fathoms. Large ships find a good anchorage at 2 miles N.E. or E.N.E. from the fort, with a small but conspicuous Djatty bush, about W.N.W. in $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, soft mud; and small vessels more in shore half a mile from it, in 3 to $2\frac{1}{4}$ fathoms. In the western monsoon this road affords a good shelter from the high sea, and is a safe anchorage at any time of year.

Cheribon Peak, 10,323 feet as ascertained by barometer, in 1840, by Dr. Junghun, being very conspicuous, is a good mark for ships sailing along this coast; it stands in $6^{\circ} 54\frac{1}{2}'$ S., and $108^{\circ} 28\frac{1}{2}'$ E.

Peak of Tegal.—Between Cheribon and Tegal the coast is low, but inland the country is mountainous, and the Peak of Tegal, or *Gunong Gede*, is the highest point of the whole island; it is in $7^{\circ} 13\frac{1}{2}'$ S., and $109^{\circ} 13' 3''$ E. A little more to the eastward, but nearer to the sea, there is another conspicuous mountain, called *Gadjah*, or the *Elephant*.

TEGAL, or Tagal.—The flagstaff of the fort at Tegal lies in $6^{\circ} 44'$ S., and $109^{\circ} 8' 7''$ E., and bears North by West from Mount Tegal. It is an open port for exports only. The anchorage is in 4 or 5 fathoms North by West from the fort, 1 or $1\frac{1}{2}$ mile off shore. *Tegal Rock* lies N.E. $\frac{3}{4}$ E. $4\frac{1}{2}$ miles from

Tegal, and about 3 miles from the nearest point of the shore. This rock is partly even with the water's edge, and extends East and West 710 yards, and North and South 300 yards. It is marked by a *white* beacon. From Tegal Peak this beacon bears about N. $\frac{1}{2}$ W., and the soundings at half a cable's length round it are 9 fathoms; shoaling regularly towards the shore, in 8 and 7, to the mid-channel in 6 fathoms. Tegal cannot be considered a safe anchorage during the N.W. monsoon.

It is proposed to show a *fixed red light* from an iron post at Tegal.

From Tegal to Samarang the coast runs about East with some small bights. Cape Pamalang should not be approached nearer than in 16 fathoms, to avoid the shoals of *Soegalie* and *Pemoelang*, which lie about 4 miles N.W. and N.N.W. from that point. The shoalest spots upon these shoals are 16 and 27 feet; and they bear about 16 miles E.N.E. $\frac{1}{2}$ E. from Tegal, and N.N.E. from Mount Gadjah.

Pekalongan, an open port for exports only, is at the mouth of a river, which lies in $6^{\circ} 51\frac{1}{2}$ S., and $109^{\circ} 43' 40''$ E.; the town being a little inland, and not visible from seaward through the trees.

Light.—A white plastered pyramid was erected in 1836, a little to the westward of the entrance of the river; and since September, 1866, this pyramid has been used as a lighthouse, showing a bright *fixed* light, elevated 26 feet, visible 8 miles off. It is a guide to the roadstead off the river.

When coming from the eastward, if a vessel should pass *Cape Goenong* at the distance of 2 miles, in 5 or 6 fathoms depth, the lighthouse will be seen bearing West by South; from thence steer W.N.W. $\frac{1}{2}$ W. in $5\frac{1}{2}$ fathoms, toward the road of Pekalongan, where she may anchor in $4\frac{3}{4}$ or $3\frac{1}{2}$ fathoms, soft ground, at $1\frac{1}{2}$ or $1\frac{1}{4}$ miles from the entrance of the river. Coming from the westward, Cape Pamalang should not be approached too near, to avoid the shoals of *Soegalie* and *Pemoelang*; but once past those rocks, Oeloedjami Point may be approached to $4\frac{1}{2}$ fathoms, at the distance of 3 or 2 miles, where the pyramid will be discerned, bearing E.S.E. about 8 miles, amongst some high trees on the beach which served formerly to guide a ship to Pekalongan Road. Pekalongan is not a safe anchorage during the N.W. monsoon.

Bappang, or Coreas Reef.—When not touching at Tegal, 14 to 20 fathoms is a good depth in the night to avoid the Bappang or Coreas Reef, which was examined, in 1847, by Captain Theedens, who anchored near it in 8 fathoms, and found its length and breadth to be about half a mile. Its general depth was $5\frac{1}{2}$ to 4 fathoms, but in one spot there was a single rock carrying only 14 feet; close round the reef there were $4\frac{1}{2}$ fathoms, and it lay in the stream of 23 fathoms, and 20 miles from the shore, and about 18 miles East of Pamalang Point; but this position is doubtful, as it has been placed 5 miles farther to W. by N.

Korowelan Shoal.—Another shoal called Korowelan, or *Korrowolaan*, with

3 $\frac{3}{4}$ fathoms depth, is situated more to the eastward about 6 miles off shore, abreast of Kendal. Between this shoal and the shore is a channel with 10 to 5 fathoms depth. A conspicuous *conical Herbert's beacon buoy* (which always stands upright), painted *red*, is placed on the shoal.

MOUNTAINS.—Between Tegal and Samarang the land is high in the interior; the most conspicuous mountains toward the latter place are the *Sindoro* (10,318 feet), and *Soembing* (11,030 feet), or the *Twee Gebroeders* (Two Brothers), both remarkable peaks, the easternmost being most remote, 26 $\frac{1}{2}$ miles from the shore. They bear S.W. by W., and S.W. $\frac{1}{4}$ S. from the entrance of Samarang River. The easternmost and highest peak (8,389 feet) of the *Prahoë*, or *Praaw Mountains* bears W.S.W. nearly from the mouth of that river. To the eastward of these stand the Samarang Mountains, called *Oenaran*, or *Onarang*, 5,147 ft., and *Merbaboe*, 10,220 ft., bearing S. by W. $\frac{3}{4}$ W., and S. $\frac{1}{4}$ W., from the mouth of Samarang River.

THE BAY OF SAMARANG, bounded to the eastward by the high land of Iapara, lies South from the islands of Crimon Java, or Karimon Java. This bay affords good anchorage in the eastern monsoon in 5 or 6 fathoms, mud, at about 3 or 4 miles from the beach, the flagstaff of Samarang bearing S. or S.S.E., the westernmost visible land about West, and the high land of Iapara N.E. by E. Small vessels may anchor in 4 fathoms, 2 or 1 $\frac{1}{2}$ miles distant from the shore. The road being open to West and N.W. winds, ships are exposed in the western monsoon to a high sea, for which reason this bay is not to be recommended in that season, particularly if compelled to make a long stay.

SAMARANG, which lies in the head of the bay, is one of the three principal cities of Java for European residence and commerce, and one of the ports of call for the Netherlands' Indian Steam Navigation Company's boats. It is an open port, and the seat of the governor of the important province of the same name. The shore of the bay upon which it is built is very low, the site being an alluvial plain, and the beach is only communicated with by means of a raised causeway. It, however, contains some handsome buildings, and is protected by fortifications from native attack. The great highway which traverses Java from West to East, passes through the place, and there is another road which crosses the island here, about 70 miles broad, from North to South. A railway runs into the interior from Samarang. The concession was first granted in 1872, but many delays have occurred in its construction.

At Samarang there are no establishments for repairing vessels. The harbour is quite open, and in the N.W. monsoon very dangerous, and communication between the shore and the harbour is often interrupted for several days. The Government continued deaf to the representations of the mercantile community of Java regarding the necessity of insuring the complete

safety of the harbour, although it has indeed met them half-way by building a new walled-in canal extending some way over the surf.—(1870.)

A harbour light is *proposed* to be established here on the completion of the harbour works. A white beacon is placed on Oedjoing Kalavaran, to indicate the N.E. limit of the Road of Samarang.

The flagstaff stands in $6^{\circ} 57' 20''$ S., long. $110^{\circ} 24' 37''$ E.

IAPARA ROAD is situated in $6^{\circ} 32\frac{1}{2}'$ S., and $110^{\circ} 35\frac{1}{2}'$ E., and is very safe in the eastern monsoon. The anchorage is inside of the islands Kelok and Panjang, in 4 to 6 fathoms depth. When coming from the westward the high land of Iapara appears like an island, the coast near Samarang being low, and forming a deep curve. From Samarang Road to Iapara Point the course is about N.N.E.; and between them lies *Visscher Island*, in about $6^{\circ} 36'$ S. Approaching from the northward, caution is required to avoid a $3\frac{3}{4}$ -fathom bank, which lies between 2 and 5 miles off shore, and between 3 and 5 miles north-westward of Panjang Island. Its centre is in lat. $6^{\circ} 28'$ S., long. $110^{\circ} 34'$ E. It appears to be about 3 miles in diameter, and leaves but a narrow channel between it and the dangers extending off shore.

It is proposed (May, 1877,) to show a small *fixed red light* at Japara.

KARIMON JAVA, or the **Crimon Java Islands**, are very numerous, covering a space of 12 or 13 leagues East and West, and 5 leagues North and South.

They were surveyed, but not completely, by the Dutch, in the frigate *Vreede*, Captain Dibbets, in 1803; many detached shoals and other dangers have since been discovered.

The largest and highest of these islands are *Karimon*, *Komodian*, and *Parang*, which are discernible at a great distance. There is a Dutch settlement at Karimon, which is sometimes visited by ships. The general anchorage is about 3 miles West from Karimon, and about midway between the islands Meniangan at the East side, and Glean and Boerong at the West side, in 20 to 30 fathoms water; but there is a sand bank 3 ft. above water, extending E.S.E. and W.N.W. about 3 cables' lengths, with the West end of the Great Karimon bearing N. 25° E.; Pulo Boerong, W. 17° S.; and Pulo Glean, W. $7\frac{1}{2}^{\circ}$ S.

Another sand bank, with $4\frac{1}{2}$ ft. water over it, stretches N.E. and S.W. for 4 cables' lengths in breadth, with the West end of Great Karimon E. $7\frac{1}{2}^{\circ}$ N. Pulo Boerong and Pulo Glean in one, S. 48° W.; Pulo Tjamara Ketjil, N. 30° W. The flagstaff stands in $5^{\circ} 54'$ S. and $110^{\circ} 31\frac{1}{2}'$ E. Between the different islands there are deep channels with 10 to 30 fathoms, but they should be cautiously used, for besides the reefs which project from the islands, there are some other dangerous rocks, which were discovered and surveyed, in 1825, by Lieutenant I. I. Baedrie, and in 1826 by Captain Elgenhuizen, D.R.N., and in 1862 by Captain Halverhout, D.R.N., in the steam frigate *Soembing*.

A coral reef, dry at low water, with both Krakab Islands in one, and bearing S.S.W. $\frac{3}{4}$ W., the highest land of Karimon Island E. by S.

The *Katang Reef* stretches East and West about 2 or 3 miles, and North and South about a mile, and although it does not dry at low water, it is easily discerned in clear weather. From this reef Katang Island bears E. by N., the highest land of Karimon E. $\frac{1}{2}$ S., Krakab-besar E.S.E. $\frac{1}{4}$ E., Krakab-ketjil S.E. by E. $\frac{1}{3}$ E., and the North point of Parang N.E. $\frac{3}{4}$ E.

The sand bank and coral rocks, called *Kappal*, are about 2 or 3 miles East and West, and a mile broad. Upon its shoalest part there are 2 and 3 ft. water. From its West point Krakab-besar bears N. by E. $\frac{2}{3}$ E., and Krakab-ketjil N. by E. $\frac{1}{4}$ E., Boerong E. $\frac{1}{3}$ N., the highest land of Karimon Island E.N.E. $\frac{3}{4}$ E., Niamok Island N.N.W., and the West point of Parang Island N. $\frac{1}{4}$ E.

There are also the following dangers to be guarded against.

A coral reef, with 6 ft. water on it, 2 cables in length North and South, with Pulo Katang bearing S. 62° E.; Karang Bessie N. 17° W.; and Pulo Njamok E. 17° S.

A coral reef, uncovering at low water, one-third of a mile long, N.N.E. and S.S.W., with Pulo Njamok E. $8\frac{1}{2}^{\circ}$ S.; Pulo Katang N. 17° E.; Karang-Katang W. by S. A reef of sand and coral extends for 3 miles to S. 62° W. from Pulo Njamok. From the outer end of this danger Pulo Katang bears N. 19° E.; Karang Bessie N. 19° W.; Pulo Krakab Ketjil E.S.E.

Karang Bessie, discovered in 1826, is an isolated sand bank, high out of the water, and about $1\frac{1}{2}$ mile long N.N.E. and S.S.W.

From these rocks the N.W. point of Parang bears N.E. by E. $\frac{1}{2}$ E., the highest land of Karimon E. by S., Kombang E. $\frac{1}{2}$ N., the South point of Njamok S.E. $\frac{1}{2}$ S., and the middle of Kombar Island N.E. $\frac{1}{2}$ E.

Besides these reefs and rocks, a shoal will be found between Kombar and Parang Islands; another 2 miles S.E. of Parang; again, at a mile N.E. of Tjamara-ketjil; and several other small rocks along the East coasts of Komodian and Karimon Islands. A vessel coming from the westward, and intending to touch at these islands, should make Karimon about E.N.E., and steer right for it, taking care to give Krakab-ketjil a berth of 6 miles to the southward, in order to avoid Kappal Reef; and then to pass between Boerong and Meniangan, steering for the anchorage. Between Karimon and Meniangan there is a channel with sufficient depth for large ships, but it is rendered very narrow by reefs that project from both sides. When passing along the western side of this group of islands, it would be prudent to keep at least 8 miles to the westward, to make sure of clearing Katang and Bessie Reefs.

Tides among the Karimon Islands.—In 1839 Mr. Michalofsky observed the tides among these islands, and states that they are very irregular, but that with rising water (in the eastern monsoon by night, and in the western

monsoon by day), the current runs most to the eastward, and with falling water to the westward. It is but once in the 24 hours high and low water, each tide lasting from 9 to 15 hours. At full and change it is high water in the eastern monsoon at 8 p.m., and in the western monsoon at the same hour a.m.; and there seemed to be a general, although irregular, retrograde motion in the time of high water. The mean rise and fall of the water was 4 ft., and the greatest 6 ft.

The **PASSAGE** between the Karimon Islands and the coast near Iapara is 10 or 11 leagues wide, with depths of 19 to 30 fathoms. Near the Java coast lies the island of *Mandeliké*, in $6^{\circ} 22' S.$, and $110^{\circ} 49' E.$ This island bears North from *Mount Moera*, about a mile off shore, and may be approached very near, it being steep-to at all sides. The passage between *Mandeliké* and the main is free from dangers, being a mile wide, and having $3\frac{3}{4}$ and $4\frac{1}{2}$ fathoms water.

Two miles East of *Mandeliké*, at *Cape Boegel*, the coast forms a deep curve, from which the *Bank of Taioe* projects 5 or 6 miles off shore; a large ship should therefore not bring *Mandeliké* to the North of West, until 6 miles past *Cape Boegel*. This bank consists of the same whitish clay which is found near *Mandeliké* and in most places along the North coast of Java; it stretches along the coast, toward *Joana Road*, where there are 4 fathoms water.

REMBANG BAY is bounded to the eastward by the Point of *Lierang* in $6^{\circ} 36\frac{1}{3}' S.$, and $111^{\circ} 28' E.$ Close to the beach are the towns of *Rembang* and *Lassem*, noted for their timber, and at the West end of the bight the village *Joana*, a little way up a small river. The South shore of the bight is lined with a great many islets and rocks. The flagstaff of *Rembang* stands in $6^{\circ} 40\frac{1}{2}' S.$, and $111^{\circ} 14' 40'' E.$ This is an open port for exports only. To steer for the road, and to avoid the rocks, of which some are lying $2\frac{1}{2}$ miles off shore, bring the flagstaff to bear South, and anchor on that bearing in 4 or $4\frac{1}{2}$ fathoms, about 2 miles from the shore. From *Lierang Point* the coast leads, with some small curves, about E. by S. to *Sourabaya Strait*, and may be approached to 6 and $5\frac{1}{2}$ fathoms, and in some places into $4\frac{1}{2}$ fathoms water. It is proposed to show a small *bright light* at *Java*.

PANKA POINT, or rather the flagstaff, is in $6^{\circ} 56' 2'' S.$, and $112^{\circ} 34' E.$, or $9' 56'' W.$ from the western pier-head of *Sourabaya*; it forms the western side of the strait which leads to *Sourabaya*, and is a low and sandy point. A little to the westward of it there are some conspicuous mountains, two of which are called the *Coffins* (*Doodkisten*), from their shape, and a third is of a square form; and these hills serve exceedingly well to recognize *Panka Point*, and in the western monsoon it is advisable to get sight of them in time, especially at night, because the current carries a ship speedily to the eastward of the strait.

The **STRAIT of SOURABAYA** was trigonometrically surveyed, in 1843-7,

by Lieutenant (now Captain) M. H. Jansen, D.R.N. (a name since famous in connection with Indian Hydrography and Meteorology), assisted by five other able officers; at its entrance, between Panka Point and Cape Wodon, the N.W. point of Madura, it is 15 miles wide, and that space is nearly all filled up by an extensive flat, called the Zee Bank, but leaving at the western side two narrow channels for the navigation of large ships.

The Lightvessel at the northern entrance of the western channel leading to Sourabaya exhibits a *white* light, elevated 28 ft. above the sea, visible 10 miles off. The light consists of three lanterns hoisted on the mast of the lightship, which appear as one light at a distance. The vessel, painted yellow, carries a black ball at the masthead, and has the name "Sourabaya" painted on the side. When, for trimming the light, the lantern is hauled down, the gong will be sounded, and a clear burning lantern hoisted temporarily. She lies in lat. $6^{\circ} 57'$ S., long. $112^{\circ} 40'$ E., midway between white buoys 2 and 3, which mark the western side of the Western Channel at the North entrance to Sourabaya Strait. From her Panka Point bears W. by N. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles distant; Cape Wodon or Madura, W. by S. $\frac{1}{2}$ S. 8 miles distant; and Fort Erfprins S. by W. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles distant.

All vessels require pilots, and should anchor, or heave to, off Panka Point, to wait for them. In the eastern monsoon a vessel may anchor at the entrance of the New Channel, to wait for high water, if necessary, to carry her over the bank, and the more so, because in this monsoon high water takes place in the morning. In the western monsoon high water occurs at night, or in the evening, and when a high swell makes it unadvisable to anchor outside of the bank, it is better to do so under Panka Point, bringing the flagstaff to bear N.W. 1 or $1\frac{1}{2}$ mile distant, in 3 or 4 fathoms.

To pass outside of the Zee Bank, keep the Little Square Mount (being the western of the hills near Panka Point) W. by S. $\frac{1}{2}$ S. open to the North of the Coffins till at the entrance of the channel, taking care that the two Coffins are in one, and appear to be as one long mountain ridge. To the eastward the N.W. extremity of Madura, Cape Wodon, should not be brought to the northward of East, in order to clear the Zee Bank, and the rocks of Iamoeang, which lie a little to the eastward of the channel, and which are covered by the sea at high water.

Ships are sometimes detained upon the bank or at the entrance of the channel by the singular tides which prevail there, and for which science has not yet been able to account, or the pilots even to reduce to rule. In the chart of the channels leading to Sourabaya, by Capt. M. H. Jansen, D.R.N., the depths are given at low water, and the following remarks are made on the tides—

"During the months in which the sun is on or near the equator, i.e., in March, April, September, and October, there are in this channel, at the full

and change, two tides in the 24 hours; but at the quarter moons, as well as during all the other months, there is only one tide, and it makes low water in the night with South declination, and in the day when the sun has North declination.

“The greatest rise and fall of spring tides is 6 ft., and it occurs only in those months when there is but one high water in the 24 hours, and 3 or 4 days after full and change. The least rise and fall is 4 ft., and this takes place at the full and change also, but only in the months when there are the two tides, which may be regarded as a change for the day high water to the night high water, and *vice versa*. At the quarter moons of these months the water rises about 5 ft., and in every other month $5\frac{1}{2}$ ft., above the depths marked in this chart.*

“In the month of—

		HOURS.	HOURS.
May	it is high water between	$9\frac{1}{2}$	and $0\frac{1}{2}$
June	„ „	8	„ $0\frac{1}{2}$
July	„ „	7	„ 0
August	„ „	4	„ 9
November	„ „	10	„ $12\frac{1}{2}$
December	„ „	8	„ 12
January	„ „	8	„ 12
February	„ „	7	„ 12

“At the spring tides, as well as at the quarter moons, it is high water always at $10\frac{1}{2}$ or $22\frac{1}{2}$ hours.

“During the months when the two tides occur, it is also high water at $10\frac{1}{2}$ ^h and $22\frac{1}{2}$ ^h. These two tides are, however, different in height; and when the sun’s declination is North, the morning tide is the highest; but when it is South, the evening tide. In those the quarters which give but one tide, give the higher water as at full and change.”

For more convenience, a stake will be erected at each side of the channel, inside of the bank, indicating how many feet of water there is upon the bank.

A vessel bound to Sourabaya may steer for the entrance of the channel across the Zee Bank, as before directed. The land about Grissee slopes gradually up from the eastward to Mount Gierie, but its western side is abrupt. When this steep western face of the mount bears S. by W. $\frac{1}{2}$ W., the trees of Menarie will be in the same direction, and this is the mark to enter the channel with the courses of S. by W. $\frac{1}{2}$ W., S by W., and South.

When a little way up channel, more trees will be seen on Menarie, and

* In most of the months there are 15 or 16 ft. water upon the bank, but when the sun has no declination, or when it is very small, 14 ft., and 14 ft. at full and change.

they should be brought, as soon as they are visible, in one with that same steep western side of Mount Grisee; and at length, when the low point of Menarie is entirely seen, keep it just open of the steep, and enter the strait on that mark. If there be a commanding breeze, she may be kept more towards Piering Point on the Madura side, because the Menarie Bank projects into the channel. In hazy weather, especially during the eastern monsoon, the Grisee hills are not always distinctly seen, but the buoys hereafter described render that of less importance than formerly. In the eastern monsoon, when high water happens between 8 o'clock a.m. and noon, and the springs at 10 or 11 o'clock, the period when the land wind ceases and the sea breeze has not yet set in, the best way is to work up with the land wind towards the shoalest part of the bank, in order to make use of the high water, when the sea breeze sets in. The current sets to the northward immediately after high water, and therefore if vessels that are outward bound can get with the land wind to this spot, they will be able in a few tacks, with the sea breeze, to pass outside the bank.

The shoalest part of the Zee Bank channel is nearly level. On the shallowest, in 1847, there were 10 ft., and with spring tides 16 ft.; with common tides it was 15 and 14 ft.

Generally the ground is so soft that a vessel receives no damage by remaining aground there; and there was an instance of a ship, drawing a quarter of a foot more than the depth of the channel, passing over the bank.

In the western monsoon, when it is high water between 8 o'clock, p.m., and midnight, the sea breeze generally prevails; in case of its being somewhat scant when going out, keep close along the western buoys, and then one tack will carry you over the bank.

The directions given above will be found useful in studying the tides and best time for entering the channel. We now proceed to describe the buoys, and a few of the directions given above will be repeated.

Buoys.—The northern entrance channels to Sourabaya Strait are marked by *white* buoys on their western sides, and by *black* buoys on their eastern sides, or by white buoys to starboard, and black buoys to port, in entering. The buoys are each surmounted by a staff and ball. The entrance to the Western Channel, at 7 miles E. by N. of Panka Point, is marked on either side by a white buoy and a black buoy, these buoys being 2 miles apart E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N. from each other. The white buoy, on the western side of the channel, lies 7 miles nearly E. by N. $\frac{1}{5}$ N. from the flagstaff on Panka Point, and N. $\frac{1}{5}$ E. $3\frac{3}{4}$ miles from the new lightvessel.

The leading mark up the Western Channel is the western slope of Grisee Hills, in line with the outer edge of the trees on Menarie, S. by W. $\frac{1}{2}$ W. This mark will lead up between the white buoys and the lightvessel (each about 2 miles apart) on the western side of the channel, and the black buoys on the eastern side. By keeping to this mark a vessel will pass nearly a mile

eastward of the lightvessel, $1\frac{1}{2}$ mile eastward of *Fort Erfprins*, and 4 cables outside the shoal water extending off that fort; thence the course continued will carry her in safety nearly up to *Kresik*.

The *Eastern Channel* is marked in a similar manner to the *Western Channel*, but is much narrower, being only about half a mile across. It has three white buoys on its western side, and three black buoys on its eastern side; the outermost buoy lying three-quarters of a mile E. by S. $\frac{1}{2}$ S. from the outer black buoy of the *Western Channel*, $9\frac{1}{2}$ miles E. $\frac{1}{2}$ N. of *Panka Point*; 5 miles W. $\frac{1}{2}$ N. of *Cape Wodon*; and N.E. $\frac{1}{4}$ E. 4 miles from the lightvessel. From a position midway between the outer buoys of this channel the course is S. by W. $\frac{3}{4}$ W. for $4\frac{1}{2}$ miles, thence from abreast the third white buoy the course is more westerly, or about S.W. by S. for 3 miles into the *Eastern Channel*, which is entered abreast *Fort Erfprins*. In proceeding up this channel great caution is requisite to avoid the *Dyamnang Rocks*, on the eastern side; the second black buoy lies off their eastern side. From abreast *Fort Erfprins* the leading mark previously given will lead up the channel.

The *Java Bank*, abreast *Fort Erfprins*, is steep-to, shoaling suddenly from 15 to 2 or 3 feet. The channel is a mile wide, and if too fearful of the *Java Bank*, you will be in danger of the *Zee Bank*; and the more so, because the stream from *Solo River* runs along the western side of the fort, and then sets over to the *Zee Bank*. The most projecting part of the sand abreast *Fort Erfprins* lies E. by S. $\frac{1}{2}$ S. a mile from the fort, and can be easily cleared by passing 2 cables outside of the white buoy, lying E. $\frac{3}{4}$ N. from the fort, and steering nothing westward of S. $\frac{3}{4}$ W., the course previously recommended for passing through the channel.

In the narrows of the strait a mark to avoid the *Java* side is the steep side of *Mount Grissee* open of the low point of *Menarie*; and the mark for the opposite shore, or *Madura* side, is the small house upon the pier-head of *Sembilangan*, not open of the land. When a vessel has to enter these narrows with a faint breeze, which is often the case, it is advisable to keep on the *Menarie* side of the bank in 10 fathoms, because the stream setting out of the *Solo River* has often so much force, particularly a little before low water, that she may be swept by the united efforts of this current and the stream from the old channel, across the strait, and compelled to anchor. In the westerly monsoon it is also advisable to keep this side, to be certain to fetch above the fishing-stakes, when the wind is scant.

When working through this part of the strait, stand over toward the *Madura* side into 7 fathoms, and to the *Java* side while the steep side of the *Grissee* mount is open of the *Menarie* land. Ships that anchor in the narrows of the strait should do so under *Sawo Point*, 2 miles southward of *Fort Erfprins*, in not less than 10 fathoms, as in less water there are rocks under

the mud, which would endanger the safety of the ship by the loss of the anchor. The stream is very strong in the narrows, especially to the northward.

The fishing-stakes which are found in this strait, and which are a great obstruction both to its navigation and to the streams of tide, should be kept all to the eastward; pass them very near when going to the southward, and make the Fourteen-foot Bank. With a working wind the Madura shore may be approached by keeping the lead briskly going till amongst the fishing-stakes; but on the other side be careful to keep the flagstaff of Fort Erfprins open outside of the trees of Menarie, to avoid the steep Java Bank, which fills up the whole space formed by the curve between Menarie and Grisee. A red buoy marks the North side of an isolated $2\frac{1}{4}$ -fathom patch, in the middle of the strait, N. $\frac{1}{2}$ E. 2 miles from Kresik light. This patch is about 2 cables across; Kresik light bearing S. $\frac{3}{4}$ E. leads in mid-channel westward of it.

In the beginning of the eastern monsoon, the northerly sea breeze with which the Zee Bank has been crossed, will not blow farther than abreast of Sembilangan; and from thence to Boeloe Point, light baffling winds will be met with; but when the easterly wind comes out from the bight of Sotja, keep along the fishing-stakes, so as to make a good board to the southward in working towards Sourabaya. In a more advanced stage of the eastern monsoon the sea breeze will reach farther in, and will also be more northerly; so much so that, generally in the afternoon, vessels run right before the wind into Sourabaya. In the night the land wind blows from the West, and in the morning more from the southward. In the western monsoon the land wind varies between the N.W. and S.W., and towards the end of that monsoon more northerly.

Kresik or Grisee is a noted trading place, being frequently visited by coasting-vessels, which keep up a brisk trade; many of the Indian ships were built there, and it affords good means for repairing them. A pier projects for a considerable distance, and close to this pier is the usual anchorage.

A *fixed bright light* is shown at the pier-head of Kresik, elevated 42 feet, and visible 8 miles off.

From Grisee to Sourabaya the course is S.E. and S.E. by E., and close to two rocks situated near the Madura shore, called the *Buffels Rocks* (Buffaloes), the outermost of which is seldom covered by the sea, even at high water. The Madura shore may be approached by the lead till near the Buffels, and these rocks may be approached till within half a mile. The Java Bank, near the *Pisang Rocks* (which are marked by a *white* buoy on their northern side), is steep-to, the depth increasing towards them to 8 or 9 fathoms, and in some places near their edge to 10 or 11 fathoms; they are always covered, and on their shoalest part there is but a foot of water. They nearly touch the steep bank of Java, S.W. by W. from the Buffels. To keep clear of the Pisangs, do not bring Tanjongan Point to the eastward

of North, and tack immediately when the water deepens, as that indicates the proximity of this bank. The current sets direct on these rocks, for which reason it is advisable in calms and light winds to remain near the Madura shore, if possible; but when once past the Pisangs and Buffels, both shores may be approached to 7 fathoms till in Sourabaya Roads.

SOERABAYA, Sourabaya, or Surabaya, is in the southern part of the Strait of Madura, and, with the exception of that of Tjilatjap on the South coast, is the only sheltered harbour that Java possesses, the others being only open roadsteads.

It is the stronghold of Java, and the Dutch government have spent large sums in fortifying. It is a port of call for the Netherlands' India Steam Navigation Company's boats. The ground on which the town stands is a flat alluvium, of recent formation, and surrounded by marshy land, which is penetrated by the sea. A river, called the *Kali-Maas* (river of gold), the source of which is at a considerable distance in the interior of the island, separates into two branches just before reaching the town. While one of its streams divides Sourabaya into two equal parts, the other just enters it, and falls into the sea about half a mile to the East of the former. The principal branch is straitened from Sourabaya to the sea. The current in it is very strong, and always running down; the flood or ebb stream being neither of them felt, except by producing a difference of level.

This canal is the high road of intercourse between the roadstead and the town, which is accessible to all vessels of less than 12 ft. draught. Boats are tracked up against the stream, and on the left bank of the river is a track road for the purpose.

Besides a strong citadel built at the entrance of the town on the right bank of the river, there is an enceinte with bastions, entirely surrounding the town on all sides. This enceinte is very wide; but the importance of the town must not be judged by its dimensions, for there are no houses of stone excepting those along the quays, and these are only about 300 or 400 yards on each side of the canal. The rest of the enclosure is filled one-half by swamps and the other by the straw huts of the Malays.

The left bank of the canal is reserved for the houses of Europeans and the various government establishments; the right bank is occupied by the Arabs and Chinese. The Europeans who live there are generally military and civil functionaries of the government and some small merchants, who have only their houses of business in the town, their dwelling-houses being outside of the enceinte. It is the same with those carrying on business, who do not employ more than two hours at their office. All these buildings are scattered towards the river South of Sourabaya, and extend to 2 or 3 miles from the centre of the town.

There is an excellent Marine Establishment and good Hospital at Sourabaya. There were, in 1870, several private establishments for the repair of

ships, but all on the primitive heaving down system. The Government Floating Docks are excellently managed, but merchant vessels can seldom get access to them. A *time ball* is in operation at the Marine Establishment, longitude $112^{\circ} 43' 30''$ E.

Vessels may at once embark their cargoes without employing proas; and all sorts of supplies and refreshments are to be had in abundance, especially fresh water, which is filtered and purified, and carried on board in tanks, in the same manner as at Batavia.

The river is broad and elongated by two piers; and at high water there is sufficient depth for large proas and square-rigged coasting vessels, which come in to be careened and repaired. At low water, however, great care is requisite in entering the river, even with boats, there being sometimes only a foot of water upon the bank, and if not kept just in the mid-channel, they may be upset by the current. The road is esteemed to be very healthy, and affords, in all seasons, proper and safe berths for vessels of all sizes.

The anchorage is about half a mile North, or N.N.W. from the entrance of the river, in 9 fathoms water, Grisee bearing about N.W. by W. In the western monsoon it is better to anchor a little farther out in stiffer holding ground, and also to moor.

Vessels staying longer than 24 hours in Soerabaya Roads are compelled to moor with sufficient scope of cable, and clear of other shipping, under a penalty of 100 florins for vessels above 100 tons burden, or of 25 florins for smaller vessels. (Ordinance, March 28, 1862.)

The land is low fronting the strait, but at a considerable distance in the interior there are some high mountains, of which the principal peaks are the *Penang*, S. by W. $\frac{1}{4}$ W., distant 26 miles, 5,495 ft. high; *Arđjoeno*, S. by W. $\frac{1}{3}$ W., distant $36\frac{1}{2}$ miles, 11,627 ft. high; and *Semiroe*, S. by E., $55\frac{1}{2}$ miles, 12,385 ft. high.

The Solo River, which discharges its water into the strait of Sourabaya at a distance of 2 miles W.S.W. from Fort Erfprins, is one of the largest and deepest rivers of the Isle of Java, and is navigated by large proas far into the interior. In 1841 a part of this river, with the shoals at its entrance, was surveyed by Lieut. Groll, commander H.N.M. iron steamer *Etna*. He states that the channel, from the southward of Fort Erfprins to the entrance, leads close along the shore of Menarie, and at low water in from 3 to $1\frac{1}{2}$ fathoms in depth. Upon the bank which runs along the North side of this channel there are, at low water, but $5\frac{1}{2}$ or 6 ft., and part of it dries; it consists in some places of sand, and in others of mud, but higher up of clay and mud. The depth is greater inside than outside the entrance, amounting in many places towards the village Boenga to 5 and 7 fathoms. In the eastern monsoon the flood streams up as far as Boenga, and at Bodjo Negors the water is brackish and unpalatable. In the western monsoon there is more

water in the river, and, according to the natives, the current in this season always sets down.

MADURA ISLAND.

The North Coast of Madura, and the channels eastward, were surveyed, in 1822, by Lieut. F. A. Fokke, of the Dutch Royal Navy. The whole of the North coast of this island may be safely approached, there being at the distance of 1 mile 4 or 5 fathoms depth, at 2 or 3 miles 7 to 9 fathoms, and 6 to 8 miles 15 to 20 fathoms, and 16 to 20 miles 30, 40, and 45 fathoms, for the most part good holding ground.

This coast is moderately elevated, and except for some hills near its western end, of a uniform height; it has generally a fertile appearance, with some rocky sand patches at its eastern extremity. A fresh-water place is said to be not far from the East end.

BAWEAN or **Bavian** or **Lubec** Island bears due North from Sourabaya Strait, and its centre lies in $5^{\circ} 49'$ S., and $112^{\circ} 42'$ E., according to the mean of several chronometric observations. It is of considerable extent, being North and South $9\frac{1}{2}$ miles, and East and West 10 miles; towards the centre and West end very high; and having some small islands on both sides. It is dangerous to approach from the eastward, on account of extensive rocky shoals, which reach 6 to 10 miles off, and near which there are 25 and 30 fathoms water. The outermost of these is the extensive group of the *Tambaga Rocks*, which show, and lie about 10 miles E.N.E. of the peak of Bawean Island. These rocks form a group 2 or 3 miles in extent, and are the northernmost of the patches lying off the East side of Bawean. Separated from them by a channel, $1\frac{1}{2}$ mile wide, is another patch, 2 miles in extent, North and South. These are separated from Lor Island ($1\frac{1}{2}$ mile off the East extreme of Bawean) and its surrounding dangers by a channel $1\frac{1}{2}$ mile in width. *Bungarang Reef*, under water, lies 4 miles S.E. of Lor Island. The channels within these reefs are of doubtful safety. The South, West, and North coasts of the island should not be approached within 2 miles, except with great caution, as many sunken rocks lie off its shores. *Noko Reef* lies S.E. from the peak of Bawean, $1\frac{1}{2}$ mile off shore.

Sankapoera.—The principal place in this island is Sanka Poera, or Sanca Poura, on the shore of a bay, in its southern coast. There is good anchorage in this bay, in 7 to 10 fathoms water, between the reefs, the western extremity of the bay, Alang Point, which is high and conspicuous, bearing from West to W.S.W. There are several reefs in this bay, which stretch

across from both sides, and therefore a stranger should not bring Alang Point to the southward of W. $\frac{1}{2}$ S.

W.S.W. $\frac{1}{2}$ W., 3 or 4 miles from Alang Point, Lieut. Fokke discovered a ledge of rocks, carrying from 5 to 9 fathoms, but suddenly rising from the depth of 30 fathoms; and the *Bromo* found another at the same distance from that point, but bearing from S. by W. $\frac{1}{2}$ W. to S. by E. $\frac{3}{4}$ E., with 7 to 9 fathoms.

Milton Rock, 4 miles westward of Bawean Island, was found by Mr. George Butchard, in 1875, to consist of coral, to extend about 270 yards in a N.W. and S.E. direction, and to have 16 ft. on its shoalest part, deepening all round to $4\frac{1}{2}$ and 6 fathoms, and then to 18 fathoms. The following bearings for the position of this danger are given by Mr. Butchard:—S.W. point of Bawean Island, S.E. by E.; North point of Bawean Island (Tienio Point), N.E. by E.; Small Islet (Nusa), N.E. $\frac{1}{2}$ N. These bearings place the rock in lat. $5^{\circ} 44' S.$, long. $112^{\circ} 33' E.$

Nusa Island and Rock, the rock lying about a mile N.W. from the islet, are about 4 miles N.N.E. of Milton Rock, and 4 miles westward of *Tienio Point*, the N.W. extreme of Bawean Island. S.W. and N.E. of Tienio Point dangers lie at the distance of a mile.

The **Hastings Rock**, upon which the British ship the *Marquis of Hastings* struck, May 27, 1826, lies in $6^{\circ} 6' S.$ and $112^{\circ} 32' E.$, with the summit of the island of Bawean bearing N.E. by N., 20 miles distant. The rock is not visible, and probably but very small.

Nahmen's or Oosterling Rock or *breakers* were seen from the Dutch barque *Oosterling*, March 22, 1855, at about 25 miles N.W. of the centre of Bawean. It was not sounded on, but it appeared to be in lat. $5^{\circ} 33' S.$, long. $112^{\circ} 28' E.$

The **Arrogant Reef**, in $5^{\circ} 12' S.$, and $113^{\circ} 0' E.$ by a mean of the chronometers of H.M.S. *Arrogant*, and those of the *Dover Castle*, which agreed within 4 minutes of arc, lies about 11 leagues N.N.E., of Bawean, having been discovered, in 1802, by the former ship. It was examined by the boats, and found to extend about a quarter of a mile N.W. and S.E. with only 5 or 6 ft. water, where they could approach in safety from the breakers. There were from 5 to 12 and 25 fathoms round it at the distance of a cable's length. This reef is just in the track of ships from Batavia to Macassar &c.

GILIANG or **Pondi** is a small flat island, in $7^{\circ} S.$, and $114^{\circ} 10' 48'' E.$, and about 3 miles East from the East point of Madura. The passage between them has from 5 to 16 fathoms water, soft ground, but is a very narrow channel, occasioned by the shoal spit which projects from the East point of Madura, and upon the edge of which there are but 3 fathoms. A small shoal, with $3\frac{1}{2}$ fathoms water, lies a mile West from the North point of

Giliang; and a large bank with $1\frac{1}{2}$ fathom shoalest water stretches North and N.N.E. as far as 3 miles from the East point of Madura.

Tambaga Rock.—The two dangerous rocks of Tambaga, according to Lieutenant Fokke, lie 4 miles East from Sarotak Point, the south-eastern angle of Talango Island; N.E. by N. from Lawak; and S. by W. $\frac{1}{2}$ W. from Giliang. At low water, these rocks are even with the water's edge, and lie about a mile distant from each other, with 10, 20, and 24 fathoms close to. A third and very dangerous rock, previously known to exist, lies rather above a mile to the South of them. Its position was ascertained by Captain Gaeter, D.R.N., in the steamer *Draak*, in 1867. The British ship *Edendale* was wrecked on it. It has only 14 ft. water, and bears S.E. by E. from the westerly Tambaga Reef and S.W. $\frac{1}{4}$ S. from the eastern one, Gili Lawak bearing S.W. westerly.

A fifteen-feet patch lies a cable southward of the Tambaga Rocks.

Four miles N.E. of these Tambaga Rocks there is another, which was discovered, in 1822, by Lieut. Fokke, and named, after the vessel he commanded, the *Jacoba Flizabeth*; but it need not be avoided by ships, as the shoalest water upon it is 7 fathoms, with 22 and 50 fathoms all round.

SAPPOEDIE ISLAND, the Galioen, or Respondi, of the old charts, lies between $7^{\circ} 3'$ and $7^{\circ} 10\frac{1}{2}'$ S., and the West point in $114^{\circ} 19' E.$; it is larger and higher than Giliang. Both are well cultivated, and bear a fertile and pleasant aspect. About 5 miles to the N.N.E. of the N.E. end of Sapoedie is Pandyang, a small island with two small islets, lying within 9 miles westward from it. North 3 miles from the centre of the three islets, and N.E. $\frac{3}{4}$ N. of the West point of Sapoedie is a 6-fathom bank, discovered in 1864 by Capt. Kuffeler.

Sapoedie Strait, or the channel between Sapoedie and Giliang, is 6 miles wide, and the usual track for vessels bound to the Strait of Bali. Besides the above-described rocks of Tambaga and Jacoba, there are no dangers; and though the soundings are very irregular, varying from 10 to 30 fathoms, yet it is a very good channel, and preferable either to that West of Giliang, or East of Sapoedie. South of Sapoedie the depths increase rapidly to 50 and 100 fathoms; and the course to be steered to Cape Sedano is about S. by E.

There is a safe channel to the eastward of Sapoedie, with moderate depths between it and the isle of Ra-as (Great Hog Island). Lieutenant Boedrie, in H.N.M. schooner *Iris*, found a rocky shoal, upon which were but 2 fathoms. This spot bore W. $\frac{1}{2}$ S. from Sarok Island and N. $\frac{1}{4}$ E. from the West point of Ra-as. The shoal is round, about a cable's length in diameter, and very dangerous for all vessels passing through this channel from Sumanap to Kangeang or Macassar.

Lawak, or *Turtle Island*, lies in lat. $7^{\circ} 12' 20''$ S., and long. $114^{\circ} 3' E.$ It is a small sandy island, covered with trees, and discernible 8 miles off.

Between this island and the extremity of the long neck projecting from Gintang Island, 6 miles to the westward, are two rocks above water, E.N.E. and W.S.W., $1\frac{1}{4}$ mile apart. The easternmost lies 2 miles West of Lawak, and has a sunken rock just West of it. The western rock has a sunken danger on its eastern side.

SUMANAP (the Flagstaff) lies in $7^{\circ} 2' 30''$ S., and $113^{\circ} 55'$ E. It is a considerable town, and furnishes fresh water and provisions of all kinds. The adjacent country abounds with rice and timber, several coasting traders being built here. The bay is margined by a soft mud bank, so that ships are obliged to anchor at a great distance from the shore. Large ships anchor in 5 or $5\frac{1}{4}$ fathoms, 4 or 5 miles from the fort. Small vessels anchor more in shore, about $2\frac{1}{2}$ miles from Sumanap, in 3 fathoms, mud.

Ships coming from the southward, and intending to touch at Sumanap, should first make Lawak, pass on its eastern side, and stand along the South side of Talango for the anchorage. The passage between Lawak and Genting is not to be recommended, on account of the above-mentioned rocks; nor should Gintang, or Genting, be approached too near on its northern side, as two rocks, *Noko* and *Gemer*, lie $1\frac{1}{2}$ and 1 mile from it; both, however, are above water, and discernible at some distance. The channel leading to Sumanap, between Gintang and Radja, is safe, with 19 to 8 fathoms water; but a berth of about a mile should be given to these islands on both sides, as reefs project nearly to that distance. Channel passed, steer N.E. by E., in 8 fathoms depth, close round the South point of the bay, for the anchorage. The extremity of the reef off the West side of Gintang is marked by a *white* buoy with mast and ball, and that off the East end of Radya by a *black* buoy with mast and ball.

Along the Madura coast there is in most places soft mud, except upon the reef near the East point; but among the islands there will generally be found hard sand or rock at the bottom. Lieutenant Fokke gives the time of high water, in the middle of the East monsoon, at noon; but in November about midnight. In common tides the rise is 5 ft., and at springs 7 or 8 ft. Sometimes he experienced a current among the islands, of $2\frac{1}{2}$ miles per hour.

Gilingan Island lies S.W. $2\frac{1}{2}$ miles from the West end of Radya, and S.E. $1\frac{1}{4}$ mile from it is *Guntur Rock*. A *doubtful patch* lies S.E. $\frac{1}{2}$ S. $2\frac{1}{4}$ miles from Gilingan, and a 9-ft. rock was reported by the *Merapie* to lie in lat. $7^{\circ} 18'$ S., long. $113^{\circ} 54'$ E., with Genting Island bearing N. $\frac{1}{2}$ W. to N.E. $\frac{1}{2}$ N. This latter patch is not marked on the Admiralty chart.

Boender and **Tiandie** are two places in a bight of the South coast of Madura, about 6 leagues West of Sumanap. These places are sometimes visited by trading ships, to take in salt, which they produce in abundance. A great many dangerous rocks and reefs lie in this bay, and make it necessary to approach it with caution, the more so as the fishing stakes indicating

their position being sometimes washed away by the sea, no implicit reliance can be placed on them.

In the eastern monsoon the tide sets N.W. and S.E., and in the western monsoon E.N.E. and W.S.W. In common tides the rise is $4\frac{1}{2}$ ft., and in the springs 8 or $8\frac{1}{2}$ ft.

KANGEANG.—A chain of small islets and rocks stretch eastward of Saepoedie as far as Kangeang, an extensive island, the N.W. point of which is in $6^{\circ} 50' 30''$ S., and $115^{\circ} 12'$ E. In former charts all these island were represented very incorrectly, but the observations of various officers of the Dutch navy have made the islands better known.

The north-western part of Kangeang is high and rugged, but clothed with trees; the eastern point is less high, with a more even appearance; and in the S.W. part the land is low and bushy. It is a very fertile island, governed by the Sultan of Sumanap, and scantily peopled; but visited by trading proas from Baly, Sumanap, and Bawean. Sometimes this island is subject to invasions. Near the N.W. point of Kangeang lies the small island of *Manpoeriet*, or *Manropet*, which is of considerable height, and visible as far as that N.W. point, i.e., in clear weather, about 8 or 9 leagues; and it is surrounded by a coral reef, which projects at the N.W. and W.N.W. sides about 3 miles. Between Manpoeriet and the N.W. side of Kangeang, there is a bay of a mile wide, in which are several rocks, one of which, a dangerous coral patch of $3\frac{1}{4}$ fathoms, lies with Manpoeriet West point bearing N.W., and Katapang flagstaff W. and E. $\frac{1}{2}$ S. The village of Katapang is situated in this bay. According to Lieutenant Jolly, a ship having cleared the reef of Manpoeriet, may steer mid-channel into the bay, till Manpoeriet bears North, when a good anchorage will be found in 10 fathoms depth. This is a fair and safe berth in the S.E. monsoon, and it is not advisable for large ships to stand farther in, as coral reefs project in some places a mile off shore. There are some refreshments to be had there, and a *little* good water may be found in two wells upon the beach. In the N.W. monsoon a large ship will not obtain shelter against hard winds and high seas.

Kamirian, or Urk Island, in $7^{\circ} 2' 15''$ S., and $115^{\circ} 12'$ E., or $8^{\circ} 24'$ E. of Batavia, is of a circular form, very woody, not very high, with a sandy beach all round, but which projects most to the westward. The passages on both sides of Kamirian are safe, with 40 and 50 fathoms depth in the middle, 25 near the island, and 15 and 10 on the Kangeang side. These passages are of importance to ships coming from Australia and bound to Singapore or Bengal, and are often preferred to Salayer Strait when coming from Banda or the Moluccas, in the strength of the East monsoon, and going to Batavia. The passage to the eastward of Kamirian is 4 miles wide, and has no dangers, as the reefs project from the S.W. point of Kangeang about a mile only; and the passage West of Kamirian between it and Takat, is at least

4 miles wide, and has no dangers, the reefs on either side showing their edges by the discolouration of the water.

Karang Takat Bank, sometimes called the *Four Brothers*, is an extensive coral shoal, which stretches E.S.E. and W.N.W. for a length of 4 leagues, with three dry patches, elevated 2 or 3 ft. above low water. These patches are called by the natives *Takat Gomok*, *Takat Fimor*, and *Takat Tinga*; two of them are near the extreme ends, and one in the middle of the bank. According to Lieutenant Boedrie, in 1827, and Captain Machielson, in 1834, the southernmost part of the bank bears about W. $\frac{1}{2}$ N. from Kamirian, and the northernmost part of it S.W. by W. $\frac{3}{4}$ W. from the N.W. point of Kangeang. This shoal is very steep-to, as Lieut. Gregory, who passed very near it in 1836, in H.N.M. corvette *Boreas*, states that at the distance of half a mile E.N.E. from its north-westernmost point he had 39 fathoms, and at half a mile from its S.E. point, Urk Island bearing E. by S., there was no bottom with 45 fathoms. With a good look-out at the mast-head, this dangerous shoal will be discernible at a considerable distance by the colour of the water, except when in the direction of the sun.

The passage West of Takat, between it and the small islands of Kamoedie and Goa, is about 3 or 4 leagues wide, and is said to be safe; but as but little is known about this channel, the utmost care and prudence is to be recommended to vessels proceeding through it.

The English ship *Islay*, in 1843, passed close to the southward of Ra-as and of the islands to the eastward of it, and struck upon a coral rock there, with only 13 ft. According to the account of her captain (Galt), it lies 5 miles S.E. by E. from Little Ra-as, or Tund Island, and 6 miles S. by W. from Goa. There is also a rock between Tund and Ra-as.

Dangers Northward of Kangeang.—At 3 miles N.N.W. of Manropit Island is a *sunken rock*, and 15 miles westward of that island is another sunken rock of doubtful position, but placed on the chart in lat. $6^{\circ} 50' S.$, long. $114^{\circ} 51' E.$ *Sumbing Reef*, of 3 fathoms, discovered in 1863, is marked on the chart 6 miles North of the North side of Kangeang Island, in lat. $6^{\circ} 42' S.$, long. $115^{\circ} 22' E.$ At $15\frac{1}{2}$ miles N. $\frac{1}{3}$ E. of Sumbing Reef is a $4\frac{1}{2}$ -fathom patch, and N.E. by N. 11 miles from this patch is *Prince Maurits Reef*, in lat. $6^{\circ} 20' S.$, long. $115^{\circ} 31' E.$ A spot 4 miles long East and West, with 9 and 10 fathoms water over it, lies in lat. $6^{\circ} 5' S.$, long. $115^{\circ} 12'$ to $115^{\circ} 16' E.$

Kalkun or Turkey Islands, five in number, are low, and their locality little known. A passage between them and Kangeang has been used, but is also little known. The southern island is surrounded by rocks to the distance of 3 miles all round, and lies 13 miles N. by E. of the East end of Kangeang Island, in lat. $6^{\circ} 43' S.$, long. $115^{\circ} 41' E.$ It is 2 miles in length East and West. Two of the islands lie N.W. $\frac{1}{2}$ N., at the distance of 5 and 10 miles from the East end of the South Turkey Island, and a sunken rock lies in

the same direction 6 miles from the outer island, and 11 miles South of Prince Maurits Reef. The other two islands lie at 11 miles N.N.E., and 15 miles N.E. by N. from the South Turkey.

Looper Reef, of coral, in lat. $6^{\circ} 28' S.$, long. $115^{\circ} 55' E.$, and 10 miles E.N.E. from the N.E. Turkey Island, has $2\frac{3}{4}$ fathoms water on it, and was discovered by Capt. Looper, R.D.N.

Belliqueux Reef is the old name for all this locality. A $4\frac{1}{2}$ -fathom patch lies 12 miles E.S.E. of Looper Reef, and thence the water is considered dangerous westward of a line extending 25 miles to the southward to *Sakala* or *Hastings Island*, which lies 20 miles N.E. of the East end of Pandyang Island, the easternmost of the Kangeang Group.

A *rock* is marked in lat. $6^{\circ} 34' S.$, long. $116^{\circ} 44' E.$, 38 miles N.E. by E. of Sakala Island, and 45 miles E. $\frac{3}{4}$ S. of Looper Reef.

Peterborough Shoal, in lat. $6^{\circ} 37'$, long. $115^{\circ} 58'$, was discovered by a vessel of that name in 1871. The shoal appeared to be a narrow coral shoal, lying in an East and West direction. It was steep-to, and from it the N.E. Turkey Island, distant 10 miles N.W. by N., was just visible.

Cyclops Reef is marked in Dutch charts in lat. $6^{\circ} 48' S.$, long. $115^{\circ} 44' E.$ It has $4\frac{1}{2}$ fathoms water, and lies S.S.E. $7\frac{1}{2}$ miles from the South Turkey Island. *Sedulang Shoal* lies 6 miles eastward of it, and 10 miles N. $\frac{1}{4}$ E. of an islet of the same name. There are no reefs yet discovered between Sedulang Shoal and the islets lying off the Kangeang Group, or in the space of 9 miles southward of Cyclops Reef and Sedulang Shoal.

MADURA STRAIT.

Vessels bound from Sourabaya to the Strait of Madura will find pilots at Passeroean. There are two channels; the *Jansen Channel*, to the westward, is well buoyed, and leads along the Java shore; while the Old Channel (Trechter), lying more to the eastward, passes close to the Gezonken (sunken) Fort, commonly called Daendels Fort, and is not buoyed. But before we enter either of those channels, it will be satisfactory to give some remarks upon the tides in the Trechter, which affect them both equally.

The *Tides* in many parts of these seas are attended with considerable peculiarities and difficulties, and none more so than those which pass through the Trechter. They have been carefully investigated and elaborately described by Capt. M. H. Jansen, D.R.N.; but for the general purpose of these instructions the following briefly-stated facts will probably be sufficient. It has been seen that on the Zee Bank there are for a few months two tides in the 24 hours, but that, for the major part of the year, there is only one high water in that interval; in the Trechter, on the contrary, there are always two distinct tides, though they differ materially in height, according to the sun being North or South of the equator. Secondly, the rise and fall of the water in the Trechter, springs and neaps, are $8\frac{1}{2}$ and $5\frac{1}{2}$ ft.; which, being much greater than the corresponding rise and fall on the Zee Bank, it follows that the stream sets to the northward through the Trechter from two hours after high water, a circumstance very favourable to vessels entering from the southward, and equally troublesome to those that are bound to the eastward from Sourabaya.

The **JANSEN CHANNEL**, above mentioned, is liable to change, and therefore no permanent directions can be depended on for it. But the Dutch Government have well buoyed this channel in the early part of 1867, with *black* Herbert's buoys on its western side, and *white* buoys on its eastern side. The channel is about three-quarters of a mile wide at its northern end, and $1\frac{1}{2}$ mile wide between the buoys at its southern end. The northern black buoy lies 3 miles East of Sourabaya, and 3 cables N.E. of Kalabangkang Point; between this black buoy and the outermost white buoy, three-quarters of a mile E.N.E. of it, is the northern entrance of Jansen Channel. Thence the course is about S.E. by S. for $7\frac{1}{2}$ miles, till the outer edge of the trees on the Java shore come in line with the south-western slope of Madura bearing N.W., which is the mark for leading out of the South end of the channel.

Between the black buoy at the northern entrance, and the outer black buoy at the southern entrance of Jansen Channel, the distance is 14 miles, and, including these two buoys, the western side of the channel is marked by nine black buoys. From the southernmost black buoy the southernmost

white buoy on the opposite side of the channel bears N. $\frac{3}{4}$ W., distant 3 miles. The eastern side of the channel is marked by seven white buoys, all on Herbert's principle except the northernmost.

Jansen Channel, outward bound.—When bound to the eastward from Sourabaya, steer E. by N. to clear the Java Bank, which is steep-to, keeping the end of the Navy-yard to the southward of W. by S. If beating out, do not approach the Madura shore nearer than 7 fathoms; and on the Java side tack immediately that there is less water than 8 or 9 fathoms. If compelled to anchor, avoid doing so near Madura, as the bottom there is rocky. An 8-ft. shoal, marked by a *white* buoy, lies some distance off the shore; from it the 7-fathom line is sufficient security. In steering towards the northern entrance of the Jansen Channel, keep as near as can be done with safety to the Java Bank, in order to haul in close round the buoy off the point of Kalaban; for the eastern stream, instead of bending round the buoy, sets across the channel and upon the Tongue, which is the name of the long shoal that forms the eastern side of the Jansen Channel. When once in the channel the stream takes its direction. The depths in the Jansen Channel gradually decrease from 6 and 7 fathoms between the buoys at its North entrance to $2\frac{1}{4}$ fathoms between the buoys at its South entrance, and midway between these depths there is only 18 ft. water. Deeply laden vessels are, therefore, obliged to anchor there, and wait for high water. Along the whole length of the Tongue the banks are steep-to on both sides, and therefore, when working, vessels should tack short of the line of the stakes; and indeed in the narrow part of the channel, 3 miles within its North entrance, although a mile in breadth, it is advisable for them to drive with the tide, which runs there with great velocity—even 8 knots it has been asserted. The Java Bank, to the southward of this, is a little more gradual in its slope, but still too steep to make free with; and the *Kletta Rocks*, though buoyed, should not be approached without great caution. Still farther to the southward, the edges of the banks become flatter, and vessels may borrow on them by the lead.

OLD TRECHTER CHANNEL.—Vessels proceeding from Sourabaya by this channel, pass pretty close to the S.W. side of Daendels Fort, a large collection of stones, brought there for the purpose of building a fortress which should command the Pass, and thrown into the water. There is a *red* buoy off these dangerous stones. The channel leads along the S.W. side of the fort, and this is its narrowest and shallowest part, as no more than 2 fathoms depth will be found at low water. The rise and fall of the tides is in this place three-quarters to $1\frac{1}{4}$ fathom. From off the fort the Zadelberg Hills on Madura will be seen bearing N.W. $\frac{1}{2}$ N., N.N.W., and N.N.E. The easternmost is the highest of the three, and may be distinguished by two conspicuous trees at its foot; this hill is the great mark for the pilots throughout the strait; the middle one is not so high, and seems chiefly to be composed of

high trees; the westernmost is also of moderate height, and resembles a saddle more than the others. This passage should never be attempted without a pilot.

When leaving Sourabaya Road with a fair wind the course is E.N.E. to the Madura shore, in order to clear the mud bank which projects a considerable distance off the Java shore, East from the river, leaving nothing but a small channel between the two banks, and also to avoid the indraught of the Jansen Channel.

The land breeze seldom reaches far off shore, and therefore when leaving Sourabaya beat up along, in the eastern monsoon, the Madura shore, and borrow on the Java side only as near in as 9 fathoms; the mud-bank being here steep-to. To beat to the eastward, except with an eastern stream, is impossible; and, therefore, the Jansen Channel, throughout which the land breeze prevails, is by far the most eligible during the eastern monsoon.

When past Daendels Fort, proceed S.E. by S. and S.E., till it bears N.N.W. $\frac{1}{2}$ W., 4 miles distant, when the three hills of Zadelberg will be visible at the East side of the fort. Between the sunk fort and Passaroean a mud bank projects a considerable distance off shore, with a dangerous knoll, called the *Slatan*, which makes it advisable not to borrow on the Java shore nearer than 7 or 6 fathoms. A ship should also mind the dangers S.W. of Kambing Island, presently described, especially when working to the southward.

Passaroean.—To touch at Passaroean, the pilots have a mark of four or five conspicuous trees, in the vicinity of the town, and the mark for standing into the road is, or was, a small dark bush, at the mouth of the river, near a single house, bearing S. $\frac{1}{2}$ E. The anchorage is 3 or 4 miles N.N.E. to N.E. from the flagstaff, and N.W. by W. $\frac{3}{4}$ W. or W.N.W. from Warangan Point, in 5 or 6 fathoms, mud. *Pilots* may be procured here for Sourabaya.

A *red light* is, or is to be, shown from a lamp-post at Passaroean, lat. $7^{\circ} 37' S.$, long. $112^{\circ} 55' E.$

Kambing Island lies in $7^{\circ} 19' 36'' S.$ and $113^{\circ} 12' 40'' E.$; it is about a mile in extent, woody, not high, but visible in clear weather at the distance of 4 or 5 leagues. It is surrounded by a coral reef, close to which there are from 14 to 20 fathoms, and then shoaling gradually toward Madura into 4 fathoms. At 2 miles West from the West end of Kambing is a *sand-bank*.

A *small shoal* of $1\frac{1}{2}$ cable, bears S.W. by S., 2 miles from the West point of Kambing Island. There were 4 ft. water upon it at the time, being half tide, and therefore at low water 2 ft. It seems to correspond in place with that laid down in some charts as the *Kabeljaauw Bank*.

KOKO REEF, or ZWAANTJES DROOGTE.—A coral reef of half a mile in breadth, called by the natives *Koko*, and by the Dutch *Zwaantjes Droogte*; one part of it is always in sight, and consists of white sandstone. In 1855

a conspicuous iron screw pile beacon was erected on it, this is now superseded by the lighthouse, from which the outer buoy of the channel is visible, so that it is an excellent mark.

LIGHTHOUSE.—The lighthouse on Koko Reef, completed in 1872, exhibits a *revolving bright light*, at an elevation of 54 ft. above the sea. The light appears as a fixed bright light for $1\frac{1}{2}$ minute, and in the succeeding half minute shows a flash of 10 seconds duration, preceded and followed by an eclipse of 10 seconds. The flashes are visible about 14 miles off. In foggy weather, or if the light is out of order, a *bell* is sounded. The following dangers lie near the lighthouse.

Manilla Rock, or bank under water, two ships' lengths in extent, bears S.W. by S. and S.W. $\frac{1}{4}$ W. from the extremities of Kambing Island, 3 or 4 miles distant, having 2 fathoms water on its shoalest part, and 16 fathoms between it and that island.

Sirumpa Rock is 5 miles N.W. by N. from Koko lighthouse.

Bura Rock, with a sand-bank, is about $1\frac{1}{2}$ or 2 miles in extent, and bears N.W. $\frac{3}{4}$ N. 5 miles from Koko Reef, and about S.W. by W. 11 miles from Kambing. Upon the shoalest part there is 3 ft. water.

Eendragt Shoal.—A small rocky shoal, discovered in 1841 by Capt. H. H. Deuling, in the Dutch barque *Eendragt*, with the Koko bearing W. by N., 5 miles distant, and the island of Kambing N. $\frac{1}{2}$ E.

Ships bound to the eastward from Passaroean should generally make their easting along the Java shore, in order to profit by the land and sea breezes, which blow with more regularity and strength than on the Madura side; besides which, if becalmed or set to the westward by the current, they may anchor on the Java side. In the eastern monsoon, during the day S.E. by E. and E.N.E. winds prevail; in the night commonly a brisk S.S.W. or S.W. land breeze, and often in the forenoon followed by light baffling winds and calms. In the western monsoon, N.N.W. and W.S.W. winds blow very hard, sometimes declining in the evening, and often veering to S.W. and S.S.W. in the night; the current generally runs East or West, but that depends on the prevailing wind.

The winds, however, in the Strait of Madura, are more variable than on any other part of the coasts of Java and Madura, arising not only from the contraction of the passage, but, perhaps, from the influence upon the atmosphere of the several high mountains, among which are some active volcanoes, in the eastern part of Java. Very frequently variable and suddenly shifting winds and squalls are experienced in this strait.

A reef, called the *Karang Katang*, was discovered by Captain Kingdom, in the Dutch ship *Diederika*. It lies in the bay between Warangan Point and Probolinggo, about $2\frac{1}{2}$ miles off shore, with Probolinggo West harbour point S. $\frac{3}{4}$ E., and Gunong Loros E. $\frac{2}{3}$ S. It is very small, and has $3\frac{3}{4}$ fathoms least water, surrounded by depths of $9\frac{1}{2}$ fathoms.

KATAPANG, or *Krabben Island*, in $7^{\circ} 41' S.$, and $113^{\circ} 16' 10'' E.$, is not high, but woody; about a mile East and West, and half a mile North and South. It is surrounded by a broad coral reef, which projects fully a mile to the eastward, with 15 fathoms close to its East and N.E. sides, and 10 fathoms at the West and S.W. sides. When not bound to Probolinggo, or to one of the adjacent places, keep well to the northward of Katapang, but at the same time giving a good berth to Eendragt Reef.

A ship may safely approach the Java shore till Mount Ringit bears South, as no dangers have been found on the coast to the westward of it, except a little to the eastward of Cape Bedoelang, where there seems to be a shoal 2 miles from the shore. H.N.M. schooner *Argo* struck on it in September, 1846. It may be the same as that examined by Lieutenant Toutenhoofd, which lies above half a mile off the most projecting point between Bezoekie and Bedoelan, called Tanjong Binor. The reef is called *Karang Krantjie*, is awash, and from it Gunong Laros bears S. $\frac{3}{4}$ E.

PROBOLINGO flagstaff is in $7^{\circ} 44' 30'' S.$, and $113^{\circ} 12' E.$ The town lies in a bight of the coast, opposite Katapang, that island bearing N.E. $\frac{3}{4}$ N., Warangan Point W.N.W., and Mount Lamongan S.S.E. $\frac{1}{2}$ E. It is an open port for exports only. The coast may be approached in this bight safely, with due attention to the lead, there being at 2 miles distance 4 to 6 fathoms, at 3 miles 7 and 8 fathoms, and so on, gradually increasing. A vessel going to Probolinggo may pass either East or West of Katapang, but should not approach it within 2 miles. The common anchorage in the road is in 4 or 5 fathoms, with the flagstaff bearing about S.S.E., Katapang N.E. $\frac{1}{2}$ N., and Warangan Point about W.N.W. $\frac{1}{4}$ W. This place is often visited by ships in want of water or refreshments, both of which are excellent. The river is lengthened by a pier. The English ship *Albion*, sunk in the roads of Probolinggo, is marked by a buoy (1875).

A *red light* is, or is to be shown from an iron post at Probolinggo.

Mount Lamongan, or *Belierang*, is an active volcano, about 17 miles S.E. by S. of Probolinggo. It stands in $8^{\circ} 0' 30'' S.$, and $113^{\circ} 20' E.$; and its summit is 6,824 ft. above the sea, while that of the *Argopoera Mountain*, to the eastward, and the highest of the range, rises to 9,843 ft., according to Dr. F. Junghuhn.

BEZUKIE flagstaff is in $7^{\circ} 43' 45'' S.$, and $113^{\circ} 40' E.$ This town is the capital of the Residency which comprises the eastern part of Java, and is much frequented by ships. It is an open port for exports only.

A *bright light* is, or is to be, shown from an iron post at Bezukie.

A vessel bound to this place from the westward may steer inshore near Bedoelang Point, so as to bring *Mount Ringit*, or *Ringgit*, to bear E. by S., but not more to the eastward, on account of the shoal before described. It is easily distinguished by its superior height, its vicinity to the coast, and by its rugged, rough, and barren aspect; it is an extinct volcano, and its summit

stands in $7^{\circ} 43' 30''$ S., and $113^{\circ} 51'$ E. When this mountain bears E. by S., a hill named *Tempora*, to the westward of the town, will soon be discerned on the bearing of S.E., and the conspicuous white coffee storehouses, with red tiles, of Bezoekie. In approaching the anchorage the water will shoal from 20 to 8 fathoms, and a broad sandy bank spreads out from the shore, steep-to, and projecting farthest from Katang Point, where there is but $1\frac{1}{2}$ fathom or less. Abreast of Mount Tempora, in the western part of the road, some rocks and foul ground will be found. A mile to the eastward of Katang Point there are 11 to 13 fathoms, and this depth will be carried as far as Poetie Point. The anchorage is N. by W., or N.N.W., from the flagstaff. Mount Tempora W.S.W. $\frac{1}{2}$ W., about a mile from the shore, and in 9 or 10 fathoms water. In $7\frac{1}{2}$ fathoms, with Mount Tempora W. by S., a ship would lie too near the bank and too close to the fishing stakes.

PANARUKAN.—The flagstaff of Panarukan is in lat. $7^{\circ} 43'$ S., long. $113^{\circ} 53' 36''$ E. The town lies in a little bay at the foot of Mount Ringit. It is an open port for exports only. The western side of this bay is formed by a projecting point, on the extremity of which stands *Pilarong Hill*, and which, in one with Mount Ringit, bears S. by W. $\frac{1}{4}$ W. A *dangerous rock*, with only 10 ft. on it at low water, lies in this part of the bay at half a mile off the beach, with the flagstaff at Panarukan bearing S. $64\frac{1}{2}^{\circ}$ E., and the eastern high peak of Gunong Ringgit S. 65° W. The eastern coast of the bight leads N.E. and N.E. by E. to Cape Tyna, and is partly margined by a rocky reef, which begins 2 miles from Panarukan, projects half a mile from the shore, and reaches as far as the River Gomok. This reef dries at low water in some places, but has 5 fathoms close to it, and 10 and 12 fathoms depth at a mile distant. Ships coming from the westward and bound to Panarukan, may stand in for the road, with Mount Ringgit bearing South, and anchor in 17 to 15 fathoms water, on a mud bottom, full a mile from the shore; the flagstaff S. or S. $\frac{1}{2}$ E., and Mount Ringgit S.W. Good fresh water and beef are to be procured there; but fowls and other provisions are scarce. The anchorage is considered safe at any time of year.

A *red light* is, or is to be, shown at Panarukan.

CAPE TJINA or China Point is the northernmost point of the eastern part of Java, and is in $7^{\circ} 38'$ S., and $114^{\circ} 4'$ E.; it is all low, so that from the westward, the Sedano Hills are seen high above it. There is a small sandbank just to the westward of Cape Tjina, upon which there are but $1\frac{1}{2}$ and 2 fathoms at low water, and from which the cape bears N.E. by E., and Mount Ringgit W. by S. There is another shoal of $4\frac{1}{2}$ fathoms, hard sand, just to the westward of Cape Tjina. The cape bearing E.N.E. $\frac{1}{2}$ E., 1 mile distant, and Mount Ringgit S.W. $\frac{1}{2}$ W.; and 2 miles from the land to the southward; but the bank rises as suddenly as a wall from 13 and 12 fathoms, to 5, and less. To avoid this danger, it is advisable, when passing Cape Tjina at the West side, not to borrow too much towards the shore.

KOMBANG BAY.—To the eastward of Cape Tjina the coast runs about 8 miles to the southward, and forms Kombang Bay, in which are situated the kampongs (*villages*) of Aggel, Kombang, and Tianker. This bay reaches to Tianker Point. This bight is not free from dangers, as from Tjina there is a sandbank a mile off, with 2 fathoms water, though 14 to 9 fathoms are close to it. There is said to be another bank to the S.E., with 2 fathoms only at high water, called the *Enora*.

A dangerous shoal was discovered, in 1812, by H.M.S. *Hecate*. Her boat found $2\frac{1}{2}$ fathoms, rocks, and on some parts of it there appeared to be less water, and an appearance of breakers. Cape Tjina bore from it N.W. by W. ; Mount Ringgit, W.S.W. ; the first point to the westward of Cape Sedano (Tianker Point), E. by S. ; and Sedano Mount, E.S.E. Inside of this shoal there are 13 fathoms water, 3 miles from the Java shore. But as this shoal has been sought for without success, it is doubtful if it exists as stated ; nevertheless, vessels should not enter the bight between Tjina and Tianker without necessity, and then with very great caution.

The is a good anchorage in the eastern monsoon behind Tianker Point. In this part of the Isle of Java there are several small rivers, but at high water their contents near the entrance are brackish. The westernmost gives the best fresh water, which falls there over some rocks, situated above high water mark.

Between Tianker Point and the projecting point of *Loemoet*, 8 miles to the eastward, there is another bay, and the village of *Tiottek*, about a mile from the entrance of a river. The mouth of this river may be found by a very conspicuous dead tree, with two branches, on its eastern bank. The anchorage is in 9 or 10 fathoms, half a mile off shore, the dead tree bearing S.E. by S. or S.E., and Loemoet Point, or the East point of the bay, E. by S., about 4 miles distant. The river affords good water, and is often visited by trading proas ; but with a N.E. or E.N.E. wind the road is exposed to a high sea. The reefs near this village stretch off to the westward from Loemoet Point till abreast of the dead tree. They are all within a mile of the shore, and often afford shelter to the pirates, it being difficult to pursue them, and they find there fresh water in abundance.

CAPE SEDANO forms the north-easternmost point of the Isle of Java, in $7^{\circ} 49' S.$ and $114^{\circ} 26' 53'' E.$ From Loemoet Point to the eastward the coast curves gradually from E.S.E. to S.E., without any conspicuous points, the whole being considered as Cape Sedano. The true cape is a bluff rocky projection, which bears E.N.E. $\frac{1}{3}$ E. from the summit of Mount Sedano, and from which the coast runs more southerly. The perpendicular height of the mount above the sea is 4,760 ft. Near the cape there is a reef, which stretches 2 or 3 cables' lengths off shore, and inside of which frequently proas are anchored. The depth along this coast is considerable, being in places 50 and 60 fathoms, no bottom. Mount Sedano is high and rugged, and from different

points of view has a different appearance, showing sometimes a flat table top, and sometimes separate summits.

MEINDERS DROOGTE is $1^{\circ} 41' 30''$ S., and $114^{\circ} 22' 30''$ E., lies North nearly 6 miles from the north-eastern coast of Java, and consists of coral, part of which is always above the level of the sea. This dry part stretches N.W. and S.E. about a mile; it is very narrow, and resembles at some distance the trunk of a fallen tree.

LIGHT.—An iron pile lighthouse, with three galleries, was constructed in the Meinders Droogte Reef, in 1877, and from it is shown a *fixed bright light*, from a catadioptric (lenses and reflectors) apparatus of the fourth order. The lighthouse is 46 ft. high, and the light, elevated 56 ft., is visible 12 miles off.

Vessels should not approach the lighthouse for 3 or 4 miles on its eastern side, as a 2-fathom patch extends to the distance of $2\frac{1}{2}$ miles from it in that direction. It is separated from the dry reef by a narrow channel. On its S.W. side the lighthouse reef spreads a mile under water, consisting of large detached rocks, carrying 3 fathoms water, while there are 50 fathoms close to them.

About a mile W.N.W. $\frac{1}{4}$ W. from the above reef there is another patch of half a mile in extent, with 2 fathoms water in the shoalest place, and no bottom with 25 fathoms between them.

Lieutenant Rietveld discovered three other reefs bearing W. by N. and W.S.W. $\frac{1}{2}$ W., besides the last-mentioned, at the distance of 1 and 2 miles from the dry part of Meinders Droogte, but with not less than 7 fathoms in the shoalest place, and then 8, 10, and 15 fathoms. Two Dutch vessels were wrecked in 1866, on what were stated to be some detached shoals, but it was found that the *Isis* was S. 30° W., a third of a mile from the beacon, and the *Cornelis Anthony* was on the reef bearing W.N.W. from the beacon. To the southward of them there are 50 and 58 fathoms.

The Eastern Coast of Java, which forms the western shore of the Strait of Bali, will be described in the next chapter, in connection with that strait, and the islands East of it.

The **SOUTH COAST** of JAVA is unlike the North coast, which in most places consists of low plains near the sea, with regular soundings along the coast, and anchoring ground almost everywhere. The South coast is generally high, consisting of steep rocks and rugged points, always covered with foam and breakers, and the whole coast wearing a barren and desolate appearance. In general, great depths will be found in the immediate vicinity of the coast, and although in some places a less forbidding beach and a less depth of water may be found, yet they very seldom afford a fit spot for an-

chorage, as a terrific swell, especially in the N.E. monsoon, lashes with unceasing fury on to its headlands, or, carried by the full force of the ocean, rolls into its ports and havens. Notwithstanding this, the South coast of Java is not altogether destitute of places of shelter, for there are a few bays and harbours which afford, under every circumstance, a safe retreat, and have been made known by the surveys of some eminent officers of H.M.S. navy.

From the small extent in latitude of Java, and the consequent approximation of its North and South coasts, the mountains serve as leading marks equally on either side of the island. Throughout the western monsoon some of these mountains may be discerned at the distance of 15 to 25 leagues, but in the eastern monsoon they are generally concealed by a hazy sky, and therefore not distinguishable till very near. The situation and height of these mountains have been already described in the former pages.

The WINDS and SEASONS are described on page 14 *ante*; the CURRENTS on pages 30, 31.

The SOUTH POINT of Java, in $8^{\circ} 47' S.$, and $114^{\circ} 26' 13'' E.$, is the southernmost projection of the great peninsula which forms the south-eastern extremity of Java. From this point the coast curves in a little, E. by N. for about 8 miles towards the *Zuidoost Hoek*, or *S.E. point* of Java; and again, N.W. by W. for about 6 miles towards *Tambang Point*. This part of the coast seems to be fringed with reefs under water, to a mile off shore, with 20 and 25 fathoms close outside, and with 70 and 100 fathoms of line, no bottom, at 2 and 4 miles distance. Continual breakers will be seen there, and the impracticability of anchoring in such large depths makes it advisable to keep at some distance off this coast, especially in calms and light airs.

GRADJAGAN BAY.—Gradjagan is a large bay to the westward of *Tambang Point*. It is 10 or 11 miles wide, and about 6 miles across; and it is said to afford good anchorages during the eastern monsoon, in 14 to 8 fathoms water. On the western side of the bay, on a small river, stands the village of *Gradjagan*, but neither there, nor in the wells along the beach, is good water to be had; nor can ships' provisions be procured.

From Gradjagan Bay to *Nusa Baron*, or *Baron Island*, a distance of about 16 leagues, the coast is steep, rocky, and barren, forming a chain of small bights, lined with several islets and rocks, which make the approach dangerous. One of these bights, 16 miles to the eastward of *Baron Island*, is called *Vledermuis (Bat) Bay*, but from its rocky shore, large depths, bad shelter in most winds, and continual surf, is unsafe.

Baron or Barung Island.—The S. point of *Nusa Baron* is in $8^{\circ} 32' S.$, and the W. point in $113^{\circ} 15' E.$, and the island is 8 miles in length, and 4 miles in breadth. Its South side is low, fronting the sea, but the S.W., S.E., and E. sides steep, of considerable height, and rocky, and discernible at a considerable distance. The summit of *Mount Semiroe* bears from the East point

about N.W. by W., and its nearest distance from the shore of Java is $2\frac{1}{2}$ or 3 miles, with 20 and 30 fathoms between them. At the N.E. angle of the island there is a small bay, where tolerable anchorage may be found in the N.W. monsoon in 27 fathoms.

N.N.W. $\frac{1}{2}$ W. from the East point, and E.N.E. from the West point of Baron Island, the Java shore forms a projecting land-tongue; 5 miles to the eastward of which lies the village and the river of *Poeger*, where some provisions and water may be procured in the western monsoon.

Dampar Bay.—N.N.W. of Baron Island, the Java coast makes a bay, with 50, 30, and 20 fathoms water. The easternmost part of this bay has a sandy beach, which rises into sandhills or downs; the western shore is rocky, and it is said that dangerous sunken reefs project some distance from the shore. One rock lies 8 miles W.N.W. from the N.W. point of Barung Island.

To the westward of Dampar the country inland is mountainous, and in clear weather a good mark to correct the reckoning is the high hill of Semiroe, the conical summit of which is in $8^{\circ} 8' S.$, and $112^{\circ} 54' E.$, and discernible 20 leagues. The coast forms here several bights, of which the principal, *Pelolot Bay*, bears about S. $\frac{1}{2}$ W. from Semiroe Peak.

Sempoe Island is 8 miles to the westward of Pelolot Bay, and its West point lies in $8^{\circ} 28' 30'' S.$, and $112^{\circ} 39' E.$, or about S.W. by S. from Semiroe Peak. The island is 5 miles long, and consists, as does all the adjacent coast, of high rocks. It is separated from the main by a strait a quarter of a mile wide. From the island of Sempoe the coast runs about 17 leagues W. by N., and consists of a ridge of steep rocks, fronted by an uninterrupted line of surf.

SEGORO WEDIE BAY is one of the most splendid bays of the whole island of Java, as well with respect to its situation and fitness for trade as to the magnificent appearance of its extensive basin, surrounded by its high and picturesque land, or by the numerous islands in its entrance. The latitude of *Tawing*, a village at the northern part of the bay, is $8^{\circ} 16' 40'' S.$

The group of *Limo Rocks* (or Five Islands), which are full 2 miles S.E. of the entrance, are in $8^{\circ} 22' 45'' S.$, and $111^{\circ} 43' 48'' E.$ Outside of the bay, besides the Limo Rocks, there are several other small islands, but all within 3 miles of the shore, and as some of them are elevated from 120 to 400 ft. above the sea, they serve as leading marks towards the entrance of the bay. All these islands, as well as the adjacent coast, are steep-to, rising abruptly out of the water, so that a ship may pass on either side of them when entering the bay. There is said to be a dangerous rock of $3\frac{1}{2}$ fathoms called *Bergat*, with Goenong Island bearing W.N.W. $\frac{1}{2}$ W., Wot Jaloe Point N.N.E., Losari Island E. $\frac{1}{8}$ S., and the West point of Boyo S. by E. $\frac{1}{2}$ E., but this is doubtful.

There are no other concealed dangers in the entrance of the bays, as the Batang and Skel Rocks remain always above the surface.

Segoro Wedie Bay is separated into two bights, *Segoro* and *Damas*; the former is bounded to the southward by the sugarloaf shaped island *Rembeng*, and to the northward by the rock of *Pegat*. In this bight a ship will be sheltered, in 14 fathoms mud, from wind and sea in the eastern monsoon, on the eastern side of the bay. Fresh water may be procured, and communication may be kept up with the shore, by the ships' boats or by proas, as most convenient respecting the cargo.

The anchorages along the western side of the bay are not safe, and, with a southerly wind, even those on its eastern side are not exempt from a heavy swell that rolls heavily in; while with south-easterly gales, sudden gusts of wind come down from the mountains, but they are not of long duration.

Gemah and Boemboen Bays.—About 4 miles to the eastward of Segoro Wedie Bay there is a deep bight, between Wat Jaloe Point and Djong Pakis Point, about $6\frac{1}{2}$ miles wide at the entrance, and receding 4 miles to the northward, where it is divided into two parts by a rocky projecting interval. The western part is called *Gemah Bay*, and the eastern *Boemboen*.

In general the coast is here rocky, but very steep. In the eastern monsoon the bay is wholly open to the wind as well as to a high running sea, except under the south-eastern point of Lemiring, where a ship will find a tolerable shelter close in-shore near the village of Popoh. The northern and western sides of Gemah Bay are unsafe in that monsoon.

Popoh has about 150 inhabitants, and affords good water and wood, but no ship's provisions whatever. Inland communication is here much more convenient than from any of the other bays of the South coast, as it is only separated from the interior by a ridge of hills 300 or 400 ft. in height, which is comparatively low.

Boemboen Bay lies 3 miles to the eastward of Gemah Bay, and extends from *Pakis Point*, upon which stands a round hill of the same name, to *Selo Pajong* (a flat stone), which bears some resemblance, at a distance, to a dismasted wreck. There being no inhabitants, no provisions are to be had; but the bay is unfit to be used in the eastern monsoon.

Soembreng Bay.—From Segoro Wedie Bay the shore stretches West, and W.N.W. 8 miles to Soembreng Bay, forming different points and small bights, though not offering good anchorage.

Soembreng Bay, in about $8^{\circ} 20' S.$, and $111^{\circ} 34' E.$, is far inferior to that of Segoro Wedie, not only in regard to its smaller extent, but in its insecure anchorages and inconvenient landing-places. Two or three miles S.W. of this bay the three rocky and uninhabited islands, *Kalengan*, *Prendjono*, and *Kepanean*, serve as good marks for this or for Pangoel Bay.

It is 2 miles wide at its entrance, and contains no dangers except the

rocks round the small island of Sroyoe, near its S.E. point; and Gebos Reef which bears S.S.E. from that island, about 2 cables' lengths, but it shows itself above water. The depths in the entrance are from 35 to 40 fathoms.

At each end of the sandy beach, upon which there is always a high surf there is the mouth of a river. The eastern one has some rocks beneath the water's edge at high water, and very dangerous when there is the least swell. The water, however, is very good, and fire-wood may be had in plenty there. The communication with the interior is difficult from the steep ridge of mountains.

PANGOOL or Pangoel Bay is about 6 miles to the westward of Soembreng, and 5 leagues from Segoro Wedie; it affords a good anchorage in the eastern monsoon, and is frequently visited by coasting traders, being an open port, but for exports only. Its limits were defined by the Royal Ordinance, March 23rd, 1862, as lying within the line joining the beacon mark for the harbour and the N.W. point of Pulo Kongitan, or North Gialang, and bearing from each other N.E. $\frac{1}{4}$ E. and S.W. $\frac{1}{4}$ W.

At the distance of a mile from the S.E. point of the Bay of Pangoel lie the dangerous rocks of *Sero*; they are partly above water, and though the southernmost is sometimes covered, its high breakers usually show its place. The passage to the eastward, between them and the S.E. point of the bay, is a mile wide, and seems to be free from danger, as all the rocks are visible above water. The common anchorage in Pangoel Bay is at the N.E. side in 7 or 8 fathoms, sand, opposite the Government Salt Storehouse; but as a ship is exposed there to a dangerous swell, and the landing is troublesome, another anchorage, a little more to the southward, in a bight abreast of Kongilan Island, is preferable. This bight is scarcely half a mile wide, but it has good ground, sand and clay, in 7 to 5 fathoms. The bottom rises gradually towards a sandy island, upon which stands the coffee storehouses; and there is a pier, which much facilitates the transfer of cargoes, as well as the intercourse of boats.

From Pangoel the coast stretches to the westward for 24 miles to Patjitan, but forming some bights, of which *Lorok Bay* is the principal, although too small and too much exposed to afford any anchorage for ships. The coast is high, rocky, and lined by a continued range of breakers.

PATJITAN BAY.—Ships bound to Patjitan Bay ought to steer close along the shore, for fear of passing it in the night, the opening not being wide; care is also requisite not to mistake it for Lorok Bay, as they bear much resemblance to each other; but as these bays differ 15 minutes in longitude, an error of this kind is not probable, if any confidence can be placed in the chronometers, and if due attention is paid to the following directions. The middle of the bay lies in $8^{\circ} 15' S.$ and $111^{\circ} 3' E.$ Its limits were officially defined (March 23, 1862) as being inside the line joining the signal flagstaff on Ngamber Point, on the eastern side, and the hillock of Karang Semondo

on the West. The entrance is only 1 mile wide, but inside it expands to 2 miles in breadth and in length; and when it bears N. or N. by E. the bay is open and easily discovered. The fair track into the bay is mid-channel between the two points, on both of which a high surf always breaks. Patjitan Bay cannot be considered as quite safe, or as an agreeable resort, for ships must submit there to continued heavy rolling, sometimes gunwale under, occasioned by the perpetual high southerly swell. Notwithstanding all this, the anchorage has in most places good holding ground, consisting of black sand mixed with clay, in 8 to 14 fathoms. There are but two places in the bay fit for boats to land; the first on the western side, near a small patch of white sand, called *Temperan Beach*; the watering-place is also there, and near it the best anchorage in 8 or 9 fathoms water. The other landing-place is near the eastern point of the bay, in *Megelon Cove*, which, though very small, is large enough to contain a single ship. In this cove there is very little swell, and 12 to 10 fathoms, soft ground; farther in, a deep cleft will be discerned in the land, in the direction of N.E. by E., forming a little harbour, with depths of 4 to 2 fathoms, soft ground, and shoaling gradually to 3 ft., with a small white sandy beach without any surf at all. Both the little harbour and the cove in which it is situated are completely landlocked; but the communication with the chief town, Patjitan, is difficult from the intervening mountains. Patjitan is an open port for exports only.

The fine river *Pantier* falls into the bay at its N.E. side, but it is difficult to enter on account of its bar. The whole North side of Patjitan Bay is lined with a beach of white sand, but the high surf renders it impracticable for landing. It is high water, at full and change, about 3 o'clock, and the vertical rise is a little more than 7 ft.

From Patjitan Bay a barren, woody, uninhabited coast of chalk mountains, and fronted by a continuous line of breakers, stretches W. by N. and W.N.W. It forms, however, some small bights, of which *Hombo*, *Krakal*, and *Baron*, are the largest, but all of them useless to ships. Farther on, from near Brossot to Bollong Head, the shore is not so steep, and the beach rises into a chain of sand downs, about 25 ft. in height above the water. There is no anchorage near this part of the coast.

BAGLEN HEAD, or Meganties Point, lies in long. $109^{\circ} 24'$ E., and is a promontory of steep and inaccessible rocks, said in the old charts to resemble Beachy Head. Landing there is impossible from the high surf; and it is without doubt that there are some sunken rocks near it. Many instances are on record of boats and proas, in endeavouring to land, having been upset, and of large trading proas, as well as other vessels, having been wrecked there.

When coming from the eastward, Baglen Head seems to be surrounded by low land, and is a notable mark for ships bound to Tjilatjap. From the S.E. or southward it has the appearance of an island with peaked hills. It

bears much resemblance to Kambangan Island; but if the chronometers are not much in error, such a mistake is not probable, as the two points differ 24' in longitude.

SCHILDPADDEN or **Turtle Bay** is the long bight between Kambangan Island and Baglen Head. According to the Kambangan pilots, this bight is without dangers, and has good holding ground throughout, except near the range of breakers. Some rivers that discharge themselves into it cause irregular currents, with patches of discoloured water and ripples, and drive out trees and shrubs in abundance. In the eastern monsoon it affords no anchorage for ships, at least not without suffering from much wind and swell, near the village of *Jettis*; for though Baglen Head offers some partial shelter, by which landing is rendered less dangerous than at any other place, yet the promontory does not project enough to afford a safe anchorage. The only good anchorage in the whole of Schildpadden Bay is behind the eastern end of Kambangan Island.

KAMBANGAN ISLAND is separated from Java by a very narrow channel, and it occupies the whole space between the bays of Schildpadden and Penaniong. At each end of the island there is a harbour, Tjilatjap and Tjitando. The latter, to the eastward, is a place of considerable resort for vessels of all sizes; and on the right bank of the river, which empties itself into the former, stands the establishment of Kalie Poetjang.

To the northward the channel expands into Anakan Lagoon, which is fully 4 miles square, but from its extensive mud-banks it is navigable by proas and small vessels only. Kambangan is throughout its whole length high and rocky, but covered with large trees, and stretches from W.N.W. to E.S.E., its extreme length being 15, and its breadth 4 miles.

TJILATJAP or **Chailachap**, near the eastern part of Kambangan, is an open port, and the most important on the South coast of Java. It has increased remarkably in importance since the development of the commerce of the island, being the market for the entire products of the surrounding country. The surveys of the Dutch Government, and the marks established, will simplify its navigation, but a pilot is necessary.

The South point of Tjilatjap lies in $7^{\circ} 44' 40''$ S., and $109^{\circ} 5' 30''$ E.; and the flagstaff on Bollong Head is in $7^{\circ} 46' 12''$ E., and $109^{\circ} 7' 0''$ E., according to Lieut. Rietveld.

Vessels bound to Tjilatjap ought to steer for the eastern end of Kambangan. This island, from the southward, is very conspicuous; the East part being high and terminating in the bluff head of Bollong. In clear weather, and when the mountains are not hidden by clouds, the conical peak of Tegal will be an excellent mark; by bringing its summit N. by E. $\frac{1}{2}$ E., when Bollong Head will be seen in the same bearing; but if the peak should be made on the bearing of North, then the head will rise in the N.W. about 20 miles distant. When approaching to within 5 or 6 miles to the eastward of

Kambangan, some hills will be discerned, which are situated to the eastward of the rivers Serayoe and Adirejo, and near the shore, and have the appearance of an island.

LIGHT.—In order to distinguish the eastern point of Kambangan from Karang Bollong to the East of it, a stone tower was erected, but it was blown down. A new stone tower, 75 ft. high, was erected in 1861. There is now a lighthouse on this part of the island, on Tjimiring Hill, from which a *bright revolving light* is shown at an elevation of 665 ft. above the sea, and visible 20 miles off. It appears as a bright light for 8 seconds in every minute, and is obscured to vessels close under the land.

Besides this outer mark there are three pairs of leading marks or beacons, which show the direction of the inner channel, and two others farther in.

In coming from the eastward, and getting near the island, the rock of Bollong will be perceived, lying 87 yards from the N.E. point of Kambangan Island; this rock, at which the channel begins, is very small, covered with some trees, and hollow underneath.

Lieutenant Rietveld says—When Bollong Rock bears West, at 2 miles distance, good anchorage will be found; when the S.E. point of Noesa Kambangan bears S.S.W., 12 or 13 fathoms, sandy bottom; the East point approached within half a mile, 8 fathoms, sandy bottom; the East point bearing South, 5 or 6 fathoms, sand; and N.E. of Bollong Rock, or of the flag-staff, at low water, 4 fathoms. Inside or to the westward of Bollong Rock, there are again 6 and 8 fathoms, and throughout the whole channel good anchorage ground will be found, as indicated by the chart.

A government native pilot proceeds instantly on board of any vessel on her making the signal for a pilot, which should be accompanied by a gun.

With westerly winds there is no great swell under the lee of Kambangan Island, and vessels to the N.E. of Bollong Head, while waiting for a pilot, may anchor there as soon as they are sufficiently sheltered. In the south-eastern monsoon the pilot will come out, unless the wind and swell are too high, in which case that anchorage would not be safe, and then vessels should stand off and on in the offing, unless they are so far acquainted with the place as to be able to run inside of Bollong Head, where they will be protected from the wind, and not very much incommoded by the swell. While waiting outside, keep Bollong head to the West of S.W., as the outer or sea-bank stretches from the point N.E. of the Hard Sand-bank opposite Kambangan.

Beacons.—The channel within Karang Bollong is shown by several beacons as above mentioned. The principal are two *stone* towers, surmounted with hexagonal iron plates, 25 ft. in diameter, standing near Karang Tenga, and 288 ft. apart; being in one, S. 68° W., they lead up to Karang Rempak.

Two smaller but similar *beacons*, near Banjoe Njapa, 75 ft. apart S. 45° W. in one, lead through the narrows by Karang Rempak.

To the southward of Karang Rempak are two similar *inner beacons*, East and West, 45 ft. apart, leading between Karang Rempak and Karang Tenga.

These three pairs of beacons are alike in form and colour. The higher and inner ones are white, with three black perpendicular stripes. The outer and lower ones are white. When in one the white beacon covers a portion of the inner one, the black stripes on which are thus seen over it.

Besides these beacons there are two pair of *marks* farther in. The first two are on the North side of the channel; they stand on Karang Balie, and point out the end of the sea-bank. Their tops are triangular, the base of the triangle being perpendicular, and their upper points in opposite directions, so that when seen in one, these tops being at equal heights, form a square. Their bearing is N. 53° W., and show the above direction.

Another pair of similar beacons stand on the southern side of the channel, a little to the southward of the former, and are in one N. 60° W. 260 ft. apart. In using these marks, great caution is requisite, to keep the narrow channel, without touching on the banks.

As for a stranger a pilot is necessary, it is needless to give more directions than those which were generally useful previous to the establishment of the beacons in 1861.

The channel up to Tjilatjap is very narrow from abreast of Bollong Rock, where it makes a curve towards the S. W.; and between the end of the Hard Sand and Kambangan it is not 220 yards wide, but on both sides steep-to. In the middle of the channel there are from 4 to 9 fathoms, with a few spots which carry only 20 ft. It is too narrow to work in, and therefore a vessel must be warped in against the wind.

To avoid a rock which bears North of Mount Brambang, or S.S.E. from the coal store on the South point of Tjilatjap, and which carries only 2½ fathoms at low water, keep the point of Sodon in sight, well outside of Agong Point. This point, Agong, in one with the foot of the farthest visible mount, Boaya, leads just upon the rock, Sodon Point being then, of course, shut in. Keep nearest to the Kambangan side, where good anchorage will be found S.S.W. from the storehouses, on the line uniting the pier and the watering-place, and in 5 or 6 fathoms, with a sand and mud bottom. The deepest water will be found on the Kambangan shore, which is also steep-to. A vessel lies here as in a dock, sheltered from all winds, and without any swell; so that since the pier was completed, cargoes are shipped or disembarked with facility.

The bight of Tjilatjap, between the South point and Green point, contains a soft sloping mud-bank, stretching out as far as the pier, and drying at low water spring tides. With the South point of Tjilatjap in one with the flag-staff of Bollong, there are not more than 4 fathoms depth between those two above-mentioned points.

Tides.—The following information respecting the tides, currents, and winds in the neighbourhood of Tjilatjap, has been collected from Lieut. Rietveld's remarks.

The ebb tide runs between the easternmost beacons to the N.N.E. and N.E., and the flood to the S.W., over the Hard Sand-bank, and then partly turns to the W.S.W.

Abreast of Balie Rock, just to the westward of Rempak Point, the ebb tide sets to the North and N.E. over the sand-bank; also the flood to the South and S.W.; and in the West monsoon to the S.S.E., towards Banjoe Japa Rock, in the deepest part of the bight, from whence it follows the westerly trend of the channel. When the Hard Sand-bank is dry, the streams set of course along its edge.

To the westward of Tjilatjap Point the tidal streams follow the direction of the channel; the flood, more than half the length of Kambangan Island, into the Anakan Lagoon, where it meets the flood which sets in through Tjitando Bay and round the West point of Banting Mattie. The ebb runs in the contrary directions, sweeping round the bight of Banjoe Japa, and then N.E. through the narrows, and crossing the Hard Sand, or entering the sea in an East or E.S.E. direction.

The velocity of these streams is variable, $2\frac{1}{2}$, 3, 4, $4\frac{1}{2}$ knots, and the ebb even 5 and $5\frac{1}{4}$ in the rainy season. The time of high and low water is, at full and change, low water, $2^h 35^m$, and high water $8^h 45^m$; the length of the flood being about $6^h 0^m$; and the mean rise and fall about $3\frac{1}{2}$ ft. The greatest range of the tide that took place was 6 feet $3\frac{1}{2}$ inches.

In the morning, before 8 or 9 o'clock, there is usually a gentle land breeze from the West or W.N.W., which enables vessels to go out in the eastern monsoon. Then, in both monsoons, it is calm till 11 o'clock, which allows ships to warp or tow in, during the western monsoon. From the middle of July, however, till the beginning of October, there are continued easterly winds, without the least interruption; and in August and September they are accompanied by heavy rains, and sometimes storms, with no westerly or land breeze at all.

Deep-laden ships waiting outside for a fit opportunity to weigh often suffer severely from the sea. In both monsoons a small steam-tug (perhaps now established) would, therefore, be a great benefit to the trade of Tjilatjap.

The watering place on the Kambangan shore is near the anchorage, and affords good and pure water; a brick aqueduct and reservoir may be the process convenient.

The Island of Kambangan is all rock and wood, there is therefore plenty of fuel, and even trees fit for topmasts; there is also a profusion of game, such as deer, wild hogs, tigers, rhinoceroses, &c. Refreshments are to be procured plentifully at Tjilatjap, but few ships' stores at present. The favourable position of this port for general commerce has so wonderfully in-

creased the number of vessels by which it is visited, and so conveniently is it connected with the rest of Java, that perhaps at no very distant period it will be the principal entrepot of the whole island. On the sea-face of Karang Bollong are numerous caves, in which are found the edible birds' nests so highly prized by Orientals. The nests are formed, by a small species of swallow, of gelatinous seaweed. The caves are from 50 to 700 ft. beneath the hill tops, and inaccessible, except to men lowered by ropes.

The climate of Tjilatjap cannot be considered healthy, especially in the western monsoon; and malignant fevers prevail sometimes after a long drought, and during the rainy season.

At Tjilatjap are residing an assistant resident, a storekeeper, and some civil authorities of minor importance, and a small garrison at Karang Bollong, a military doctor, hospital, &c. The western entrances of Segara Anak, which are formed to the westward of Kambangan Island, and which are visited sometimes by coasting vessels to fetch a cargo of salt for Kalie Poetjang, are very narrow and intricate. Bessek Head, the S.W. extremity of Kambangan Island, lies in $7^{\circ} 41' 45''$ S., and $108^{\circ} 49'$ E.

Tjitando Inlet, the western entrance to the *Segara Arrakan*, or *Anakan Lagoon*, between Kambangan and the Java shore, is 2 miles long, and for a mile 2 cables' lengths wide; and both sides are high, steep, and rocky. *Wre Island* divides the inlet into two parts, and there are also some detached rocks, which make it still more intricate. The opening into this inlet, which lies 2 miles North of Bessek Head, Kambangan, is not discerned easily when coming from the southward, even at a short distance, from its tortuous course and its high shores; but steering a little northward of Bessek Head, *Wre* will easily be distinguished when standing in-shore.

Ships bound to this place in the eastern monsoon should make the land a little to windward of the western end of Kambangan, and then run along towards the Isle of *Wre*, but not forgetting the *Amboer*, a dangerous sunken rock, bearing N. by W. $\frac{1}{2}$ W., 700 yards from Bessek Head.

In the western monsoon a ship should first steer for Cape Mandararie, at the extremity of Penaniong Bay, and bearing W.S.W. $\frac{1}{2}$ W., 19 miles from Bessek Head. From Cape Mandararie the course of E.N.E. leads into the entrance of this inlet.

The steep sides of the Tjitando Inlet intercept all winds which do not blow straight through, and the little room it affords for working, along with its winding form, in most cases render towing or warping unavoidable. A ship must trust chiefly to the tides, and when she arrives at the mouth of the inlet, she should anchor and wait for the flood. It need scarcely be mentioned that with westerly and southerly winds there will be a heavy swell there, and, although the holding ground is good, a ship cannot be said to lie in safety.

With southerly winds, in either monsoon, the entrance of this inlet is very

troublesome and sometimes impossible; but with easterly winds, and no high sea, a ship may anchor near the South side of the Isle of Wré, and wait for a favourable tide.

Between the entrance of the inlet and Bessek Head there is a small bight called *Bator Cove*, which, though only half a mile wide, affords good shelter in easterly winds.

In the passage there is an irregular bottom of gravel and broken rocks, and not till in the Anakan basin will better ground be found, and there only for a small space. When abreast of Banting Mattie, a ship will be landlocked on all sides, and, being no longer exposed to the swell, she may anchor in safety; but she should be provided with chain cables, for the channels being passed entirely by warping or towing, it is necessary to bring up very frequently.

Wré Island, which divides this inlet in two parts, is high, rocky, and densely clothed with trees, stretching N.N.E. and S.S.W. nearly a mile in length, but varying in breadth from 440 to 55 yards. The passages to the East and West of Wré Island are called respectively *Tando* and *Sehel*. It is difficult to prescribe under what circumstances either of these channels should be preferred,—the position of the vessel, the wind and weather, the tide, and other considerations,—must decide the choice of the prudent seaman.

When proceeding through Tjitando or Channel, it should be considered that the reef projecting from Serang Point (which is the western extremity of Kambangan, and bearing E.S.E. from the South point of Wré) is not so dangerous as its heavy breakers would indicate at the first appearance; for outside of this reef there is hard sand ground, with 10 to 14 fathoms water, where, although much exposed to the swell, anchoring is not dangerous. In bad weather, indeed, this reef should never be approached, except to pass it with a leading wind and good headway. Within Serang Point lies the small island of Manok, and W.N.W. from it the dangerous rock of Tongak, which, is, however, visible at low water. The channel leads between this island and some rocks, and is only 328 yards wide, with from 5 to 18 fathoms depth in the middle. Between Tongak and Wré the passage is barred by rocks, and to the depth eastward of Manok there is only from 1 to 3 fathoms depth. Accordingly vessels should steer close along the West side of Manok Island; thence with a N.E. or E.N.E. course in 12 to 20 fathoms depth, along the projecting peninsula of Java, called Siragalo; and pass Cape Mattie with a North or N.N.W. course. *Siragalo Peninsula* is high and steep, and may be passed at the S.E. and East sides at half a cable's length, in 6 and 12 fathoms water; but the Kambangan side should not be approached too near, on account of the rocks of Gomboyok, which are dry at very low water, and bear S. by W. and S.S.W. from Cape Mattie, and E. by

N. and E.N.E. from the point of Siragalo. The eddy of the ebb tide along the Kambangan shore sets right upon those rocks. Cape Mattie lies half a mile North of Siragalo, and half a mile farther, on the Java shore, the river Tjitando falls into the sea. The anchorage off Cape Mattie is in 12 to 20 fathoms water, but a better berth may be found in 7 to 10 fathoms, sandy bottom, about 4 cables' lengths from the mouth of the river Tjitando. There being extensive reefs on the Java shore, and in the Anakan Basin, and the tides and eddies being very irregular, it is advisable to moor the ship.

The Tji Schel Channel to the westward of Wré Island is not so dangerous as that of Tando, and has throughout its whole length, irregular depths, from 4 to 12 and 16 fathoms, gravel and broken rocks. It is necessary, however, to keep in the mid-channel, as there are but 3 fathoms water to the North and N.E. of the Isle of Wré; for 330 yards distance, and to the westward of the peninsula of Siragalo, the Rawit Rocks, which are dry at low water, project 100 yards distance off shore.

This channel is longer than that of Tando, and has the further disadvantage that, when the wind is not favourable, vessels cannot get directly inside of Siragalo, and they are compelled to anchor, which occasions loss of time. In such circumstances it is better to wait to the S.W. of the North end of the Isle of Wré, because the North and East sides afford less shelter, and a nasty swell makes the eastern anchorage very inconvenient. When Siragalo has been rounded, proceed according to the directions for the Taudo Channel.

As both these channels are too intricate for strangers, they should not attempt them, unless in a case of high necessity, without a pilot.

The rise and fall of the water depend much upon the winds, and on the more or less efflux of the rivers which fall into the Anakan Sea; spring tides generally rise 5 to $5\frac{1}{2}$ ft., and the neap tides $3\frac{1}{2}$ to 4 ft. The currents are unequal in force, and the duration of the streams very irregular, except when the rivers are low, the flood and ebb then changing every 6 hours; but while the rivers are full, the flood runs 3, and the ebb 9 hours. At full and change, the times of high and low water are too variable to allow us to give the establishment.

PENANIONG BAY, formed between the western end of Kambangan and Cape Mandararie, is about 6 leagues in extent, and is divided into two unequal parts by the peninsula and point of Penaniong, the eastern Maurits Bay, and the western Vries Bay.

In Maurits Bay, between the peninsula and Kambangan Island, a ship may find sufficient shelter in the western monsoon. When entering Maurits Bay, a rock, perforated like the arch of a bridge, will be discerned, also three rocks in a line, like sugar-loaves; there are no dangers, the soundings decrease gradually till within a mile of the shore, where a ship may anchor,

or nearer if requisite; and fresh water may be procured easily in a small sandy bay.

From Cape Mandararie the coast stretches westward, and then W.N.W. and W. by N., to Cape Anjol, a distance of more than 40 leagues, without meeting between these points anything worth notice. Notwithstanding, there are two points where, at *Cape Santiang*, the coast curves in for some miles; and still more at *Cape Eurum*, about $107^{\circ} 36'$ E. longitude. Near *Boemie Point*, which lies in $108^{\circ} 17'$ E., there are two small islands, the westernmost of which is round, and the other low and more level.

This part of the South coast of Java seems to be free from dangers, although off most of the points there are reefs, on which the sea usually breaks with violence, and in every bight or curve a heavy surf rolls up a white sandy beach. In general, at 4 miles distance off shore, 50 to 30 fathoms will be found; and within that distance a 30 to 12 fathoms line will reach the bottom, which is mostly sand, and tolerably good holding ground, were it not for the very high swell. Vessels beating up along this coast should therefore keep under sail during the night, and not approach too near the shore; but in all cases their ground tackle ought to be kept in readiness for immediate use if required.

From Cape Santiang to the eastward the coast is low near to the sea, woody and cultivated, and of an agreeable appearance, but to the westward of that point to Cape Anjol it is much higher and mountainous.

Coasting along this part of Java, a ship may often correct her reckoning by the summits of the mountains; the positions of the Mounts Patoeha, Tiloe, Papadayang, and Tjikoray, between $107\frac{1}{2}^{\circ}$ and 108° E., have not been yet ascertained with accuracy, but a little more to the westward, in clear weather, the bearings of Pangerango (blue mountains) and Salak, of which the places and the elevations have been determined, will be satisfactory.

CAPE ANJOL, in the old charts called Wine-coopers (Wynkoops) Point, is situated in lat. $7^{\circ} 25'$ S., and long. $106^{\circ} 24\frac{1}{2}'$ E. The point is low, but nevertheless easily distinguished, and from the westward is very conspicuous. Near the point there is a low sandy island, with some trees on it. To the eastward of Cape Anjol the coast bends slightly round to Gadia Point, and has somewhat of the appearance of a wall with embrasures. About 3 miles off shore the depth is 19 fathoms.

From the cape the coast trends suddenly to the N.N.W. for about 3 leagues to Cape Monijel, and from thence N. by E. and N.N.E. 6 miles to Pantyoer Point and Zand Bay, which extends to Cape Ragat, where Wynkoops Bay begins.

WYNKOOPS BAY lies N.E. and S.W., and is entirely open to W. and S.W. winds. Its entrance points, Ragat and Payong, bear N.W. by N. and S.E. by S. $9\frac{1}{2}$ miles from each other; and the whole length of the bay is 10 miles. At the N.E. side of the bay are the government storehouses for coffee

and salt; and their position has been determined by many observations to be $6^{\circ} 59' 30''$ S., and $106^{\circ} 31'$ E., or $17'$ W. of Batavia. The limits of the road, defined officially March 23rd, 1862, are on the North, the parallel of the beacon to the southward of the government storehouses, to southward the parallel of the beacon of Palaboean-Raṭoe, and to the West the 12-fathom (Rynland) line. Wynkoops Bay is an open port for express only. There are many spots of good anchorage ground, but a large funnel-shaped space in the middle channel, leading from the entrance to the store, is more than 100 fathoms deep. Two cables' lengths due West from the stores there are some sunken rocks, with 3 and $1\frac{1}{2}$ fathoms water; and they so fend off the sea, that a communication may always be kept with the shore in boats. The bay is surrounded by high hills, which are clothed with trees to the water's edge. In some places ragged points project, with a few scattered rocks upon them, some visible and others invisible, and reaching half a cable's length or more off shore. The best roadstead is to the southward of the storehouses, and is called the Palaboen Radja. Regular soundings will be found there and along the coast as far as Gambang Point, with good holding ground of clay and sand; and vessels may safely anchor there in as far as 8 fathoms, or from half a mile to a mile off shore.

Between Gambang and Ponnay Points there is also good anchoring ground, but the water is too deep there, being at half a mile from the rocks 50 fathoms, and a little farther 100 fathoms, no ground. Between Ponnay and Ragat Points, the latter being the S.W. point of the bay, there is no anchorage, as there is no bottom at a quarter of a mile off shore with 50 fathoms. In the northern part of the bay vessels may also anchor to the westward of Pamoelang Point, up to the River Tjiboreno. In the western monsoon it is better to anchor in a greater depth, as the usual road is not then so safe, the winds raising a considerable sea. At the South side of the bay, if it be necessary to land in the eastern monsoon, smooth water will be found in some places, where native huts are seen near the beach, or behind the rocks; but at the N.W. side there is then no landing place at all.

At night the N.E. side of the bay is usually obscured by mists; and as the depth in the entrance is too great for anchoring, all vessels should stand off and on till morning; and this they can do without trouble, there being no tides worth mentioning.

With heavy rains the current from the River Mandirie sets to the S.W. along the coast, but is never stronger than three-quarters of a mile per hour; and in the N.E. corner of the bay there is none. From the River Tjiboreno also there is sometimes an outset of 2 miles per hour; but this N.W. part of the bay should never be visited without necessity, for although the ground is good enough, when close in, yet there is much danger there from the breakers.

In neap tides the rise and fall near the storehouses is 2 feet 7 inches, and in the springs about $5\frac{1}{2}$ feet. At full and change the time of high water is 5 o'clock, but the time, as well as the rise, depends much upon the influence of the rivers, which often disturb its regularity.

At full and change there is commonly a change of weather; baffling and variable winds, with sudden squalls, predominate about this time, and the sea runs higher.

The land wind during the night is either N.E. or S.E., according to the side of the bay; the sea breeze sets in usually at 9 or 10 o'clock in the morning, and in the eastern monsoon is not stronger in the roadstead than a topgallant breeze.

The little strength of the eastern monsoon in this bay is probably caused by the high mountains which surround it, and though in the monsoon the western wind blows with force, Wynkoops Bay is visited throughout both seasons by coasting vessels, as well as by large ships, for they are at all times sure of finding a good anchorage.

Ships coming from Europe in the eastern monsoon generally shape their course so as to make the land to windward of Sunda Strait, and it often happens they get first sight of the land near Cape Anjol or of Wynkoops Bay. Should a vessel in such a case require fresh water, it may speedily be procured in Wynkoops Bay, whilst beef, rice, and fowls may also be had there. This bay is also very convenient for shipping produce for Europe.

The only river of importance in the bay is the *Mandirie*, which is of considerable breadth, but a bar at its mouth is an impediment to its navigation, and the stream meeting the swell produces heavy breakers. The other rivers divide in rivulets and small branches, and disperse themselves on the beach without being noticed.

ZAND BAY, $1\frac{1}{2}$ mile to the S.W. of Wynkoops Bay, is about $3\frac{1}{2}$ miles across, between the points of Jaiar and Pantyoer; but further in contracts to $1\frac{1}{4}$ by 1 mile. The N.W. point of the little island of Mandra in this bay is in $7^{\circ} 11' 7''$ S. and $106^{\circ} 25'$ E. The depths at the entrance are irregular, from 40 to 50 fathoms, but just outside, in a line between Ragat and Pantyoer Points, and bearing N.W. $\frac{1}{3}$ W. from Mandra Island, there is a patch with 7 to 14 fathoms. A little inside of the entrance the depth decreases rapidly to 30, 20, and 10 fathoms, mud bottom, and to the north-eastward of Mandra to 7, 5, 4, and 3 fathoms, also mud.

Besides *Mandra*, which is a remarkable rock, surrounded by cliffs, with some trees, there is *Manok*, another small rocky island, less elevated and more oblong.

This bay is essentially rocky, yet in the middle there is a large and good anchoring ground, consisting of mud mixed with sand. Along the north-eastern side of the bay, the rocks do not run off more than a cable's length, except at Jaiar Point, where a reef, visible above water, projects for a dis-

tance of 3 cables' lengths. There are many rocks, both visible and sunken, on the South side of the bay and near Mandra Island; one of them, called the *Castor*, is particularly dangerous, from its being in 11 fathoms and near the anchorage; it carries 2 feet at low water, but is only made visible by the breakers during the sea-breeze, its top not being above 8 ft. in diameter. To the south-eastward of it 43 yards, there is another rock of the same kind carrying $2\frac{1}{2}$ fathoms. From the *Castor* Rock the North end of Mandra bears S.E. by E., Byoek Point S. $\frac{1}{4}$ E., and Pantyoer Point W.S.W. $\frac{1}{4}$ W. The best anchorage for a large ship in Zand Bay is about the middle, in 12 or 13 fathoms water, and with the following bearings: the North end of Mandra Island S.E. by S., Pantyoer Point W.S.W., Jaiar Point N.E. $\frac{3}{4}$ E., and Ragat Point N.N.E. $\frac{1}{4}$ E., or about half a point open of the farthest visible land to the northward. When anchored on these bearings a ship will be N.E. $\frac{1}{2}$ E., about 900 yards distant from the *Castor* Rock, and to avoid that danger it is advisable, when entering the bay, not to bring the North point of Mandra Island to the southward of S.E. by S.

Two sunken rocks lie southward of *Castor* Rock at 2 cables from the shore, and at the distance of 6 and 7 cables westward of the West point of Mandra Island. Another rock lies 2 cables W.N.W. of the West end of Manok Island, and the water East and South of this is dangerous.

At the N.E. and S.W. sides of the bay the mountains approach close to the sea, but the S.E. shore is more even, and high and marshy alternately. The hills and the low land are all covered with high trees, and near the beach with bamboos.

The largest river which discharges into Zand Bay is the *Latoe*, S.E. $\frac{1}{2}$ E. from the isle of Mandra. The vertical rise and fall of the water is there 4 feet 10 inches, and at half tide the river is navigable for boats.

The rivers *Kanter* and *Maringo*, at the eastern side of the bay, in which there are waterfalls of 400 and 200 feet in height, are barred by breakers across their mouths, and consequently not navigable.

To the southward of Zand Bay, between the points Pantyoer and Kapoo, there are two bights, also surveyed, in 1837, by Captain Ampt, and found to contain good anchoring ground, mostly white sand with shells, and mixed with some clay.

From the numerous rocks along this part of the coast these bights are avoided by all strangers, but they are really very convenient to anchor in during the night in the eastern monsoon for vessels bound to Wynkoop Bay, and not being able to reach that road. A ship will then be well sheltered here, and also with southerly or even south-westerly winds, but in the western monsoon it would be very dangerous to anchor in either of them. Both these bights contain wood for fuel, plenty of fish, and turtle in abundance.

Between Kapoo Point and Cape Monyol, which bear S. $\frac{1}{2}$ W. and N. $\frac{1}{2}$ E.

3 miles from each other, there is another bight, with regular soundings of 20, 15, and 10 fathoms, and good anchoring ground, but H.N.M. corvette *Castor*, having remained here a whole day at anchor, found that she was not sufficiently sheltered, and that the surf was so high that landing was deemed almost impossible. In proceeding to the southward, towards Cape Anjol, the greater is the swell and the higher the surf; and although the lead marks from 10 to 40 fathoms, between 4 and 8 miles off shore, the coast to the southward of Kapoo Point affords no safe anchorages. Upon the rocks of Cape Anjol the sea breaks with tremendous force, preventing all intercourse with the coast; and in the eastern monsoon, as soon as a ship comes abreast of this cape, she will find that the wind considerably increases.

From Wynkoops Bay the coast of Java stretches 9 miles West to *Gebang Point*, and from thence it trends more north-westerly. The coast is high and rocky, but becomes more level to the westward at *Hussa Point*, where there is a sandy beach; the whole coast is covered with trees. In the whole of that interval there is but little anchoring ground, and in many places very near the shore no bottom with 100 fathoms line. A little to the eastward of *Hussa Point* there is a bank of soundings carrying from 15 to 30 fathoms water, coarse sand and mud, and extending to *Trowers Island*.

From *Hussa Point*, off which a reef projects a mile to the south-eastward, and between it and *Malang Point*, there are many rocks near the shore, but mostly visible. To the westward of the latter point is the mouth of the *River Tjibinoeangan*, which is said to be navigable for small proas, provided there be no swell. From the point of *Mentoyong*, to the westward of that river, some shoals stretch out full 2 miles to the southward along with some sunken rocks, while, by keeping more to the southward, towards *Trowers Island*, 10, 15, and 17 fathoms water will be found. From the southern extremity of those shoals the following bearings were taken; *Hussa* E.N.E. $\frac{1}{2}$ E., *Sodon Point* W. $\frac{1}{2}$ S., and the western point of *Trowers Island* S. by W. $\frac{3}{4}$ W.

CAPE SANGIAN SIRA.—The coast from thence to *Cape Sangian Sira* and *Java Head*, as well as *Trowers* and *Klapper Islands*, with adjacent depths and dangers, have been described on pages 152, 153, *ante*, in connection with the account of *Sunda Strait*.

THE JAVA SEA.

The space comprised between the islands of *Sumatra*, *Borneo*, *Java*, and *Celebes*, is known by the name of the *Java Sea*. It is more than 800 miles from West to East, and has a breadth of 250 miles. For a great portion of its area there is no proper survey, and therefore it should be navigated with

more than ordinary caution, as defective charts are *stated* to have been one cause of disaster.

The East Coast of Sumatra between Sunda and Banka Straits has been described on pages 181 to 187 *ante*. The dangers which lie to the eastward of the direct track between these two straits will be now described. The *North Coast of Java* has just been given in detail.

The **THOUSAND ISLANDS** (Duizend Eilanden, Dutch).—The Thousand Islands have been surveyed by Lieut. Dijksrink, D.R.N., whose chart was published in 1862. They are about sixty in number, and approach within 2 miles of the Hoorn Islands (page 680), and the northernmost *Pulo Doea* and *North Island* is in lat. $5^{\circ} 24\frac{1}{2}'$, so that they extend $22\frac{1}{2}$ miles in a North and South direction.

Previous to the survey they were but little known. Among the southern groups there are many lurking rocks and reefs; this portion should therefore be carefully avoided, unless well acquainted. The channel between their South end and the northern side of the Hoorn Islands appears to be quite clear, and there are numerous passages between them to the northward, but, as before said, they should not be attempted by a stranger.

The northern part of the Thousand Island group is described on pages 183, 184.

The following are the dangers to the eastward of the Thousand Islands:—

Siren Rocks, reported in 1838 as a patch of breakers, in lat. $5^{\circ} 19' 30''$ S., long. $106^{\circ} 34' 45''$ E., has since been searched for carefully without any success, and its existence is now considered as disproved.

ARNEMUIDEN ROCK lies East of the North Watcher. As the position of the latter island has been altered in latitude and longitude, it is probable this may account for the differences in the positions of this well-determined shoal, which is in lat. $5^{\circ} 12' 30''$ S., long. $106^{\circ} 42'$ E.

Molenwerf Shoal, a doubtful danger, is marked in lat. $5^{\circ} 13'$ S., long. $106^{\circ} 50'$ E. **Etna Shoal** lies $4\frac{1}{2}$ miles southward of it.

The **Etna Shoal**, so called by Lieut. Groll, although covered by the sea, was very probably not far below its surface, as the swell occasionally broke upon it. It was impossible for a boat to go upon the shoal to sound, but close to were 20 fathoms mud, with much shells and coral sand. At $1\frac{1}{2}$ cable's length there were 13 fathoms, same bottom; although less sand when farther from the shoal. The position was determined to be $5^{\circ} 17' 18''$ S., and $106^{\circ} 55'$ E. Lieut. Groll found no other danger.

BROUWERS SHOAL has been determined by the Netherlands survey to be in lat. $5^{\circ} 17' 30''$ S., long. $107^{\circ} 0' 20''$ E., about 8 miles north-eastward of its position on the old charts.

The **SOUTH WATCHER**, or **Pulo Ampel**, or *Peniekie*, lies in $5^{\circ} 42' 47''$ S., and $106^{\circ} 42' 17''$ E., and bears N. $\frac{1}{3}$ W. 13 miles from Dapur Island, from whence it is just visible, but from the deck of a large ship the island may be

discovered in clear weather at the distance of 5 or 6 leagues. It is small, thickly covered with wood, and surrounded by a reef which projects to the N.E. about 450 yards, and to the South and West about 100 and 220 yards. This reef is very steep, with 8 fathoms close, and at two boats' lengths 24 and 23 fathoms, mud; it cannot, therefore, be approached by the lead. From the deck of a ship off the South Watcher, Dapur and the Thousand Islands cannot be seen, but from her tops they will be just visible.

- **NASSAU** or **Kroya Bank** was surveyed, in 1841, by Lieut. T. Groll, in H.N.M. steamer *Etna*, with great accuracy. It bears N.E. $\frac{1}{2}$ N. from Dapur Island, S.E. $\frac{1}{4}$ S. from the South Watcher, and N. by W. from Edam; in $5^{\circ} 49' S.$, and $106^{\circ} 49' E.$ The natives, who are commonly very well acquainted with the existing dangers, assert that there are no other shoals than this ledge between Edam and the South Watcher, which need be avoided by ships, although Lieut. Groll found some patches with $5\frac{1}{2}$ and 7 fathoms to the westward of Nassau. The shoalest ledge upon the *Nassau* was $1\frac{3}{4}$ fathom, according to Lieut. Groll, and round it 3 and 4 fathoms, coral bottom. It stretches E.N.E. and W.S.W. about 300 yards, with 17 fathoms very near it, and a little farther off, 16 fathoms, mud with shells. From this ledge Alkmaar in Batavia Roads was just concealed behind Edam, so that they afford a fair mark to avoid it by keeping these islands well open of each other.

A 6-fathom patch lies S.W. 25 miles from Nassau Bank.

A shoal of from 20 to 7 fathoms was sounded on by Th. Schut, of the Dutch frigate Maria Elise, Dec. 11, 1861. Its position is given as $5^{\circ} 50' 15'' S.$, long. $107^{\circ} 35' 30'' E.$, or about 43 miles W. by N. of Rackit Island light.

DIRECTIONS.—Ships leaving Batavia and bound to Banka Strait, ought to steer betwixt Rynland Shoal and the eastern reefs, and proceed on a northerly course through the Great or Edam Channel; this course leads between the Hoorn and Haarlem Islands, and Monnikendam sandbank on the port side, and Leiden, Enkhuizen, Alkmaar, and Edam on the starboard side, but avoiding the shoals near Dapoer and Edam.

From Edam steer for the South Watcher, avoiding the Nassau Ledge by keeping Alkmaar open to the westward of Edam. From the South Watcher do not steer too much to the westward towards the Thousand Islands, especially in the eastern monsoon, when a ship is liable to be driven in a calm amidst unknown dangers, where there is sometimes a current of 4 miles an hour. The South Watcher may be passed on either side, but off the North Watcher, beware of the Arnemuiden, and other shoals more to the eastward. To avoid them with certainty, give the North Watcher to the eastward a berth of 6 miles. A ship may also pass the North Watcher on its western side, but then she must borrow towards it, so as to clear the Two Brothers, and the Lynn Shoal, and to give a sufficient berth to the

Brouwer Bank. From the North Watcher shape a course for Lucipara' about N. by W.; but in the western monsoon, with S.W. and westerly winds, it will be prudent to steer more to the westward, borrowing toward the banks which project from the Sumatra coast as far as to 11 to 9 fathoms, but they should not be approached nearer than 9 fathoms, particularly in the night.

Ships that have passed through Sunda Strait, and are bound to Banka Strait, should steer a direct course N. by E. for the Two Brothers, after having passed also the Zutphen Islands and North Island, according to the directions before given. It is prudent to keep within a moderate distance of the Sumatra coast, in order to avoid the shoals in the offing; 11 or 12 fathoms is a good depth. With a working wind, a good mark in daylight is, when standing in-shore, to tack when North Island is just in one with the highest Zutphen Island; the depth will then be generally 7 or 8 fathoms, and a large ship should not risk a less depth when working between North Island and the Two Brothers.

The Islands and Reefs which lie off the North coast of Java to the eastward of Batavia have been described in previous pages. The following are between it and the South coast of Borneo.

The **SOLOMBO ISLANDS** are but little known. *Great Solombo*, or *Nusa Lumbo*, is about 100 miles E. $\frac{3}{4}$ N. from Bavian Island, described on page 704. It is said to be 5 or 6 miles in length from North to South, where it terminates in a high, flat-topped hill, about 550 ft. high, visible 24 miles off. This hill is in lat. $5^{\circ} 33'$ S., and *about* long. $114^{\circ} 27'$ E. The greater part of the island is a long projection of low land.

The middle island, or *Little Solombo*, is about 3 leagues to the northward of the former, its eastern extremity bearing N. $\frac{1}{4}$ E. from the hill of Great Solombo. Its centre is in $5^{\circ} 21\frac{1}{2}'$ S., $114^{\circ} 28'$ E. This island is neither so large nor so high as the former, and between them the channel is 6 miles wide, and considered to be safe. The North coast of Little Solombo should however, be approached with caution, as Capt. Millbank, of the *Shun Lee*, in 1869, saw what he thought to be the wreck of a barque on some rocks, off the N.W. side of that island.

Arends or *Arentes Island*, the northernmost of the group, is in $5^{\circ} 1'$ S., and $114^{\circ} 35'$ E., and bears N. by E. $\frac{1}{2}$ E., about 9 leagues from Little Solombo; a little islet lies off its South end. The channel between it and Little Solombo seems to be safe, but tide rips and a reef with fishing stakes is marked on the chart as extending 7 miles E.S.E. of its S.E. end. The South end of Arentes may be passed at the distance of 3 or 4 miles, but the western side should be approached with caution, on account of a rocky spot, upon which an American ship struck in January, 1794, the captain reporting that he had 18 fathoms just before and after striking, and one cast of 5 fathoms immediately after the shock; the track of 18 fathoms should therefore be

avoided. This rock must lie about 3 leagues West from Arends, but its position has not yet been accurately ascertained. Fishing stakes extend 4 miles off the N.W. end of the island.

The **Rosalie Rock** was discovered, in 1823, by Capt. Baptist, of the Dutch Indian ship *Rosalie*, on her passage from Sourabaya to Macassar. According to his statement, it lies in $5^{\circ} 56'$ S., and 8 leagues S.S.W. $\frac{1}{4}$ W. from Great Solombo, which brings it in longitude $114^{\circ} 15\frac{1}{2}'$ E. Rosalie Rock has the appearance of a small island of reddish sand, with one tree in the centre. It seemed to be about 6 ft. above the sea, and all round it small rocks above water, which was very deep, as the ship was at anchor in 42 fathoms, at 1 mile distant.

The islands and shoals which lie still farther to the eastward will be described in connection with the Strait of Macassar hereafter.

The **SOUTH COAST** of BORNEO is but little known, and has not been surveyed. Therefore what follows respecting it must be received with all caution. It was made to accord with the charts drawn up by the late Mevill van Carnbee and W. F. Versteeg, 1859.

TANJONG SAMBAR, the S.W. headland of Borneo, has been described in connexion with the Carimata Strait, in a former portion of this book, page 281. To the eastward of this, *Yeritam* or *Ajer Hitam Bay* extends for 22 miles, a small river of that name falling into its head. *Tanjong Ajer mata* is its eastern limit, to the East of which is a considerable river, the *Kwala Djellei*, has a broad entrance. Off the coast to the East of this, shoal water extends 20 miles seaward, and facing the western limits of the *Bay of Kotaringin*, the name of the Dutch province, and the river which falls into it, at 40 miles East of the mouth of the Djellei or Dieley. The *Koemai River* enters the next bay to the eastward, and the coast here assumes a southerly direction for 35 miles, terminating in *Tanjong Poeding*, or *Flat Point*, in lat. $3^{\circ} 30'$ S., long. $111^{\circ} 55'$ E.

From Flat Point the coast trends to E.N.E. for 70 miles to *Sampit* or *Pandaran Bay*, which from the map appears to be an extensive inlet, and is an open port for exports and imports; *Tanjong Malalajer*, lat. $3^{\circ} 30'$ S., long. $113^{\circ} 30'$ E., is 30 miles S.S.E. from the entrance to this bay, and at about 30 and 42 miles respectively to the E.N.E., are the mouths of the *Great Dayak* or *Kohajau River*, and the *Little Dayak River*. Off these rivers there is a very extensive sand-bank, said to extend for 20 miles and more off the land, and beyond this are some shoal patches 10 leagues from the coast. One of these, in lat. $4^{\circ} 0'$ S., long. $113^{\circ} 50'$ E., has $4\frac{3}{4}$ fathoms, with 8 fathoms close to it, and the land of Borneo is just visible from it, bearing N.E. $\frac{1}{4}$ N. All these remarks, however, are of the most vague description.

BARITO or **BANDYER RIVER**.—*Bandjermasin*, a port of call for the Netherlands' India Steam Navigation Company's boats, and an open port for exports and imports, was once a very important pepper port of the Dutch,

and stands about 13 miles up the Barito River, about 23 miles eastward of the Little Dayak River. It is the port of a principality acquired by the Dutch in 1785, and is now held by that nation. The river has been surveyed by P. H. Wedden, and the following directions by Capt. Godtare, adapted to that chart.

The entrance of the river is formed by *Tanjong Boerong* on the East side, and *Tanjong Bedalla Toea* on the western, these being $2\frac{3}{4}$ miles apart. At about a mile N.E. from the latter point is another, called by Captain Godt *Bearing Point*, being the visible extreme, used as a mark for sailing over the bar. This bar is 7 miles to the S. 35° E. of *Tanjong Bedalla Toea*. The channel lies between banks of hard clay and sand to the eastward, and of mud and clay westward, and the bar has from 11 to 16 ft. at high water, the bank on the western side being nearly dry at low water, and another rock lies near the bar on that side.

Buoys.—Two *white* on the eastern and two *black* buoys on the western side were placed, in 1876, to mark the channel across the bar of the Barito River. The outer black buoy, in lat. $3^{\circ} 39' 33''$ S., long. $114^{\circ} 25' 54''$ E., is in 7 ft. water, S.S.W. from the West entrance point of the river; the outer white buoy, in 7 ft. water, three-quarters of a mile N.E. by N. from the black buoy. About $1\frac{1}{2}$ mile within these outer buoys, and to the N.N.W. of them, lie the two inner buoys. The channel within these buoys is marked by eight ball beacons on the port side and five ninepin shaped beacons on the starboard side.

To enter, bring *Bearing Point* to N. 35° E., and *Tanjong Boerong* N. 58° E., and you will then be on the outer edge of the bar in 3 fathoms water. From hence steer N.E. $\frac{1}{2}$ N. in 16, 15, 13, and 14 ft. water, to bring *Bearing Point* N. 34° E., when *Tanjong Boerong* bears N. 66° E.; then steer N.E. $\frac{3}{4}$ N. until the former bears N. 25° E., and the latter E. by N., when you will be inside the bar in from 15 to 20 ft., and should steer N.E. $\frac{3}{4}$ N. for the mouth of the river, and clear of a narrow spit that projects a considerable distance from *Tanjong Boerong* to the westward. *Bearing Point* may be approached to within 30 or 40 fathoms if necessary. From hence local knowledge is necessary to take a ship up to *Fort Van Tuyl*, at the South end of the town. Mid-channel is the best track to keep clear of the trees, and to avoid the eddy tides near the points.

CAPE SALATAN, or *Tanjong Soengibaroe*, of the Dutch charts, in lat. $4^{\circ} 10'$ S., long. $114^{\circ} 41'$ E., is the southern point of Borneo, and the high land over it, called *Gunong Ratoos*, appears like islands when seen 10 or 12 leagues off. This high land forms a ridge of peaked hills, stretching eastward toward *Pulo Laut*, but close to the sea the coast is low and wooded. The district is called *Tanah Laut*, and is very populous.

The coast hereabout may be approached to 10 fathoms, but 14 fathoms is a good depth to preserve in passing *Cape Salatan*, and from hence towards

Pulo Laut it may be approached with caution to 7 or 8 fathoms; the former ought not to be passed at a greater distance than 8 or almost 10 leagues, on account of Arentes Island, on the South side of this passage, and a rocky spot to the westward of that island.

Dangers.—Between Arends Island and Pulo Laut there have been several isolated dangers reported. *Bampton Bank*, a small patch of 2 fathoms, lies 20 miles N.E. $\frac{1}{2}$ N. from Arends Island. At 15 miles northward of this danger is a 4-fathoms patch, surrounded by depths of 14 and 15 fathoms. It was discovered by Capt. Duaud, and named by him Oiseaux Bank. *Duaud Bank* bears from Cape Salatan S.S.E., distant 22 miles. There have been no dangers reported between these and Little Pulo Laut Islands, but at 5 miles off Tuka Point the Dutch S.S. *Coehoorn* reports having struck on a 2-fathoms patch in lat. $2^{\circ} 58' S.$, long. $115^{\circ} 25' E.$ At $11\frac{1}{2}$ miles N.E. by E. $\frac{1}{2}$ E. from this is a *sunken rock*, 4 miles off the land and 11 miles beyond this a $2\frac{1}{2}$ fathoms bank was discovered in 1869 by the S.S. *Betsy*, 5 miles off the land and 15 miles S.W. $\frac{1}{4}$ W. from the West entrance point of the Pulo Laut Strait.

LITTLE PULO LAUT, or the Lauriot Islands, are mostly high, and extend 9 miles from N.W. to S.E. The S.W. island, *Matta Siri*, is in lat. $4^{\circ} 51' S.$, long. $115^{\circ} 43' E.$, and about 850 feet high. The shore is rocky. On the N.W. side of the northernmost island, the *Laurel* filled up her water from some deep holes or wells under the trees at the foot of the mountains.

Moeso Siri, or the *Moreses*, in lat. $4^{\circ} 23' S.$, long. $115^{\circ} 50'$, is a group of three islands, the highest of which lies 15 miles N. by E. of the northernmost of the Little Pulo Laut cluster. It is formed like a pyramid, and has a regular peak at the summit.

There are three or four islets or rocks above water contiguous to them; they lie near each other, the largest in the centre. They ought not to be approached nearer than 3 miles in the night, for the outermost rock is about $1\frac{1}{2}$ mile to the southward of the high island, and is on with the body of it, bearing N.N.W. $\frac{1}{2}$ W.

PULO LAUT, which lies off the S.E. end of Borneo, and forms the S.W. side of the Macassar Strait, is 56 miles long from N.N.E. to S.S.W., and from its South point a reef of breakers projects almost to the nearest island, *Pulo Koenyit*, which is small and bold-to.

The **STRAIT of PULO LAUT**, which separates that island from Borneo, is said to be too narrow for large ships, but may be followed with a commanding breeze, and in daylight. The southern portion of it was surveyed by the Dutch officers A. H. Huijsman and G. A. de Lange, in 1848, and this shows a clear channel, with from 6 to 4 fathoms throughout its southern half; but beyond this, to the northward, it is more intricate. We have no available directions for it.

CHAPTER XVII.

ISLANDS AND PASSAGES EASTWARD OF JAVA.

OUR knowledge of the islands eastward of Java is not so exact as that of other parts of the Indian Archipelago, but much has been done through the zeal of the Dutch officers, who have been stationed here. They have recorded a vast number of excellent observations, and these have been collected by the Dutch commission for the improvement of the East India charts. Among these officers who may be cited as foremost in this good work, are P. Baron Melvill van Carnbee, Rietveld, Boom, J. Van Gogh, J. M. J. Brutel de la Rivière, P. F. Uhlenbeck, T. Van Capellen, R. F. de Sciiff, C. Bosch, &c., &c. These remarks have been collected in the Directions drawn up by Lieut. H. D. A. Smits, of the Dutch navy, 1848, which have been followed here.

BALY ISLAND AND STRAIT.

The Island of Baly or Bally is 82 miles long East and West, and about 50 miles in its greatest breadth, containing about 1,700 square geographical miles. An excellent and elaborate account of it and the adjacent island of Lombok, has been drawn up by Melvill van Carnbee, and published in the *Moniteur des Indes*, 1846.

It is very mountainous; a ridge, apparently a continuation of the Java-nese ranges, traverses nearly the whole of it from West to East. One of its peaks, in the eastern part, far overtops all the rest, and is seen very far off at sea, 70 to 80 miles in the wet or rainy monsoon, when the air is clear of clouds or fogs. In the opposite season its head is usually enveloped in clouds. This *Peak of Baly*, properly *Gunong Agong*, or *Agoeng*, lat. $8^{\circ} 20'$ S., long. $115^{\circ} 28'$ E., is 11,326 ft. high, inferior only to those of the Java peaks, and nearly equal to that of Tenerife. The island is chiefly volcanic, and resembles in a remarkable degree the geologic formations of the East end of

Java. The South point, or *Tafelhoek*, is a calcareous formation of very recent geological origin, according to M. Zollinger. Besides Agong, which broke out in 1843 into a state of activity, several other mountains are still showing the effects of that volcanic agency which has manifested itself in such terrible forms here. Earthquakes, as may thus be supposed, are very common. The most disastrous was that of November 22, 1815, seven months after the famous eruption of Sumbawa, which covered Baly with a bed of ashes more than a foot thick. That of November 22nd was felt as far as Sourabaya, and lasted an hour; and one of the mountains which lie in the rear of Beliling, on the North coast, was overturned and rolled down, and a subterranean lake burst out with incredible fury.

From its elevation, Baly is abundantly provided with water by numerous streams. Rice is consequently the chief article of cultivation. The people are a mild and tractable race, of industrious agricultural habits, and, on the coast at least, chiefly profess the Hindoo religion. The island is very populous. M. Huskus Koopman, the Dutch commissioner, in 1842, estimated it at 700,000, or more than 480 to the square mile, a remarkable density of population, which is a powerful argument as to their industry. This small island is divided into eight independent principalities, each of which abuts on the coast. It is very favourably placed for commerce and revictualling. Its trade is chiefly in the hands of Chinese and Buginese. The Dutch formed a trading post at Kotta, in the South Peninsula, in 1839, but it was given up. Owing to the frequent insults to the Dutch flag, the governor ordered an expedition to Baly in 1846; this attacked and took Beliling on the North coast, on June 28th in that year, after a strong resistance. Their bravery was forgotten on a subsequent attack, when the Dutch force was compelled to retreat. But the ultimate result was to cause the native princes to respect Dutch commerce, to endeavour to suppress piracy, and consent not to allow any European power to become possessed of their territory.

The **NORTH COAST** of **BALY** runs generally East and West, and belongs to the States of Beliling and Karang Assem, the latter occupying the East end of the island.

CAPE PASSIER, before mentioned, the N.W. point of Bali, forms the narrowest part of the strait, which, between Baly and Java, is here only $1\frac{1}{2}$ mile wide. A reef projects about half a mile from Cape Passier, and is marked by a *white* buoy, but the Java shore is steep-to, and may be approached without fear.

The coast to the eastward of this cape has three places to which vessels resort, Tebunkus, Beliling, and Sangsit, all on its western part. They can only be visited in the eastern monsoon.

St. Nicolas Bay lies 5 miles eastward of Cape Passier. The northern part appears to be free from dangers, but it has no convenient soundings; in the

southern part two dry reefs are seen, and it is probable that there exist other dangers thereabout.

Minjangan or *Herten Island*, contiguous to the shore, to the westward, is surrounded by a reef, which projects far to the eastward and westward. There is a dry patch of coral and sand off its western end, and at low water the whole reef is often visible. In the passage between Minjangan and Bali soundings may be had in 12, 15, and 20 fathoms, but there is a sunken rock in the strait S.S.E. from the West end of Minjangan. Ships may shelter in the strait during the western monsoon.

Banju Wedan Bay, to the eastward of St. Nicolas Bay, is nearly closed by a reef, and turns immediately to the eastward; proas may lie here hidden from the sea view. There is a warm spring at its head.

Gunong Sandan is 6 miles East of Banju Wedan Bay. It is close to the shore. The low point to the westward of Mount Sandan has a large reef running off W.N.W. and W. by N. along the shore, inside of which numbers of piratical proas may lie concealed.

Gunong Gondol, or *Mount Goendol*, 4 miles eastward, is a small peaked and bare hill, which may be known by its yellow aspect, standing on a low land-tongue projecting to the northward, so as to form a safe sheltering place, and at the same time a good lookout for the pirates.

To the northward of Mount Goendol there is an extensive reef of an oval shape, with 20 fathoms near its northern edge, then 9, 4, 3, 2, 3, and 7 fathoms rocky and sandy bottom, and 24 fathoms to the south-south-westward, which enables ships to pass (having a fair wind) between the reef and the shore, so as to overtake the pirates in their sheltering place on the East side. From the reef, Mount Goendol bears S.S.W., Plakkie Point, West-northerly, and Mount Sandan W. by N. nearly. Another small reef, with 4 and 6 fathoms, and 18 fathoms on its northern edge, bears N.W. by W. from Mount Goendol, distant $2\frac{1}{2}$ miles.

There is a single rock carrying 7 and 9 fathoms, with Mount Goendol bearing S.E. by E. $\frac{3}{4}$ E., Plakkie Point S.E. by E. $\frac{1}{4}$ E., and another more extensive reef stretching E.N.E. and W.S.W., with 4, 3, 2, $1\frac{3}{4}$, 4, and 7 fathoms on it, Mount Sandan bearing W. $\frac{3}{4}$ S., and the North point of Minjangan or Herten Island W. by N.

From the N.W. points of two other reefs, in soundings of $2\frac{3}{4}$ and 9 fathoms, Mount Sandan bears S.W. $\frac{3}{4}$ S., and the East point of St. Nicolas Bay W. $\frac{3}{4}$ N. The innermost reef is partly dry.

From the East point of another extensive reef, in $2\frac{3}{4}$ fathoms, Mount Sandan lies S. $\frac{1}{4}$ E., and the East point of St. Nicolas Bay W. $\frac{1}{2}$ N.

From the centre of a smaller reef, south-westward of the last mentioned, in 3 fathoms, Mount Sandan was found to bear S.E. by S., and Mount Goendol E.S.E.

Tebunkos.—The road of Tebunkos, or Teboenkoes, in $8^{\circ} 7' S.$ and $115^{\circ} E.$,

is said to be the best on the North coast of this island, being sheltered from N.W. and North winds by a dry coral reef, which fronts the shore at the distance of 380 yards, and inside of which first-rate ships may lie in safety, but they should moor W.S.W. and E.N.E. in mid-channel, so that vessels may swing clear of the shoal water on both sides. Between Antoran Point to the eastward and Cape Koanjer to the westward, many dangerous reefs project to a considerable distance from the land.

Bound to Tebunkos, keep the reef, which may be known by a small house and some trees on it, bearing South; round it very closely on either side, and moor to the southward of it in 13 or 14 fathoms.

The ebb runs westward, and the flood eastward; generally only one flood and one ebb tide are observed in 24 hours. At full and change of the moon it is high water at 5 o'clock, and the rise of the tide is 6 or 7 feet at the springs.

Beliling and Sangsit Roads.—Beliling or Bleleng, the chief village of the N.W. principality, is 7 miles E.N.E. of Tebunkos, and Sangsit is 3 miles farther on in the same direction.

There is anchorage all along the shore between Beliling and Sangsit Points, at $1\frac{1}{2}$ or 2 cables' lengths off shore, on a steep bottom of coral and sand. During the western monsoon the anchorage opposite to the Beliling fort is considered unsafe; it is better to lie then inside of the reef to the westward of Sangsit Point, which is about 4 cables' lengths distant from the latter, being steep-to, and having patches of only $1\frac{1}{4}$ fathom. At Beliling Point there is a steep reef, of which several rocks are visible above water. With the river bearing South you may stand in for the anchorage without fear. Beliling River will be known by the proas lying inside; its entrance is in $8^{\circ} 5' 30''$ S.

Light.—A red light was first shown at Sangsit in September, 1877.

The N.E. Coast of Bali is still more unsafe than that to the westward. The principal points being *Koeboe* and *Tjoelik*, at 18 and 6 miles respectively, from the East point of the island.

To the eastward of Sangsit the high mountains nearly reach the coast; near Tianiar the chain is split by a deep ravine; it then passes the village of Tiolik, and forms, under the name of *Mount Seraja*, the bold eastern extremity of Bali, sends out ridges southward towards Labuan Amok and Padang Cove, and slopes down to the southward in low, cultivated land. The coasts are steep-to on either side, though close inshore some anchorage may be found in considerable depths.

Mount Agung, or, as it is usually called, the Peak of Bali, is the highest point of the chain of mountains which terminates in the East point of Bali; its summit is often visible at the distance of 80 miles. The most remarkable summits of the chain are the four peaks of Mount Tabanan, about the centre

of the island, and the volcano Bator, although the latter is not very high, the smoke issuing from its crater may be perceived at a great distance.

Cape Karang Assem, the eastern point of Bali, is in about lat. $8^{\circ} 21' 30''$ S, long. $115^{\circ} 41'$ E., and is formed by the eastern slopes of *Gunong Seraja*, a mountain more than 4,000 ft. in height. *Kubu Manak*, a small island, lies off its eastern extremity.

Oedjong, the landing place for the chief town of the Karang Assem state, is 6 miles S.W. from Manak Island.

There is anchorage near the village of Oedjong in 20 fathoms, 3 cables' lengths off shore, the village and the peak bearing N.W. $\frac{1}{4}$ W., the N.E. point of the land N.E. by E., the islet of Asam S.S.W. $\frac{1}{2}$ W., and the East point of Pandita Island S. $\frac{1}{4}$ W.

Green or Groen Island is 5 miles farther to the S.W. The passage inside it is safe.

Amok Bay, or *Labuan Amok*, is very safe during the western monsoon, the bottom being not so steep, and there is little surf on the sandy beach; the soundings decrease regularly from 35 to 10 fathoms at 2 cables' lengths from the beach.

Padang Cove is separated from Amok Bay by Castor Point, and is nearly filled up with reefs, between which there remains only a small gullet about 82 ft. broad, where small craft may find anchorage in $2\frac{1}{2}$ or 3 fathoms.

Castor Point, between the cove and Labuan Amok, may be known by a temple standing on it. The village *Padang* is seen in the back ground, between tufts of trees. The S.E. coast of Bali is safe to approach, but there are no soundings near it, unless close in shore. The anchorage near Lebi, at 9 miles W. by S. of Padang, is said to be safe in both monsoons, and ships may anchor there in from 15 to 8 fathoms, abreast of the sandy beach.

Panteh Timor, or the eastern road of Bali Badong, is safe during the western monsoon; ships may moor inside of the reefs along the shore. The entrance between the reefs, however, is very narrow and intricate, and as the tides set with great velocity over the points of the reefs, it is dangerous to haul a ship inside.

From *Benoa Point*, the southern side, on which is a flagstaff, a reef runs south-eastward, the outer edge of which bears about North from the Brothers, two small islands lying close to the shore. The low island of Serangan extending between the points of the bay, is lined by a broad reef, which is steep-to, and has a sharp point projecting to the southward. Schooners and small craft may haul inside through the channel between these reefs. At full and change it is high water about 11 o'clock.

The Pandita, *Banditi*, or *Salombo* Group, situated between $8^{\circ} 39'$ and $8^{\circ} 48'$ S., and $115^{\circ} 22'$ and $115^{\circ} 31'$ E., appears from the southward as high table land, with a small peak on its East end. It is dangerous to approach these islands, as the tides run there with tremendous rapidity.

The channels on both sides of the group are safe, but the western is to be preferred, as the eddies are not so violent there, and there being anchorage near the Baly shore. There is also a patch, with soundings of 30 fathoms, on which ships have stopped a tide in fine weather, Kassoemba (which may be known by large store houses on the beach) bearing N.W.

TAFEL HOEK, or Table Point.—The southern part of Baly, called Tafel Hoek, is a high peninsula, joined by an isthmus to the body of the island; the isthmus, upon which there are two viliages, *Kotta* on the North side, and *Toeban* to the south-eastward, is barely a mile broad. On both sides of it there are anchoring roads, of which the westernmost is used during the eastern monsoon, and the other, just alluded to, during the opposite monsoon.

Panteh Barat.—The western road, or *Badong Bay*, is not, however, quite safe during the eastern monsoon, on account of the heavy rollers which enter about full and change of the moon, nor after very blowing weather; these rollers often cause the chains to part, or oblige the vessels to leave the road, and therefore they ought never to moor there.

Coming from the westward, a high tree, standing near *Toeban*, may be seen long before the low land can be discerned, and soon afterwards the flagstaff and a small house, the lower part of which is whitewashed. The shore is covered with heavy breakers, which project a long way opposite to the flagstaff. The anchorage is unsafe on account of the heavy swell which comes round Tafel Hoek, very far from the village of *Kotta*, and the landing is dangerous. Westward of the reefs are soundings in 12 and 15 fathoms, and close to their edge 6 and 7 fathoms. There is a bar W. $\frac{1}{2}$ N. from the flagstaff, with $2\frac{3}{4}$ (or $1\frac{3}{4}$) fathoms on it, at low spring tide; there remains a passage with depths of 3 and $3\frac{1}{2}$ fathoms between the bar and the reef. The bar diminishes greatly the swell of the sea, and the anchorage inside is safe, although lying in the midst of breakers. It happens, however, that vessels lying too near the bar, or when the breakers on it are very high, are sometimes obliged to leave this anchorage, and run for shelter to the northward of the bar, where the breakers do not reach. By keeping the high tree, which stands to the northward of the flagstaff, between E.S.E. and S.E. by E., you may work in-shore till in $5\frac{1}{2}$ fathoms; but, if not acquainted with the place, it is prudent to anchor in 8 or 10 fathoms, with the flagstaff bearing S.E. by S., and to send for a pilot.

It is high water at full and change of the moon at 11 o'clock, and the rise of tide amounts sometimes to 8 or 10 feet. The export of rice to China and Singapore is considerable, and supplies are to be got in abundance, also cattle and poultry, the watering place is near the flagstaff.

The S.W. coast of Baly, beyond this, which also forms the Strait of Bali, stretches to N.W. and W. by N. for 38 miles, whence it assumes a more northerly direction for 20 miles to Cape Passier, before mentioned. It is

generally lined by a reef with a great surf upon it, which, however, is the only danger near this coast, and in calm weather ships may anchor along it in from 12 to 18 fathoms. This facility of anchoring, together with the pretty regular land breezes, make it easy to work along this shore in the eastern monsoon.

Manok Bay lies about 4 miles to the southward of Cape Passier; the entrance is barely a ship's length wide, and inside of the bay there are three small islands, surrounded by a flat of mud and sand. To the eastward of the islands there are only 2 fathoms, and the cove near the watering place has only water enough for very small proas; fresh water is very scarce. The tides run with great velocity round these islands, and the perpendicular rise of the water is from 8 to 10 feet.

BALY STRAIT.

With the exception of the Strait of Allas, to the East of Lombok, the Baly Strait is to be preferred to all the passages eastward of Java, as there is anchorage on both sides of the Narrows, which may be gradually passed in a single tide. Another advantage of Baly Strait is, that ships bound to Europe during the western monsoon are not so much liable to fall in with the coast of Australia as when passing through any of the other eastern passages.

Winds.—From February to September southerly winds prevail in Baly Strait, and during the other months baffling westerly winds, succeeded by calms and heavy squalls, probably caused by the high land of Java. During the eastern monsoon fresh breezes occur from S.S.W. to S.W. to the eastward of Cape Sedano, while steady East and E.N.E winds, succeeded by land breezes from South to S.S.W. are found to the westward of the same cape; from July to November the S.W. winds to the northward of the strait blow rather strong, while at the same time fresh northerly breezes, varying between N.W. and N.E., prevail to the westward of the cape. This change of the winds takes place immediately to the eastward of Cape Sedano, or when the strait opens; but past the strait, or when approaching the coast of Baly, the wind diminishes in force, and veers gradually to S.E. Mount Goendol seems to be the limit of the S.W. winds, or of the influence of the strait in rendering the winds unsteady and variable. The southern part of the strait being much wider the wind is not so strong there, and near the shore of Baly the regular land breeze usually occurs.

The *currents* are noticed on page 31, *ante*.

The **EASTERN COAST** of JAVA, forming portions of that of the Dutch provinces or *Residentees* of *Bezoeki* and *Banjoewangi*, is about 70 miles in extent from Cape Sedano, the N.E. to the S.E. point of Java.

CAPE SEDANO is in $7^{\circ} 49' 12''$ S., and $114^{\circ} 27' 30''$ E. ; it is rocky and steep, and the middle one of three points near each other. The volcano of *Gunong Baloeran*, or *Telagu Woerong*, or *Tafelborg*, 4,347 feet, bears W.S.W. $\frac{1}{2}$ W., nearly from Cape Sedano, and N.N.E. $\frac{3}{4}$ E. from Mount Idjing.

The anchorages of *Tinjang*, *Toe*, and *Assam*, to the southward of Sedano, are much frequented by the pirates ; they are formed by detached reefs, and have only single entrances and little space inside, but at *Kajang*, $3\frac{1}{4}$ miles South of the cape, a large number of proas may lie concealed, and may escape either to the northward or southward.

Pirates also often take shelter inside the reefs of *Tiotek*, 10 miles to N.N.W. of Bape Sedano, which stretch parallel to the shore between the points of *Tiotek* and *Loemoet* ; they consist of 4 large reefs above water and some other shoal patches. Those passages between the three westernmost are the widest, and lead to the anchorages of *Labuan Gattal* and *Labuan Gollek* near which there is a watering place.

MEINDERS DROOGTE, or *Karang Maas*, in $7^{\circ} 41' 30''$ S., and $114^{\circ} 22' 30''$ E., has been before described on page 718, together with its lighthouse. It bears N.N.E. from Mount Sedano, E. $\frac{3}{4}$ N. from Mount Ringit, and N. $\frac{3}{4}$ W. from the easternmost point of Java. Ships passing between Java and the rocks ought not to approach close to their S. and S.W. sides, on account of the reefs.

Tanjong Tjandibang is 5 miles South of Cape Sedano. A *bank*, covered with only 3 feet water, lies about a mile off shore, Mount Sedano bearing W.N.W. $\frac{3}{4}$ W., Mount Idjing S.W. and *Tjandibang Point*, with some trees on it, S. by W. $\frac{1}{2}$ W. The 2-fathoms bank is the north-easternmost danger, and is known by its discoloured water. Mount Sedano bears N.W. $\frac{1}{2}$ N. ; Mount Idjing S.W. by W. $\frac{1}{4}$ W. ; and *Tjandibang Point*, North from the shoal.

It is also said that the 2-fathoms bank lies S. by E. of Cape Sedano, and N. by E. $\frac{1}{2}$ E. of *Duiven Island*, and about 3 miles off shore ; it consists of five rocks close together, with only $6\frac{1}{2}$ ft. water over them. It will be, however, prudent not to bring *Duiven Island* to the southward of S.S.W.

There are two reefs to the south-westward of the 2-fathoms shoal ; they bear about N. and S. from each other, and on the southernmost, in soundings of 5 fathoms, Mount Sedano was found to bear N.N.W. $\frac{1}{2}$ W. Another rock, close to which 19 fathoms were found, lies with Mount Idjing bearing S.W. by W. $\frac{3}{4}$ W., Mount Sedano N.N.W. $\frac{1}{2}$ W., and *Tjandibang Point* N. by E. From another shoal, to the southward of the former, Mount Idjing bears W.S.W. $\frac{1}{4}$ W., Mount Sedano N.N.W. $\frac{1}{4}$ W., *Tjandibang Point* N. by E., and *Duiven Island* S.S.E. $\frac{1}{3}$ E. All these dangers have also light-green discoloured water.

DUIVEN ISLAND, also named *Taboan* or *Gilboan*, is small, and sur-

rounded by a reef, which projects to the North and S.E. of the island, and bears E. $\frac{3}{4}$ N. from Mount Idjing.

LIGHTHOUSE.—An open iron framework, 30 ft. high, was completed in 1872, on the East side of Duiven Island, and from it is shown, at an elevation of 55 ft., a *fixed bright* light, visible 12 miles off. Lat. $8^{\circ} 2' 30''$ N., long. $114^{\circ} 27'$ E. Duiven Island is dangerous to approach, as the current sets strongly towards it, so that vessels can only be saved from driving upon it during a calm by their anchors holding against the reef in 60 fathoms depth. It was the practice for piratical proas to lie in wait on the North side of the reef for vessels coming out of Bali Strait. The passage to the eastward of this island is preferable, as there are dangers to the westward, but in light and favourable breezes the western branch may be adopted, there being anchorage N.N.W. from the island in 40 fathoms; or, by keeping a good look-out for the reefs, in 20 fathoms closer in shore. When going out by the western passage, if overtaken by the contrary stream before reaching the northern anchorage, vessels are better able to fetch the anchorage to the southward of Dodol.

The first anchorage is in the bight to the southward of the first point following after Batoe Dodol (which place may be known by a bridge over a creek, with a guardhouse near it), in 18, 12, and 10 fathoms, and in the eddy. There is also anchorage, but closer in shore, in the small bays to the southward of this, as far as the high tree on the Java shore, but it is difficult to reach them with light winds if the vessel is not near the shore.

The dangers of Baly Strait begin when you approach the high tree 2 miles N.N.E. of Banjoewanjie. This tree is difficult for a stranger to recognise, but a beacon is marked on the chart as situated on a point of the land near it. At three-quarters of a mile S. by W. from the beacon is *North Rock*, of 3 fathoms, a small patch lying 3 cables off shore. It lies with the high tree N. $\frac{3}{4}$ W., and the flagstaff of Fort Utrecht S.W. by W. $\frac{3}{4}$ W. Vessels coming from the northward, and bound to Banjoewangie during the eastern monsoon, are sometimes obliged to pass this rock at low water, and as there is often a great swell, it is considered very dangerous; but by keeping Mount Ikan about a ship's length open to the eastward of Pakkem Point they will pass to the westward of the rock.

The Deptford Shoal stretches here along the shore, being a reef of rocks with unequal soundings. Its North end lies in 6 ft. water, with the flagstaff of Fort Utrecht, Banjoewangi bearing S.W. by S., Pakkem Point in one with the western foot of Mount Ikan S. $\frac{1}{2}$ E., the high tree N. $\frac{3}{4}$ W., and a *white buoy* on its South end S. by W. westerly, $3\frac{1}{2}$ cables distant. This buoy lies half a mile N.E. of Banjoewangi Light.

Cameleon Rock, a small patch of 3 fathoms, marked by a white buoy, lies nearly a mile E.N.E. of Banjoewangi Light.

Further southward lies the *Great Rock*, which carries 2 fathoms water;

from the black buoy on it the pier at Banjoewangie is seen in one with Fort Utrecht W.N.W., the high tree North, and Mount Idjing N.W. $\frac{1}{2}$ N. Inside of this rock lies another, also marked by a *black* buoy. It is called the *Kaiman* or *Crocodile*, with 2 fathoms water, the fort bearing W. by N., the high tree N. $\frac{1}{2}$ E., and Pakkem Point S. $\frac{1}{3}$ W.

BANJOEWANGIE, the Dutch settlement in Baly Strait, from which the telegraph cable leaves the shore to cross the water to Port Darwin, is the chief town of its province, and 8 miles South of the Narrows. It is an open port for exports only, and is a place of call for refreshments for vessels proceeding by the eastern passages. The water is good when the pipes are clean, otherwise it soon becomes fetid. The town is not always readily distinguished in the afternoon, when the sun is behind it; a good guide then is the Bakungan Mountains, a triple topped range on the Baly shore, from which it bears West.

The road of Banjoewangie is limited by the last-mentioned reefs. There is very safe anchorage there during the western monsoon, in from 12 to 8 fathoms, when ships should moor North and South, and they may then take their cargoes on board without the least difficulty. But during the eastern monsoon the South and S.E. winds blow strongly in the afternoon, and often in the morning too, and cause a great surf on the shore, through which only very small proas can pass. It is not advisable to anchor a sailing vessel close in during the S.E. monsoon, for the difficulty in getting out may cause detention.

Light.—A *fixed* light, elevated 41 ft., is shown from Fort Utrecht, seen 12 miles off; lat. $8^{\circ} 12' 50''$ S., long. $114^{\circ} 22' 30''$ E. With the light between W. by S. $\frac{1}{2}$ S., and West, you may approach the road clear of all dangers.

The river cannot be entered unless at high water, and then the surf is generally most high. Mount Idjing bears from the pier N.W. $\frac{1}{2}$ N., and Mount Ikan south-easterly.

There is a patch of 5 and 6 fathoms on a hard bottom, to the eastward of which there are 9 and 10 fathoms, to the northward 7, 6, and 4 fathoms, and to the southward 8 and 9 fathoms. The patch bears E. $\frac{1}{3}$ N. from the fort, and North from Pakkem Point.

To enter the roads from the northward, keep the land immediately to the southward of Pakkem Point in view, and do not approach the shore in less than 15 fathoms before the fort bears West, nor bring the house on the pier in one with the fort, on account of the Groots Rock; this will lead to the eastward of all the dangers. Passing between the Cameleon Rock and the Deptford Rocks, keep Pakkem Point well open of the foot of Mount Ikan but it is not required to keep in sight the land to the southward of Pakkem Point.

When the fort or its fixed light is brought to bear West steer direct for it till in 12, 20, or 8 fathoms clear bottom, where you may bring up; but some

attention is required on account of the streams of tide while nearing the shore, as they run sometimes in a contrary direction to those in the middle of the strait.

To avoid the rocks to the southward keep the pier so as to view it always on its North side. The best anchorage is with the fort bearing West, the high tree N. $\frac{1}{2}$ E., and Pakkem Point, South.

A vessel desiring to have a pilot in the strait ought to give due notice beforehand to the pilot at Banjoewangie, of the place from and the date on which she intends to sail. He then will take care to have one ready on her making the signal, near the Java shore at anchor on the reef opposite Taboean Island. During the eastern monsoon the pilots seldom cruise, as only a few vessels then require their assistance.

Departing from Banjoewangie bound to the southward, do not approach too near to Pakkem Point, as a reef projects from it about 3 miles. Its outer extremity is marked by a *black* buoy with white ring, in 4 fathoms, with the highest Bakungan mountain bearing E. by N. $\frac{1}{2}$ N., and Fort Utrecht N.N.W. $\frac{1}{4}$ W.

Anchorage in 7 or 8 fathoms may be found all along the shore from Pakkem Point to Pampang Bay.

A dangerous spot was discovered S.E. 2 miles from Pakkem Point, in 1865 by H.N.M. steamship *Bromo*. It has $3\frac{1}{2}$ fathoms least water, and lies with the flagstaff at Banjoewangie N.W. $\frac{3}{4}$ N.; Mount Ikan S. $\frac{1}{2}$ W.; Mount Raoe W.N.W. $\frac{1}{4}$ W. It is only about 35 ft. in diameter, and has 15 or 16 fathoms close around it. Its eastern edge was found by Captain M'Kenzie to bear N. $\frac{1}{2}$ E. from Mount Ikan, Pakkem Point in one with Banjoewangie N. $\frac{1}{2}$ W. distant 5 miles.

Mount Ikan, 14 miles South of Banjoewangie, is an isolated flat-topped bluff, separated from the Sloko Hills by a low isthmus, causing it at a distance to appear like an island, forms a very safe bay, sheltered on the eastern side by this hill, which is about 400 or 500 ft. high, and on the North side by the projecting land of Java, so that the water is smooth in both the monsoons. The southern shore is covered with thick forests of *jattee* trees. There is anchorage from the entrance to 3 or 4 miles inwards, on the eastern side of the bay, in depths from 12 fathoms, regularly decreasing to 3 fathoms, the bottom coral sand, but not farther to the westward of the Mount Ikan shore than half a mile or a mile. The beach on the eastern side is lined with a small reef, consisting of coral and mud, and the W. and S. shores by muddy flats.

S.E. CAPE of Java is the extremity of the low Balambangan peninsula, on the northern side of which is a range of hills which terminate on the East at Cape Sloko. The points of the low land dip at 10 or 12 miles, causing a false point to be seen beyond that distance. An extensive coral reef borders the cape, but North of the Sloko ranges the shore is very steep, and a ship

working through may stand in boldly. There is no safe anchorage near the Java shore to the southward of Mount Ikan.

The *Prince of Orange Bank*, in the middle of the strait, is a 6-fathom bank, on which ships may anchor in case of calm and contrary tide. It is about 4 miles in extent, with soundings from 6 to 24 fathoms, black sand, mixed with stones and shells. It lies with the low East extremity of Java, S. by W. ; eastern summit over Cape Sloko, S.W. $\frac{1}{2}$ S. ; and the summit of Mount Ikan, W.N.W.

CAPE TAFEL, the South extreme of Baly Island, is a peninsula of table land, bordered by a high broken cliff and a few small reefs. Though about 300 ft. high, it may be styled low in comparison to the adjacent mountainous country. The western part is the higher and bolder, the eastern tapers into a low point, off which is a low island. Soundings of 20 fathoms may be found West and South of the West cliff at the distance of a mile. *Badong Bay*, North of Cape Tafel, affords shelter from S.E. winds, with anchorage in 8 to 6 fathoms, sand and mud, good holding ground ; but there is little or no protection from the heavy ground swell that rolls in from South.

DIRECTIONS.—Ships bound from the Strait of Madura to Baly Strait during the eastern monsoon work between Java and Meinders Shoal, the dangers near the former being all above water ; but to the West and south-westward of Meinders Shoal there is a reef extends about $1\frac{1}{2}$ mile, which may be known by light-green discoloured water.

After rounding Cape Sedano, the wind will change to S.W. or S.S.W., which will enable them to fetch the Baly shore about Minjangan Island or Mount Goendol, from whence it is easy to work towards the strait. Should adverse tides or approaching night forbid an entrance to the strait, ships should keep under an easy sail. If the stream runs to the northward they will not be liable to approach the shore, and by keeping Minjangan Island to the southward of S.S.E., and the high mountain of Idjing to the southward of West, they will avoid Taboean Island and the dangers near the coast of Baly.

When the tide changes, work with short tacks between Minjangan and Taboean Islands, and keep the Java shore on board, when in the Narrows, to avoid the reef off Cape Passier ; the Java shore is preferable also, because the sea is not so boisterous there as near Baly. When the tide is going to change, search for anchorage in the bays to the southward of Dodol, the Java shore being safe to approach as far as the high tree.

When past the high tree, keep Mount Ikan well open with Pakkem Point, or, rather, stretch over to the eastward so far as to get in view the land to the southward of Pakkem Point, and do not borrow towards Java in less than 15 fathoms before Fort Utrecht bears West, for which they may then steer as before directed. When working to the southward of Banjoewangie,

keep Mount Ikan to the westward of S. by W., to avoid the reef off Pakkem Point.

The southernmost safe anchorage on the Java side of the strait is in Pampang Bay, nevertheless keep on the Java shore until near S.E. point, as the sea is usually smoother there than near Baly, and no tide perceptible. Having approached the S.E. point, stretch over to Baly, and work along that shore with the land and sea breezes, occasionally anchoring in from 12 to 18 fathoms.

If bound through the strait, keep Mount Ikan well open of Pakkem Point, or, rather, keep the land to the southward of this point in view until you are to the northward of the high tree, when it is advisable to keep nearest to Java, to be the sooner in anchorage if required, and to avoid the reef off Cape Passier. You may pass on either side of Duiven Island at a moderate distance; the western passage is preferable in case of light winds, as there is anchorage to the N.W. of that island in 40 to 20 fathoms. Great care is requisite in approaching the Java shore, on account of the several dangers near it; and should a contrary tide come before you reach the anchorage to the northward of the Narrows, you must endeavour to reach the anchorage to the southward of Dodol. When nearing the 2-fathom shoal it is prudent not to bring Duiven Island to the southward of S.S.W. The N.E. part of Java may be approached within 2 miles.

Vessels working through the strait will save time by taking a pilot, for the tides are irregular and require local knowledge.

Tides.—Near to Duiven Island the establishment of the port at 3^h. Flood runs to the North, ebb to the South. During the N.W. monsoon, December, January, and February, the ebb is very weak, especially near the times of high and low water. It is also stronger by night than by day.

LOMBOK ISLAND AND STRAIT.

LOMBOK, Lombok, Sassak, or Selaparang, is the next island eastward of Baly, separated from it by the strait to which it gives its name. Although of a very different figure, it is very nearly of the same area as Bali, and of similar geologic formation. It has also a very lofty peak on its N.E. angle, which overtops the other mountains of which it is principally composed. This is called *Rindjanie Peak*, and was measured trigonometrically by Melville van Carnbee as 12,379 ft.; Horsburgh states that he found it by the same means to be only 8,688 ft., but the Dutch officer is confident in his own observation. It is an extinct volcano, in lat. 8° 21' 0" S., long. 116° 27' E., and appears double when seen from the southward.

This peak forms a portion of a chain of mountains, which traverse the

island from West to East; and to the southward is another and lower chain, which has a similar direction. From its elevation, like Baly, it is abundantly supplied with water in the rainy season, when its numerous rivers swell to an enormous volume, and send down vast quantities of water; but during the dry season the reverse is the case, and then scarcity prevails in many parts, so that vessels coming here at this period are compelled to bring water with them.

The people, though more advanced in civilization than in surrounding countries, are difficult to deal with. Europeans are established in the two principal places, Ampanam on the West coast the chief port, and Tring in the S.W. bay, and through them the barter or trade may be conducted. They owe in some degree an allegiance to the Dutch, but all caution should be used in any dealings with them. They make excellent *krises* or swords, and firearms, which are in great request in the islands around. Rice is the staple production, and the fertile valley in the centre of the island is skilfully and zealously cultivated. The island now prospers, but two-thirds of the inhabitants perished in the dreadful eruption of Sumbawa in 1815, the whole island being covered with ashes to the depth of 18 inches, according to M. Zollinger.

The *North coast* is steep-to and without anchorage. In the old charts two dangers are laid down to the northward of the islands, which seem not to exist, as many ships have made a fruitless search for them.

A range of small islands, named *Trawangan*, *Meno*, and *Sira*, lie off the N.W. point, or *Cape Roembek*. There are numerous rocks around them, and the coast runs East and West for about 44 miles.

The North point of the island is a green point, in $8^{\circ} 11' S.$, and the land thereabout has a fruitful appearance, and seems to be well peopled.

The N.E. point of Lombok is fronted by two low islands called the *Twins* (Tweelings), which are surrounded and united by a reef with a boat passage across it; the road to *Sogean* is inside of these islands, having anchorage in from 8 to 12 fathoms. Water is to be had at the village of *Sogean* on the river *Melanting*. The channel inside of these islands is safe, with soundings from 11 to 16 fathoms mid-channel, regularly decreasing towards Lombok over a sandy bottom, and generally increasing towards the reef round the islands, which is steep-to, with 16 fathoms near its edge. The Lombok shore, as well as the *Twins*, may be approached to the distance of a quarter of a mile, as a man from the masthead can see all the dangers on either side.

The *Rocky Islets* at 12 miles South of the *Twins* is a group of three low rocky (*Rotsige*, Dutch) islands bearing S.W. by S. from each other, and a dry sandbank; but they are all connected by a reef which projects about a mile to the south-eastward. The channel to the westward of the group is free from danger, with regular soundings from 15 to 17 fathoms throughout.

The channel to the eastward of them is much wider, but destitute of soundings, for which reason the former is more generally used. When proceeding to the southward, the Lombok shore ought to be kept at least a mile distant in order to avoid the shoal on which the *Surat Castle*, an English Indiaman, struck in March, 1796. It is a coral patch of 3 fathoms, lying a little to the South of the point of land that bears W. by S. from the South extremity of the Rocky Islands, and opposite to a fresh-water creek in the bight, to the southward of that point. There are overfalls from 25 to 10 and 6 fathoms, coral rock, about 3 or 4 miles S.S.W. from the Rocky Islands, but not less, it is believed, than 6 fathoms.

Sagara, near the village of *Lombok*, is only adapted for small vessels. It is sheltered by a dry sandbank and a narrow channel with soundings of 3 and 4 fathoms, from a point of land which projects to the northward, and forms a cove. The anchorage inside is safe in both the monsoons, and it is much easier to water there than at Laboe Hadje. There is a road across the island from this place.

Labuan Hadji or *Bally*, is 12 miles South of Lombok. The road is not quite safe during the eastern monsoon, as the anchors often drag when the sea breeze is very strong. The anchorage for large ships is in 17 or 15 fathoms, black sand, about $1\frac{1}{2}$ or 2 miles off shore, with Lombok Peak bearing N.N.W., the southernmost bluff island on the Sumbawa side of the strait E.S.E., and the next to the northward E. $\frac{1}{2}$ N. or E. $\frac{3}{4}$ N. These islands are the best guide to know when abreast of Labuan Hadji, for, being situated behind a top of cocoa-nut trees, it is not easily perceived from the offing. Ships ought never to go under 10 or 11 fathoms. Boats sent to fetch water anchor inside of the reef at the mouth of the river; the casks are filled about 100 yards from the beach, and then floated off to the boats. The water is good, but ought not to be filled when the tide is high, for it is then brackish, and during the south-eastern monsoon it is often tedious getting water off from the shore. Refreshments of every description are to be procured here in great plenty. The flood sets to the northward, and the ebb to the southward, about $1\frac{1}{2}$ or 2 knots at the springs; it is high water in the roads about 12^h 30^m at full and change, but nearly 3 hours sooner upon the shore, and the rise of tide is 10 or 12 ft.

Pedioe, *Peejow*, or *Pejoet*, is more frequented than Labuan Hadji, being more safe and convenient for watering, as the river is navigable by boats. On *Cape Louar*, the North point of the bay, there is a flagstaff in about 8° 47' S. and 116° 32' E. The anchorage is in 7 or 8 fathoms, with Lombok Peak bearing N. $\frac{3}{4}$ W., the southernmost island on the Sumbawa side of the strait E.N.E. $\frac{1}{2}$ E., the flagstaff on Cape Louar, North, Ringiet Point in one with the southern part of the Tafel Berg near the S.W. point of Sumbawa S.E. Ringiet Point, on this bearing, is a good mark to avoid the reefs to the southward of the anchorage, and this line ought not to be passed when

entering the bay ; the only other dangers to be avoided are the reef off Cape Louar, which is nearly dry, and a rock bearing S. $\frac{3}{4}$ W., about a cable's length distance from the flagstaff, and visible at low springs. Capt. Kingdom discovered also, in 1846, a sandbank with $3\frac{1}{2}$ to 5 fathoms on it and 8 fathoms all round, Ringiet Point bearing S.E. $\frac{1}{4}$ S. southerly, East Island S. by W. $\frac{1}{2}$ W., and the flagstaff on Cape Louar N.W. $\frac{3}{4}$ W.

The **SOUTH COAST** of Lombok, between Cape Ringit and *Cape Bambo Bambo*, the S.W. point, is about 50 miles from E. to W. There is a small bay, *Telok Longas* or *Blongas*, which it is said affords safe anchorage in the westerly monsoons, but quite exposed in the opposite season. The S.W. point is the extremity of a peninsula which forms a bight on the North side, in the head of which is Tring, one of the best anchorages in the island.

A *rock*, scarcely showing above high water off the South coast of Lombok, was discovered by Captain B. van Riethagen, in the bark *Sophia Louize*, in 1864 ; when it bore E. by N., the South point of Panditi Island bore W.N.W. $\frac{1}{2}$ W., and the S.W. point of Lombok N.W. It lies 5 miles off shore.

Labuan Tring.—In running for Labuan Tring from Ampanam a southern course will about lead down the bay, but in blowing weather it is preferable to haul out S. by W. $\frac{1}{2}$ W. at first, and when abreast of Karang Point, easily known by a little conical hill near it, and about $2\frac{1}{2}$ miles from Ampanam, steer South, or more easterly if required, as you approach the cove. The western side of the entrance to the cove is bluff, and readily distinguished ; the East point is low and sandy, with bamboos and brushwood. Entering the cove, keep nearest to the eastern shore, as a reef runs off the other. A good mark is, to bring the low point about S. by E., and run in with that bearing till a high bluff point on the East side of the cove be seen. Haul round the East point until it bears N.N.W. $\frac{1}{2}$ W., or N.W. by N., and bring up in about 10 fathoms, mud and clay, 2 or not more than 3 cables' lengths from the beach ; the water here will be quite smooth, although a great deal of swell may be in the entrance. A reef surrounds the island, which lies E.S.E. of this anchorage ; of this be careful by bringing up close to the beach, which is so steep-to that 4 fathoms will be found over a boat's stern when she touches the ground forward, except near the eastern extreme point. There is also a good berth in the West side of the cove close in-shore in 6 or 7 fathoms, mud, care being taken not to run beyond the small islet. There are three good wells near the huts on the eastern side of the cove. Firewood and bamboos may be cut in plenty, but any other supplies, excepting plantains and cocoa-nuts, are scarce.

AMPANNAM or *Ampanam* is the chief trading place of Lombok. It is on the West coast, at about midway between Tring and the N.W. point. It affords an excellent sheltered road during the eastern monsoons, but during the westerly monsoons it has no security whatever from the swell and wind.

At all seasons there is usually a very heavy swell, which makes the taking or discharging cargo difficult and even dangerous.

The large bay of Ampanam is a safe road during the eastern monsoon, as before said, and Labuan Tring Bay, in the S.E. part of it, sheltered from all winds. A group of islands and reefs fronts the southern shore of the bay; and there is a bank of coral and sand, with soundings of from 10 to 25 fathoms, on which the *Heroine* lay at anchor during a fresh S.E. breeze, the first island to the northward of the West point of Lombok bearing S. by E. about 3 miles. There is also anchorage a little southward of the North point of the projecting S.W. land of Lombok.

H.N.M. frigate *Boreas* watered here in June, 1838, and filled daily 2,000 gallons; at high water boats can enter the river, but otherwise the casks must be carried across a neck of land. Cattle are cheap, and all kinds of provisions are to be had there. The mouth of the river cannot always be discerned at a distance, but it may be known by the huts along its banks.

There is a rocky patch, with only $2\frac{1}{2}$ fathoms, to the north-westward of the flagstaff, probably the same on which, in 1811, the boats of H.M.S. *Psyche* had 3 fathoms, Lombok Peak bearing E. by N., and the North point of the bay N. by W. $\frac{1}{4}$ W. There are $2\frac{1}{2}$ fathoms on a shoal S.W. of Karang Point, and near the shore, having 6 fathoms all round.

The tides in the bay are seldom found to be strong; the rise of tide is from 5 to 7 ft., and it is high water, at full and change of the moon, about 8 o'clock.

The best marks for Ampanam Bay are, the peak of Baly bearing W.N.W., Lombok Peak between E.N.E. and N.E. by E., or the river bearing E. by N.; but it is not safe to approach the shore, after having passed the ridge, in less than 10 fathoms, as in some parts the soundings decrease very rapidly from 7 to 3 fathoms. During the western monsoon (from November to April) ships ought to anchor 2 miles off shore, so as to be able to run for Labuan Tring, if need be. On appearance of bad weather the chains should be buoyed, and everything ready to slip.

Trawangan, or *North Island*, before mentioned, is 13 miles N.N.W. of Ampanam. It is the highest of a group of three islands near the N.W. point of Lombok, in $8^{\circ} 20'$ S., and $116^{\circ} 1'$ E., and from its North point Lombok Peak bears E. by S. H.N.M. steamer *Hecla* anchored in 15 fathoms with this island bearing from North to N.W. by N., Rombek Point S. by W., Mount Agong, or the Peak of Baly, West, northerly, and a river S.E. by E.

Siva Reef lies N.E. 5 miles from Trawangan Island, and a doubtful reef is marked on the chart at 4 miles off shore, and 10 miles north-eastward of *Siva Reef*.

During the East monsoon, strong winds from S.S.W. to S.E. prevail in the Strait of Lombok, and during the western monsoon N.W. winds; during

the former the southerly currents are the strongest, and during the latter they run with more velocity to the northward.

The STRAIT of LOMBOK, between Lombok and Bali, is 36 miles from North to South, and from 10 to 25 miles in breadth. The Bali side has been previously described, and the Lombok shore is given above.

Entering Lombok Strait, with an adverse current during the eastern monsoon, most progress may be made by keeping the Baly side on board until the peak bears West. By stretching over then to Lombok, a ship will very likely fetch the road of Ampanam, especially if the Baly side of the strait be left early in the morning for the sake of the sea breeze from the southward. With a contrary current, it is difficult to get down on the Lombok side of the strait, and on the Baly side after the peak bears to the northward of West. The channels on both sides of Pandita Islands are safe, but the western one is to be preferred, as ships may anchor occasionally near Baly, and the rippings are not so strong there as to the eastward of these islands. Although the route through Lombok Strait is liable to great delay, it is often used by ships bound to China, which pass St. Paul and Amsterdam Islands in the latter part of January, or in the beginning of February; the passage through the Strait of Allas is, however, generally quicker. Care is then requisite not to fall to leeward of the intended strait. The high peaks of Bali and Lombok may be seen in clear weather about 8 leagues to the southward of the straits, the latter one showing from this view two summits over the high western part of the island.

ALLAS STRAIT.

Allas Strait, separating Lombok from Sumbawa, is about 45 miles long on a N.N.E. and S.S.W. direction, and from 9 to 15 miles wide. Although it has not been properly surveyed, it is probable that all its dangers are known, and it has some advantages over the straits to East or West of it. The Lombok side has been just described.

The West Coast of Sumbawa, about 45 miles long between *Tangong Labu Bua*, the N.W. point, and the S.W. point of the Table Hill, which forms that extremity.

Mr. H. Zollinger, who visited this coast in 1847, gives the following description of it:—

Kamoedong, *Tawar*, *Segattal*, and *Belo*, the north-easternmost of the islands which front the N.W. coast of Sumbawa, are low, with rocks contiguous to their points, and deep channels between them. There are soundings from 4 to 14 fathoms in the channel inside of these islands, and the bays of *Paddie*, *Boer*, and *Allas*, afford anchorage. The latter is a cove, 12 miles from

Labu Bua Cape, stretching about South, and deep enough for large ships. To the south-westward of Belo are the islands of *Bassar*, *Genang*, *Patakie*, *Oenet Passeran*, and *Tatagen*, all high, and *Belang*, a low island, and the southernmost of this group. Inside of the latter islands are soundings from 25 to 30 fathoms.

Taliwang Bay.—The road of Taliwang affords a secure anchorage during the south-eastern monsoon. From the bluff North point of the bay, Lombok Peak bears N.W. $\frac{1}{4}$ N., the southernmost island in the strait W.N.W. $\frac{1}{4}$ W., and Ringit Point S.W. by W. $\frac{1}{4}$ W., and the South point of the bay S.E. by E. $\frac{1}{2}$ E. $12\frac{1}{2}$ miles from Labuan Hadji, or Laboe Hadye; the bay may also be known by a peak near the beach, rising to a height of about 1,570 English feet. Water and wood are easily procured, and provisions are cheap, but they must be ordered a day before.

Ships in want of water and wood should anchor to the south-eastward of *Knoop Island*, in 15 or 16 fathoms; but when provisions only are wanted, they may anchor in 7 or 8 fathoms, S. by E. from a storehouse, standing near the bluff North point of the bay. The natives are polite and ready to assist.

The straits to the eastward of Java being all more or less subject to frequent calms, it is advisable to keep in soundings, on account of which the Lombok side of the strait is to be preferred, the more so as the currents are not so strong there as in the middle, and on the East side, of the strait.

The Strait of Allas is easily known in coming from the southward, the S.W. part of Sumbawa being high rugged land, whereas the East end of Lombok is composed of steep cliffs, facing the sea. The S.W. point of Sumbawa is a double table-hill, in $9^{\circ} 2' S.$, and $116^{\circ} 47' E.$, and Lombok Peak bears N. by W. $\frac{3}{4}$ W. from the entrance of the strait.

With the S.E. point of Lombok bearing W.N.W., and the S.W. point of Sumbawa S.E. by E., soundings are got in 64 or 70 fathoms, clean bottom; but farther to the southward and eastward the bottom is rocky, and no soundings less than 80 or 90 fathoms.

In the south-eastern monsoon, the winds blow strongly from the southward during the greatest part of the day, but they subside towards evening, when the land wind from Lombok begins. In the western monsoon, variable and baffling southerly breezes are often experienced in the Strait of Allas.

Bound to the southward, it is advisable to get under way very early in the morning, in order to clear the strait if possible, before the sea breeze sets in.

There is good anchorage on the western or Lombok side of the strait; in many parts the bank of soundings is very steep, extending only a short distance from the shore, and requiring careful attention to the lead while approaching it in the night time. Stock and fresh water can be obtained at a reasonable price at Bally, Pidioe, and Lombok, and at Allas on the Sumbawa side.

The prevailing current is from the southward, which, in the centre of the strait sometimes runs 3 or 4 knots. In June, 1845, H.M.S. *Fly* experienced an equally strong current from the northward.

At Bally the tides are described as regular, the flood coming from the southward, and setting along shore at from 1 to 2 knots per hour.

SUMBAWA ISLAND.

The Island of Sumbawa, Sombawa, or Soembawa, is one of the most remarkable in the world, possessing as it does the most tremendous volcano known. It is of very singular form, being deeply indented by arms of the sea, especially on its North side. Its character and proximity to Celebes and Gillolo, and their fantastic forms, point to their common igneous origin.

The elevation of the great volcano Tambora, or Tumbora, is 9,040 ft.

The great eruption of Tambora occurred between April 5th and 17th, in 1815, and it, for a time at least, destroyed the island, which from a fertile and thriving region become a desolate waste. The whole area was deeply covered with volcanic ashes to the depth of from 4 to 2 ft.; nearly two-thirds of the inhabitants perished, a large number buried alive in the ashes, the rest dying from want and starvation. According to M. van den Broek, there were only 20,000 to 25,000 men who survived, and it was not for many years that any immigration took place, and then a multitude of Buginese and Makassars took possession of the land, and restored it to more than its previous fertility. The area over which the ashes fell extended from near to Bencoolen in Sumatra to Timor, a distance of more than 1,500 miles apart, East and West, and over the South portion of Borneo, Celebes, &c., for a diameter of 900 miles.

The natives are a good-natured people, and the island produces a great quantity of sandal-wood; the trade in horses is considerable.

Madang or *Flat Island*, the centre of which is in $8^{\circ} 8' S.$ and $117^{\circ} 18' E.$, lies off the North side of Sumbawa. It is very low near the West end; the northern part is a little elevated, and may be seen from deck at a distance of 16 miles in very clear weather. It has reefs from the North and S.W. points, and a dry spot near its northern edge, from which the East point of the island bears about S. by E. The S.E. shore forms a small bight, opposite to which a single ship may find anchorage in 30 fathoms a mile off shore and half a mile from a reef.

Majo, or *Maio*, 7 or 8 miles E.S.E. of *Vlak*, is an extensive island, regularly high, with the exception of the East point, which appears at some distance as a low and separate island. A reef projects from the N.W. point;

and the bay on the West side of the island is full of shoals, behind which the pirates often take shelter. In former times the West part of Maio was inhabited, and there are several springs of good water on that side of the island. The frequent visits of the pirates obliged the inhabitants to leave this island for Sumbawa.

Setonda Island, off the N.E. point of Maio, is in $8^{\circ} 6' 30''$ S., and $117^{\circ} 43'$ E. It is of moderate height, with the top appearing somewhat flattened, when seen from the north-eastward; the reefs from the points are of very small extent. Viak, Maio, and Setonda, are all uninhabited, for the pirates often make their appearance there.

The Bay of Sumbawa to the southward of Flat Island, and to the eastward of Labu Bua Point, the N.W. cape of Sumbawa, has no other dangers than the reefs along the shore, which project most from the West point of the bay, about 2 cables' lengths, and are steep-to and dry at low water; the anchorage is in 20 to 16 fathoms, clay bottom, about 2 cables' lengths off shore. Entering from the northward and steering toward the centre of the bay, the soundings decrease regularly but rapidly from 40 to 17 and to 7 fathoms within a short distance from a dry sandbank opposite to the river's mouth; and as the bay is open from N.N.E. to N.W. by W., a vessel cannot be considered safe during the western monsoon. The landing is easiest to the westward of the river on a sandy beach, as the river can be entered only at high water. The village of Sumbawa is about 2 miles inland.

To the eastward of this bay, and opposite to the South coast of Maio, is the extensive Gulf of Salee. Mr. H. Zollinger, who explored the whole island of Sumbawa in 1847, gives the following description of it.

The large Gulf of Salee extends about 12 leagues in a S.E. direction, and is about 4 leagues wide. The entrances along the N.E. and S.W. points of Maio are both narrow; the western one being about a gun-shot wide. The South point of Maio is pretty bold, but reefs project from Menangis and Gayong Points, on the southern shore; and in the bight of Peniaring between these points there is shoal water.

Gayong Point forms the West side of an inlet with deep water inside, which stretches about 4 miles South, called *Bango*, or *Bunga*, with a small village. The entrance of this inlet bears S.W. by S. from Setonda, but it is too intricate for ships, having reefs on either side.

Liang and *Negalie*, two long, narrow, and hilly islands, stretch parallel to the coast, and form two narrow channels with deep water stretching about N.N.W. and S.S.E.; proas may enter them at both ends. The southern beach is inhabited by fishermen, and about 3 miles inland stands the large village of Lapie.

The next bay to the south-eastward is called *Tieris*; then follows *Kollong*, a large bay, bounded by a monotonous and barren plain, and by low hills to the southward; the S.E. winds pass freely over them, and blow strongly in

this part of the gulf. The bottom of the bay is mud mixed with sand, and its little depth of water does not permit vessels to stand close in shore; $3\frac{1}{2}$ miles inland is *Plampang*, a considerable and well fortified place, governed by a nearly independent prince.

The island, or rather isthmus, is not more than 8 miles broad.

The *Bay of Ampang* to the eastward of Kollong Bay is also shallow. There are several islands in this part of the gulf, called *Tengar*, *Tapan*, *Kebo*, *Dempoe* (easily known by two peaked hills), *Tepie*, *Rakit*, a large island. *Kowanko Bay*, to the eastward, is shallow; near its eastern beach is the small island *Balereh*, and the long and low island Kowanko, stretching E.S.E.; *Nissah Monteh* is contiguous to its West point, and fronts the bay to the northward.

There are also several inlets in the East part of the gulf, but most of them are closed by reefs; they are named *Tioerie Lora*, *Sonapa*, and *Gempoe*, fronted by the rocks of Poedo; rivers disembogue in the former and in Sonapa. The small village Gempoe stands about a mile from the beach; good fresh water is to be had here, and the country abounds with game.

The northern shore is uninhabited; it runs in a straight direction, and is steep-to, affording no anchorage. From August to October, pirates come to this bay for fire-wood, and greatly disturb the natives, who therefore build their villages far inland. They often attack proas and ships which pass near Maio Island.

The tides set with great velocity through the Strait of Salee, and probably also through the northern entrance to the gulf. The flood sets to the E.S.E. and the ebb to the W.N.W.; during the eastern monsoon the latter is strongest, and it is high water about the moon's meridian passage.

The chains of mountains generally follow the direction of the bays which they limit, causing S. or S.S.E. and N. or N.N.W. winds in the West part of the gulf, N.W. and S.E. winds near its centre, and E. or E.S.E. and W. or W.N.W. winds at its East end. During the eastern monsoon the northerly winds are light, on account of the vicinity of the high land of Tambora and Maio, but the southerly winds blow then rather strongly over the low land of Kollong. Pilots for this gulf are to be had at Sumbawa Town. There is plenty of wood on either shore, but provisions and fresh water are very scarce.

TAMBORA VOLCANO.—The Gulf of Salee is separated from the Bay of Dampo by the isthmus, on which stands the high volcano of Tambora, or Tumbora. The summit of the mountain is very large, and of a circular form, in the longitude of $117^{\circ} 48'$, and bearing S.E. by E. $\frac{1}{2}$ E. from Setonda Island.

Dampo Bay.—In former times the Dutch had settlements in the Bay of Dampo, but they have been abandoned. Mr. Zollinger, on his journey to the top of Tambora, found a fine spring of water, called by the natives Tam-poerokh, close to the beach on the western shore of the bay. Several inlets

afford good anchorage, the westernmost of which, Bioe Bay, is much frequented by pirates. In former times the Dutch had established a trade for sapanwood at Kamboe, and the road of Kila is very safe during the eastern monsoon, but the villages along this coast are all deserted now on account of the frequent invasions of the pirates.

Bima Bay, 15 miles eastward of Dampo Bay, stretches deeply inland, and forms a safe harbour, where ships lie quite landlocked and sheltered on all sides by high land. In the wide entrance there is only a temporary anchorage. The shores which bound the bay approach each other about 4 miles from the entrance, forming a narrow channel for about 3 miles in length and not half a mile in breadth, with soundings from 32 to 20 fathoms, but leading to a spacious cove, in the centre of which lies the high island Kambing. The Dutch have a battery near the beach on the East side of the bay. The narrow entrance is defended by two small bentings, where the Dutch colours are hoisted. To the southward of Bima the bay forms another spacious cove with an islet near the southern beach.

During the eastern monsoon, very strong southerly winds, accompanied by heavy squalls, continue to blow, sometimes for many days, outside of the narrow channel; and yet, inside, quite calm under the high land, and impossible to enter the bay. The land winds blow regularly during both the monsoons, and there is therefore no difficulty in quitting it.

Kambing Island lies due South from the Narrows in $8^{\circ} 26' 45''$ S., and $118^{\circ} 41'$ E. Having passed the Narrows, the village of Bima will be soon discovered; steer directly for it until in 11 fathoms, when a low point on the opposite side of the bay will be seen open with the South point of Kambing Island. Do not run farther in, as the depths decrease rapidly from 9 to 2 fathoms on the edge of the muddy flat opposite the village.

It is high water at full and change of the moon at noon, and the rise of the tide is 6 ft. The landing is difficult, on account of the extensive mud-flat opposite to the battery; water is scarce and bad.

From the N.E. point of the bay the South point of Apie Island bears E. $\frac{1}{4}$ N., its N.W. point N.E. by E., and its southern peak E. by N. When southerly winds prevent the entrance of the bay, it is advisable to anchor on the East side of the outer bay, as otherwise you are obliged to stand off during the night, and many days may be lost in a fruitless attempt to work in.

Sangeang Island or Gunong Api is a high, volcanic, double-peaked island, off the N.E. Cape of Sumbawa, between the latitudes of $8^{\circ} 6'$ and $8^{\circ} 14'$ S., and the southern or highest peak is in $119^{\circ} 2'$ E. It bears S. by E. $\frac{1}{4}$ E. from the North peak. The island is very steep to on every side. Proas sometimes land there to cut wood. Its N. and N.E. sides should not be approached within a mile.

The Eastern Coast of Sumbawa stretches at first about South to Sapi

Bay, where it takes an easterly direction till past Midden and Todo Islands, and then turns again to the southward as far as the southern entrance of the strait. Near the North point of Midden Island lies *Keppeh*, a small islet, with two rocks, between which and Setan is the most frequented channel, being about 3 miles wide; about 6 miles to the southward of *Keppeh* lies Kamara Island, close to Sumbawa.

Sapi Bay is formed by a deep bight in Sumbawa, and sheltered by Midden Island and some adjacent islets. The bay is $1\frac{1}{2}$ mile wide, with soundings from 20 fathoms, gradually decreasing to 17 and 14 fathoms in the centre, and to 5 fathoms in the southernmost part of the bay; the shore of Sumbawa is lined by a reef, but the islands may be approached within a short distance.

Sapi Town is situated by the side of a creek, at the south-western extremity of the bay; ships may procure there every kind of refreshments, which the natives will barter for toys, fire-arms, empty bottles, &c.; but single vessels ought to be guarded against any treachery of the inhabitants.

Rees and *Britannia Bays* are formed by the projecting points of Sumbawa to the northward of *Sapi Bay*, and at either of them ships may procure wood and water.

The outer verge of soundings stretches nearly in a direct line from *Keppeh* to *Api Islands*; the soundings decreasing pretty regularly towards Sumbawa from 60 to 20 fathoms, from half to a quarter of a mile off shore; but towards Banta there are no soundings, unless very deep. Nor are soundings to be had in the southern part of the strait South of Setan, beyond half a cable's length from it; there are 20 and 25 fathoms between it and the *Low Rocks* adjacent, deepening to the northward. Hereabouts the bottom is all rocky, with overfalls and rapid tides setting past Setan, 4 and 5 knots, and producing strong rippings like breakers, which render ships ungovernable.

In about $118^{\circ} 26'$ E. there is a deep inlet or bay, with a narrow entrance. Inside is a pearl bank, which was thickly covered by the eruption of Mount Tambora. Mr. Zollinger visited this bay, which is called *Tiempia*, and got a few oysters containing pearls of a small size. He sounded in 2 fathoms in the Narrows; but according to the natives there are 4 fathoms in the basin. Pirates frequent this bay, and they often take shelter inside of *Sido* and *Tengani*, the *Ragged Islands* of the old charts.

SAPI STRAIT.

This passage through the chain of islands, between Sumbawa on the West, and Comodo to the eastward, is about 20 miles in width. Its shores were cursorily examined by Lieut. W. T. Baars, D.R.N., in 1837-8.

The *Strait of Sapi*, *Sapie*, or *Sapy*, was much frequented in former times, but at present the Strait of Allas is preferred, being both wider and easier. The northern entrance of the former is divided into two branches by Banta Island, but the channel between it and Comodo is seldom used, as it is to leeward during the western monsoon, and has no soundings, while the ebb tide sets strongly upon Comodo, which is a high and steep land, and surrounded by rocks and reefs. Between Api Island and Banta the sea is clear, but H.N.M. steamer *Hecla*, when rounding the N.W. point, at the distance of a mile, June 2, 1844, fell in with a reef when the island bore S. by E. $\frac{1}{4}$ E. to E.S.E. Another rock lies just N.W. of this islet, lying off the South end of Banta.

Gili Banta, or Banta Island, may be known by its northern peak gradually sloping to its low southern point. This peak is in $8^{\circ} 22' 30''$ S., and $119^{\circ} 15'$ E. The West side of the island forms a pretty large bay,

Setan, or *Macota*, is a small, peaked island, with several rocks to the northward, bearing S.S.E. $\frac{1}{2}$ E. from Api Peak, and S. by W. from Banta Peak. The *Middle Rocks* lie W.N.W. $\frac{3}{4}$ W. from Setan, S.S.W. $\frac{1}{3}$ W. from the eastern extremity of Banta, and S.E. $\frac{1}{2}$ E. from the Black Rocks, and the latter bear W.N.W. from Setan. The Low Rocks, nearly level with the water's edge, lie about 3 miles S.W. from the South point of Banta, and 3 miles N. $\frac{1}{2}$ W. from Setan. When Banta Peak bore N.E. $\frac{1}{4}$ N., and Setan S.E. by E. $\frac{1}{4}$ E., the *Boreas* had the Low Rocks bearing N.E. by E., visible from the shrouds.

As the Low Rocks are nearly even with the water's edge, the track between them and Setan is not so safe as that between the latter and Keppeh. In this passage keep near Todo Island, rounding its N.E. point about the distance of a mile, for some ships have been in danger of being drifted on the rocks near Setan by the rapid tides.

Although the tides set rapidly through the middle of the strait, the flood to the northward, and the ebb to the southward, they become much weaker within the edge of the bank of soundings, near the north-eastern part of Sumbawa, where there is very little tide in the bays. The rise of tide in Sapi Bay is 10 ft. ; in Britannia Bay 11 or 12 ft. ; and it is high water about 1 o'clock at full and change of the moon.

The winds are variable in Sapi Strait, forming a kind of land and sea-breeze, those from the westward prevailing in the western monsoon ; and during the opposite season, strong breezes blow into the strait from the southward a great part of the day.

The *eastern branch* of the strait, between Gili Banta and Comodo, is seldom used, there being no soundings; the passage, however, between Banta and Peak Island is safe, and the latter is very steep-to; it bears E.S.E. from the South Point, and S. $\frac{3}{4}$ E. from the East point of Banta. Several rocks lie between Peak Island and Comodo, and it seems that there is no safe channel inside.

Opposite to, or about East from Kamara Island, a small island lies close to Comodo. It is said that the passage inside of it is safe, and that there is good anchorage in the bays to the southward of it, a cable's length off shore.

No other dangers are known in the southern part of the strait, except a *shoal* to the southward of *Pulo Kamara*, in its S.W. part, rather in the bight which this island forms with Sumbawa, having only 6 ft. water on it.

Chimney or Schoorsteen Island.—Contiguous to the S.W. point of Comodo stands a high and bold island, with a nob or upright rock resembling a chimney on its declivity, which renders this island a good mark to reconnoitre the strait in coming from the south-eastward. The West point of this island bears S. by E. from Banta Peak, and is in $8^{\circ} 46' S.$ and $119^{\circ} 22' E.$ A rock lies about a mile southward of the chimney, and another near the South point of Komodo, 3 miles to the eastward.

Ships steering for Sapi Strait, with light variable or easterly winds, may fall in with the West end of Sandalwood. This island is of middling height, and may be seen in clear weather 9 or 10 leagues, and the peak near its West end about 20 leagues. The West point of Sandalwood lies in $9^{\circ} 42' S.$ and $119^{\circ} E.$ With westerly winds, which blow strongly, and produce easterly currents, the South coast of Sumbawa may be approached, as it is mostly high, except opposite to the bottom of the Gulf of Salee, near the middle, where there is a low point, covered with trees. Remark also the shoal water stated to exist by Capt. Villoch.

Entering the strait, bring the East point of Kamara to the westward of North, on account of the Ida Shoal, and steer for the passage between Setan and Todo, rounding the N.E. point of the latter island at about a mile distance, to avoid the rocks to the north-westward of Setan, and in order to be the sooner in soundings; the currents not being so strong there, an anchorage may be obtained when the tide is contrary. If during the western monsoon the route through Salayer Strait is to be pursued, borrow towards the East side of Api, and keep well to windward, because by the strong easterly current, sometimes of 32 miles in 24 hours, ships are thrown to leeward of the islands fronting the South end of Salayer, and obliged to pass them to the southward.

In going from Salayer Strait towards the Strait of Sapi, during the south-eastern monsoon, endeavour to fall in with the North point of Comodo, and pass through the eastern channel on the Banta Island side, if not in want

of water ; but in all other cases the western channel seems preferable Two islets lie in the eastern half of the channel.

The **SOUTHERN COAST** of *Sumbawa* is very little known, and the representations we have of it are derived from the ancient charts. In 1864 Don J. Frederico Villoch sailed along its southern side, and has given the following general observations on it. The mountainous coast of Sumbawa, as seen from different points, varies greatly ; generally it appears rocky and covered with bushes. At $1\frac{1}{2}$ mile from its S.W. extreme is a small islet, about three ships' lengths in extent, and near to it to S.W. is one still smaller, and the first point which projects toward them to S.E. is low, even, and terminates in a perpendicular point. The coast from this trends E.N.E. 14 miles, and then S.W. about half that distance, then South for another 4 or 5 leagues, the land being lofty and mountainous, but sloping down to the sea in an extremely low point. From this it runs East and West for 30 miles, when two conspicuous points project to southward, the bluff land between them being remarkable.

At the last of these points a sandbank terminates. It commences at 6 or 7 miles to the West of it, and reaches 10 or 11 miles to the South. Its colour is so marked that it may be compared exactly with the Great Bahama Bank. This is a good point for correcting the reckoning, a difficult matter, on account of the strength of the current, as well as from the frequency of fogs. Its edge is well defined, the colour of the sea changing very suddenly, as if its edges were perpendicular. Beyond this bank to the eastward the coast is lofty and perpendicular, appearing to be quite clean and safe.

COMODO ISLAND, on the East side of Sapi Strait, is but little known. According to the chart of Lieut. W. C. Baars, 1837-8, it is about 25 miles long N.N.E. and S.S.W., and about 8 miles broad, being separated from Floris by the intricate strait of Mangarei. It is high and steep, of volcanic formation, and said to be part of the principality of Bima in Sumbawa.

The North coast of Comodo and the N.W. coast of Floris were first explored in 1843 by Kapt.-Lieutenant Coertsen's squadron. The North coast of Comodo forms a large bay ; when entering it their first soundings were in 35 fathoms, with the North extremity of Api Island N.W. by W. $\frac{1}{4}$ W. and the N.W. point of Comodo W. by S. They steered along shore at the distance of about a mile, and sounded in 32, 35, 30, 28, and 25 fathoms, opposite to a bight where the ships anchored.

The steamer *Hecla* came to in 18 fathoms, hard bottom, with 11 fathoms a cable's length closer in shore, the N.W. point of the bay bearing N.W. by N., the North extremity of two islands contiguous to the N.E. point of Comodo N.E. $\frac{3}{4}$ E., and a small islet N.E. $\frac{1}{4}$ N.

It was easy to land, the coast having a slow ascent ; and fruit trees were in abundance, particularly tamirind and palm trees. The land abounded with deer.

The next day they passed between two islands off the N.E. point of Comodo; rocks above water being seen in the channel nearest to the southern island, they borrowed toward the northern islet.

MANGARAI or Mangerye Strait.—The *Hecla* experienced strong southerly winds at the entrance of the Strait of Mangarai, but the current was so strong that she was drawn in, at the rate of 11 miles an hour! about S. $\frac{1}{2}$ W.; the other vessels, at some distance to the northward, having a light northerly sea breeze. The Strait of Mangarai showed a continued chain of reefs, sandbanks, and islands, with three high peaks, and with apparent channels between them. At 9 a.m. the S.E. extremity of the strait, formed by a high and bold rock, was seen bearing S. by E. $\frac{1}{2}$ E.; at the same time the S.E. point of Comodo, a bold rocky point in the shape of a woman's breast, bore S.S.W. $\frac{3}{4}$ W. The course was then altered to North, but the current, which caused violent rippings and deep whirlpools, was so strong at the time, that the vessel, working with full power, hardly advanced, and could not be kept on its course, veering 4 or 5 points to and fro. After a fruitless search for a passage between the N.E. point of Comodo and the adjacent island (the several islands at the entrance of the strait having been examined by the other ships), they altogether returned through the same channel which they had passed in the morning.

The *Resource*, Captain W. Bligh, went through the strait bound to the northward August, 1789; this, however, appears to be the single case of a ship attempting this most dangerous and intricate passage.

FLORIS, or Ende, or Mangarai, is about 200 miles long from West to East, and from 40 to 50 miles broad, with an area of 4,040 square miles. Its name is perhaps more properly *Flores*, as given to it by the early Portuguese. It has not been surveyed, but it consists of a chain of volcanic hills and mountains, in continuation of the great band passing through Java and Sumbawa. Two of its peaks are active volcanoes, one of them about 7,000 feet high. The people, an inoffensive race, have frizzled hair, and appear to be an intermediate race between the Malays and Papuas, but distinct from either. Cotton and sepan wood are its chief products, but it has little trade. At Potta, on the North coast, the Dutch have (or had) a fort and small post for the suppression of piracy, and there was a Portuguese settlement at Larantuka, near the S.E. end.

The ensuing directions are chiefly those drawn up by the Dutch officer, Lieut. Smits.

Badiak Cove, on the N.W. coast of Floris, is quite sheltered by a chain of islands. It is situated in $8^{\circ} 28' S.$ and $119^{\circ} 48' E.$ Enter by the passage to the southward of all the islands, and anchor in 13 fathoms, the S.E. point of the bay bearing S. by E. $\frac{1}{2}$ E., a point of Floris N. by E. $\frac{1}{4}$ E., the N.E. point of Kanassir N. $\frac{1}{2}$ E., Badiak between W.N.W. and W.S.W., and the

watering place E. by S. This cove is a perfect hiding-place for pirates, several narrow channels between the islets affording them an easy escape in case of a surprise, and the hills in the vicinity an extensive view to seaward. A run of very clear water, from the foot of a cataract, led into a small inlet about 50 paces long, where *sampangs* can enter to fill the water-casks. The cove will be easily found by keeping the northernmost of the islands contiguous to the N.E. point of Comodo W. by N.

There are four islands close to *Cape Kandisang*, the N.W. point of Floris. Between this point and the next island the channel is only half a mile in breadth, which is reduced by the reefs on either shore to 2 cables' lengths; and the high land, producing squalls and variable winds, renders it a perilous passage. It leads, however, into a spacious bay, near the N.E. point of which lies *Bodo Island*, in $8^{\circ} 19' 30''$ S., and $119^{\circ} 59'$ E.

Seraya Island, 2 miles in diameter, lies 3 miles N.W. of Cape Kandisang. Two and a half miles North of its North point is a sunken rock. Sunken rocks also lie 2 miles N.E. by E. of Cape Kandisang, 2 miles S.W. of Bodo Island, and *Vesuvius Rock*, with 2 fathoms water over it, 3 miles North of Bodo Island.

The bays of *Terang* and *Barrie* are separated from each other by a point of land to which *Longso Island* is joined by a reef. The small islet *Koko*, which has an extensive reef, nearly closes the entrance of the Bay of Terang, leaving only two narrow channels between the reefs of Longso and Koko, and between the latter and the reef which stretches along the N.W. point of the bay. Farther inside there are some other shoals with soundings of 9 fathoms between them. All the reefs are steep-to, and mostly dry at low water.

The anchorage in Barrie Bay is in 12 fathoms N.W. or W.N.W. from the village, but deeper in the bay ships lie better sheltered and more conveniently for watering. In 1847 a colony of about 200 Bimanese was settled here, in order to keep away the pirates from this sheltering place.

The Bay of Reo, so called after the village which stands on the S.E. shore in $8^{\circ} 15'$ S., and $120^{\circ} 32'$ E., is bounded to the westward by a high and bold point called *Bessie*, and to the eastward by *Kediending Point*; reefs run off both points about half a mile, and there is a dry sandbank opposite to the mouth of *Yzer River*. The bottom is very steep, and the anchorage in from 30 to 7 fathoms, close in shore. The Yzer River is navigable for proas far upwards, and the stream carries down a considerable quantity of iron ore and also some gold dust.

POTTA.—The road of Potta, in $8^{\circ} 17'$ S. and $120^{\circ} 45'$ E., is bounded to the westward by *Cape Baya*, a bold point bearing due East from Bessie Point. The shore is here so steep-to that in some parts no bottom is felt with 50 fathoms at 2 cables' lengths outside the reef which lines the beach. The anchorage is in 18 fathoms. Cape Baya, bearing N.W. by W. $\frac{3}{4}$ W.,

Potta Village N. by E. $\frac{3}{4}$ E., Passier Point (the East limit of the bay) N.E. $\frac{1}{4}$ N.

The Dutch bark *Diederika*, Captain J. J. Kingdom, in 1847, at 6 p.m., saw *breakers* bearing S. $\frac{3}{4}$ E., distant half a mile, in lat. $8^{\circ} 21' S.$, and long. $121^{\circ} 13' 30'' E.$, about 4 miles off the shore.

A small *sandbank*, bearing S.E. about 8 miles, observed lat. $8^{\circ} 22' 40'' S.$, when this danger was South, distant 1 mile, Paloweh Island bore E.N.E. This sandbank lies about 6 miles off shore, and is surrounded by rocks.

Paloweh is a high island and bold to approach; the peak is situated in $8^{\circ} 19' S.$ and $121^{\circ} 42' E.$ The channel between it and Floris is safe, and about 6 miles wide. The coast of Floris to the southward may be known at a great distance, as it consists of high white rock.

Linguette or *Sukur Island* has a high, sharp peak near the East point, and a hill on its S.W. declivity; the summit of the peak lies in $8^{\circ} 6' S.$ and $122^{\circ} 8' E.$ There is no anchorage near this island, and the reefs projecting from the N.W., S.W., and S.E. points are of little extent; there is a rock above water with a single tree on it on the reef off the S.E. point. *Pura Rock* lies 4 miles South of Linguette.

The **Doffer Islands**, two in number, are joined by a reef; they appear at a distance as three islands, the middle part of the westernmost island being low. From the West point of West Doffer, Linguette Peak bears N.W. by N. nearly. There are sunken rocks lying to a distance of 5 miles West from Doffer Island.

The **Bastaard Islands** are high, particularly the *Great Bastaard*. The mountain on the South part may be known by two ravines. Close to the eastward of it lie six small islets, and to the north-eastward of the easternmost of these, the *East Bastaard*. The coast of Floris to the southward and eastward of this group forms several deep bays, and one of its low points approaches close to the islets to the eastward of the Great Bastaard; the channel between these islands and the point is nearly a mile wide, and the two easternmost islets are joined to each other by a reef. The coast forms several deep bays, and has the appearance of a wall in decay. Nowhere was anchorage found among these islands; it would therefore be dangerous to cruise among them in a sailing vessel. Macassar proas frequent these places, as there is much tripang there, but they are often annoyed by the pirates. Sunken rocks lie a mile South of the S.W. end of the Great Bastaard, and also 2 miles South of the S.E. end; there is also a sunken rock off the West end of the East Bastaard.

Giliting lies at the head of the bay, S.W. of Bastaard Islands; two sunken rocks lie near the shore, and *Reteh Bank*, of 2 fathoms, 4 miles W. by N. of the town.

FLORIS HEAD, or the Iron Cap.—The N.E. extremity of Floris is a

high and steep promontory of considerable extent, called Floris Head, situated in $8^{\circ} 4' 45''$ S., and $122^{\circ} 53'$ E.

The Angelica Reef is stated to lie about 30 miles N.W. by W. from Floris Head; but this position is uncertain. According to Lieutenant Hooft, May, 1844, with the reef bearing E. by N. to N.W., the peak of Linguetto bore S.S.W. $\frac{3}{4}$ W., Poloweh Peak S.W. $\frac{1}{2}$ W., Floris Head S.E. by E. $\frac{2}{3}$ E., lat. observed $7^{\circ} 48' 39''$ S., and had no soundings in 80 fathoms. The reef seemed to extend E.S.E. about 3 miles, and appeared to be about half a mile broad near its extremities, which are nearly even with the water, but only 2 cables' lengths near the centre.

The *Haai* run aground during the night, near the S.E. point of this shoal. When aground she had 6 ft. near the bow, 2 fathoms at the rudder, and 40 fathoms on the edge of the shoal about two ships' lengths to the north-north-eastward; Floris Head bore S.E. by E. $\frac{1}{2}$ E., Ilimandri Peak S.E. $\frac{1}{3}$ E., Lolotobie Peak S.S.E. $\frac{3}{4}$ E., Linguetto Peak S.S.W. $\frac{3}{4}$ W., Paloweh (indistinctly seen) S.W. $\frac{1}{4}$ W., and Toea N.W. by W.; lat. observed, $7^{\circ} 48' 30''$ S.

The reef appeared to extend about 4 miles, and is divided by two narrow channels, which traverse it in a North and South direction, with some dry rocks on the centre.

Pasier Leiyeran or Angelica Shoal is now marked on the charts as 4 miles in diameter, its centre being in lat. $7^{\circ} 46'$ S., long. $122^{\circ} 18'$ E.

Bangalore Reef, on which the ship *Bangalore*, from Amboina, bound to Allas Strait, was wrecked in 1802, is said to extend North and South about 3 miles, with rocks resembling proas under sail. It is very probable that the ship was lost on the West part of Angelica Shoal.

The ISLANDS between Floris and the southern part of Celebes and Salyer are but little known. They were great resorts of pirates, but since 1843 they have been almost cleared out, and they were partially examined by Lieutenant Uhlenbeck, in H.N.M. steamer *Hekla*, in 1843.

The easternmost islands of this group and of the *Tyger Islands* are *Kobona* or *Post Horse* (Postpaard), in $7^{\circ} 25'$ S., and $122^{\circ} 3'$ E., with a reef projecting about $1\frac{1}{2}$ mile from its East point, and *Kabia*, *Pereh*, or *Baars Island*, in $6^{\circ} 56'$ S., and $122^{\circ} 15'$ E.

Madu, or *Pandiang Island*, in $7^{\circ} 28'$ S., is separated from Kalatoa Island by a channel of 3 miles in breadth. Reefs, with much discoloured water and steep-to, run off the points on the West coast of both these islands; the channel between them is free from dangers.

Kalatoa Island is about 6 miles in diameter, with high land at its South end. To the eastward of this high land, and off the S.E. end of the island, is *Cornelia Road*, in $7^{\circ} 24'$ S., long. $121^{\circ} 44'$ E. The anchorage is in sand and coral, in 24 fathoms water, 2 cables off shore.

There are several islands and dangers to the north-westward of Kalatoa,

which are said to extend almost to the islands Latonda and Salayer, and far to the northward, although it appears that there is a passage along the coast of Salayer.

The reefs which line the West coast of Bonerato project in some parts of the bay about 4 cables' lengths from the shore.

The strait between Bonerato and Kalao is safe. *Kalao* is a mountainous island, most elevated at each end; a reef, which is partly dry, and ranging from 12 fathoms, runs off the West point in a W.S.W. direction about 5 miles.

The *Marianne Shoal*, in $7^{\circ} 27' S.$, and $121^{\circ} 13' E.$, extends about 5 or 6 miles East and West, and 3 or 4 miles North and South, having rocks above water on the southern part. From the wreck of the *Marianne*, in 1820, Kalao and Bonerato bore from N. to N.W. by W. $\frac{1}{2}$ W., and Madœ E. by N.

About midway between this reef and Madœ lie two small islets, called *Kajoe* or *Kayu*, which are surrounded by a reef.

Dyampea, or *Tjampeah*, is the largest island of this group; it has a rugged appearance, and terminates to the eastward in a low point. There is an extensive reef on the North side of this island, with overfalls from 30 to 5 fathoms. *Kambarraghie Bay*, on the South coast of Djampea, formed by a projecting point of the land and by several islets which front the South coast, and inside of which there are passages for proas, was much frequented by the pirates. The bay is environed by picturesque mountains, covered with canary and other kind of high trees, and it is considered safe in both monsoons.

Maringi Bay is 5 miles farther to the eastward, at the eastern foot of the peak of Djampea. At from 12 to 18 miles northward of Bonerato is a group of three islands, *Latonda*, *Little Latonda*, and *Kampa*, surrounded by a reef. Between them and the East point of Tjampeh, which is 17 miles West from Latonda, a reef is shown on the chart.

To the westward of the East end of Dyampea are three small islands, *Badjak*, *Batu*, and *Kamarie*; and at 14 miles North of the same point is *Kajoewaddie*, which has a peak on its West point. *Sisir*, a low island, lies 4 miles N.W. from the N.W. end of Dyampea; it is surrounded by a reef, but leaves a clear channel between. At 5 miles to the West of it a reef is reported, and at 7 miles W.S.W. is a 2-fathom rock. *Vesuvius Rock* lies in lat. $7^{\circ} 8' 30'' S.$, long. $120^{\circ} 23' 30'' E.$, $11\frac{1}{2}$ miles S.W. by S. of Sisir, and 36 miles S. $\frac{1}{2}$ E. of it is a doubtful patch.

Mamalak Island, or *Mamalakki*, in $6^{\circ} 40' S.$ and $120^{\circ} 13' E.$, is the westernmost island of this group; it is surrounded by a reef, and the channel between it and Roessa and Tambelaoeang is dangerous.

The channel between Mamalak and the Postillon is 19 or 20 leagues wide, without dangers, and is the usual track of ships from Sapi Strait bound to the Strait of Salayer or Makassar.

During the eastern monsoon ships will experience here a daily set of the current to the westward, from 16 to 30 miles, and during the western monsoon it runs with rather greater velocity to the eastward. Ships working towards Makassar during the eastern monsoon should bring Api Island to bear S.S.W. or S.W. by S. before they cross over; and during the western monsoon it is often very difficult to weather the strait of Salayer after having passed through Sapi Strait, on account of which the passage through the Strait of Allas is now generally preferred.

The route along the coast of Floris and to the northward of Paloweh and L'inguette is generally adopted by ships bound from Sapi Strait to Pitts Passage, and also by ships bound to Amboina late in the monsoon, in March or April, or returning from there in June, July, and August. It is prudent not to stretch over far to the northward on account of the islands and dangers before mentioned, and of some others which are doubtful.

SOUTH COAST of FLORIS.—As the trade on the South coast of Floris is carried on exclusively by proas, and the trade with Sandelhout Island being of little importance, the strait between these islands is seldom frequented, unless by ships navigating between Singapore, or Java and Timor, or Australia.

The *Strait of Mangarai*, or *Mangara*, before described, lies between Comodo and *Rindia*, an uninhabited island, which abounds with wild buffaloes and horses.

There is a deep bay in the South coast of this island, but full of reefs.

Molo Strait separates *Rindia* from Floris; its entrance may be easily known by a high island in $8^{\circ} 46' S.$ and $119^{\circ} 44' E.$ *Alligator Bay* is formed by a neck of land projecting to the southward. The S.W. point of this bay is low and green, and the S.E. point may be known by a perpendicular black cliff, to the south-eastward of which there is a low point, with a remarkable hole in a rock, appearing from the seaside like a sail. The bay is $2\frac{3}{4}$ cables' lengths broad, by half a mile in length, and a considerable stream or river falls into the sea in its N.E. part, where there is a steep bank, extending about a cable's length from the river's mouth; the beach is steep-to in every part of the bay, and no other dangers exist. Although the tides were nearly imperceptible, the rise of the water was observed 12 ft. at the springs.

The South point of *Mangrove Bay* may be known by a brown spot near its extremity, and the North point has a green appearance. Then follows to the northward a bold, rocky, and wooded point, and the next point is high and overhanging.

Cape Sosa, the S.W. point of Floris, appears at a distance as an island, and is situated in $4^{\circ} 49' S.$ and $119^{\circ} 55' E.$ The land falls back north-eastward and forms a bay, near the East point of which lies *Toren* (tower) *Island*, easily known at a great distance by a sugarloaf peak standing near

its western extreme in $8^{\circ} 52' 30''$ S. and $120^{\circ} 11'$ E. *Nanga Ramo Bay*, in which is anchorage, sheltered from the eastward, lies 13 miles E.N.E. of Tower Island. The coast then forms a more extensive bay, terminating in the southernmost point of Floris, on which stands the sharp peak of *Rokka*, in $8^{\circ} 54'$ S. and $120^{\circ} 59'$ E., which has been seen at the distance of 31 leagues; and in $8^{\circ} 50'$ S. and $121^{\circ} 12'$ E. stands the high volcano of *Romba Peak*, southward of which is Keo Bay. The land hereabout is imperfectly known; it appears to be fruitful and well peopled, but the inhabitants are said to be uncivilized and savage. Along the shore a great surf was observed by the steamer *Hecla*, and she ran into discoloured water when in chase of some proas, Romba Peak bearing N.E., and the extremities of the land E. $\frac{3}{4}$ S. and W. by N., half a mile off shore.

ENDE BAY is formed by the high isthmus of Api Head, on which is an active volcano, and bounded to the westward by a bold point, in long. $121^{\circ} 20'$ E. *Ende Island*, opposite to the centre of the bay, has the shape of a gunner's quoin, with the highest part turned towards the South; and appears at a distance as a projecting point of the land.

The coasts here are steep to on all sides; near the southern beach of the bight of *Ambogaga* the first soundings in 36 and 26 fathoms are within 2 cables' lengths off shore. Water is scarce, as well in the village as in the river of Braai. Proas find shelter from westerly winds on the N.E. side of Ende, where good anchorage is found opposite to the ruins of a Portuguese fort, and water may be had there.

The bay to the eastward of Api Head has not been visited, but it is supposed to be safe during the western monsoon. From hence the coast stretches about E. by N., with many remarkable mountains inland, among which the principal are a high volcano, in $8^{\circ} 49'$ S. and $121^{\circ} 52'$ E.; a lofty peak near the shore, which may be distinguished at a great distance in coming from the westward, in $8^{\circ} 48'$ S. and $122^{\circ} 5'$ E.; a mountain with a flat top, in $8^{\circ} 44'$ S. and $122^{\circ} 25'$ E.; and *Lobetobie*, the northern head peak of which forms a sugar-loaf, in $8^{\circ} 32'$ S. and $122^{\circ} 47'$ E.

SUMBA or SANDALWOOD ISLAND, the *Tanna Tyumba* of the Malays, has not been surveyed. It is estimated to have an area of 3,800 square miles, and its people are of the Malayan race, but a distinct nation. The land is mountainous, and like the neighbouring countries is perhaps volcanic. But little is known of it, and there is no trade to boast of.

The North-East coast, about 90 miles in extent, offers a very monotonous view, showing a calcareous wall with a nearly level top about 1,200 ft. high, and from 2 to 6 miles inland, covered with long grass. At *Palmedo*, *Sassa*, and *Tapi Points* the land has a more regular aspect, and the hills about *Roeboe* are rather elevated parts of the wall, but those near Nangamessie and Palmedo are peaked. The East part of Sandalwood appears to be a plain

covered with grass and bushes, and gradually sloping down towards the low points *Tapi* and *Mandieli*.

From *Tapi Point* to *Mandieli* the coast is covered by a reef projecting about 4 miles, with an island upon it formed by some flat rocks about 25 ft. above water, called *Mano*.

Nangamessie Harbour, in the bay between *Atta* and *Mandolo Points*, is formed by reefs projecting from the shore, which are steep-to and mostly dry, and by a detached reef, with only 1 and 2 fathoms water over it, on the East side of the entrance, which is separated by a narrow but deep channel from the rocks of the shore. The space between the reefs is 1 or 2 cables' lengths.

Mandolo Point and *Cape Roeboe* are bold, and *Cape Sassa* rises nearly perpendicularly to a height of 250 ft. on its North and West sides.

The entrance of *Palmedo River* bears S.W. by W. $\frac{1}{4}$ W., about 12 miles from *Cape Sassa*; boats drawing from 5 to 7 ft. can enter at high water. The road may be known by the *Kron Berg*, which is the highest point of the back land, and the top of which is wooded and peaked; and further to the westward another woody peak of about the same height will be seen.

The N.E. Coast of Sandalwood may be approached within 1 or 2 miles, with the exception of the East point of the island. From seaward no villages are visible except *Lenna*, near *Palmedo*, and *Taimano*, near *Nangamessie*.

There is a high peak in the West part of Sandalwood, which may be seen about 20 leagues, and most part of the South coast is seen at the distance of 9 or 10 leagues. The West point of the island, called *Reef Point*, on account of a great reef projecting from it, is in about $9^{\circ} 40'$ S. and $118^{\circ} 59'$ E., bearing S. by W. $\frac{1}{2}$ W. from the southern entrance of *Sapi Strait*.

Cape Blackwood, the South point of Sandalwood, is in $10^{\circ} 20'$ S. and $120^{\circ} 29'$ E., and as high and inaccessible as the rock of Gibraltar, with a low connecting land-tongue, on either side of which lies a spacious bay. The West one seems to be well sheltered by the islands fronting the point, but there are no soundings 3 or 4 miles off shore.

There is a safe harbour sheltered by reefs from all winds on the South coast, in long. $119^{\circ} 28'$, near the populous village *Tida*. There is also safe anchorage near *Treba*, and in the spacious bay of *Wedielo*, near the South end of this island.

Fly Islands are two small islands lying at 14 and 20 miles westward of *Cape Blackwood*; the eastern one is high and rugged, with a small islet off its western end; and the western one low, with a sunken rock West of it.

Niagara Breakers were seen by Captain Fray in 1869, in lat. $10^{\circ} 44'$ S., long. $120^{\circ} 5'$ E., with the largest of the *Fly Islands* bearing N.E. by N., and *Cape Blackwood* N.E. $\frac{1}{4}$ E.

A 10-fathom patch was discovered in 1869 by the S.S. *Corona*, at about 150

miles southward of Sandalwood Island, in lat. $12^{\circ} 26' S.$, long. $118^{\circ} 40' 30' E.$

Savu Islands.—The channel between Sandalwood and Savu is about 15 leagues wide, and has no other dangers than the reef which projects far from the East point of the former island.

Savu, or *Rai Hawu*, may be seen at 8 or 9 leagues distance; it has a sandy and barren aspect, and *Banjoan* is low and wooded.

H.M.S. *Serpent* coasted along the South shores of these islands to verify their positions, and found them fairly correct. They are bold, except that from the East point of Rai Diuwa or Benjoan, an extensive reef was seen on which the sea was breaking heavily. (1869).

Hockie or **Dana** (New Island) is of coral, low, and covered with scrub, having a ridge along its north-eastern side of about 120 ft. elevation, the western part of which is a detached knoll like a short horn. This latter is in lat. $10^{\circ} 49' S.$, $121^{\circ} 16' E.$ Under this ridge, and facing the N.E., is a broad sand beach, which is the only practicable landing-place in fine weather. Off the northern part of this beach is the anchorage in 12 fathoms, sand, with the knoll bearing S.W., and the East point S.S.E. Wild goats abound on the island, but no fresh water could be discovered.

Ships late in the monsoon bound to China, and passing St. Paul and Amsterdam Islands in the latter end of September, October, November, or December, generally proceed through the Ombay Passage. They ought to make the East point of Sandalwood, and to pass between it and Savu, or between the latter and Rotti, if they fall to leeward with N.W. or westerly winds. In former times it was usual to steer for the West end of Sandalwood, and to pass between it and Floris; but the route to the eastward of Sandalwood is preferable, particularly with variable winds, nor can it be required to pass to the westward of Sandalwood unless the wind blows strong from the north-westward with a lee current, when it may be desirable to pass to windward.

STRAITS between Floris and Ombay.—The several straits between Floris and Ombay Islands are narrow, and subject to strong currents and frequent calms, succeeded by heavy squalls from those high mountainous islands, and are therefore but seldom used.

The straits of Floris, Solor, and Lamakwera or Zemandro, are often used by the Dutch vessels of war bound to Timor, and it seems that formerly the Strait of Bolling, or the Dutch Gut, between Lombatta and Adenara, was much frequented. The straits of Alloo and Pantar are very intricate, very deep and embarrassed with strong currents.

In March, 1868, from twenty to thirty vessels had been over three weeks endeavouring to get through Ombay Passage—with the usual luck of losing by day what was gained at night. At length the masters of the *Lord Macauley* (drawing 20 ft.), and the *Westminster* (drawing 22 ft.), resolved to

turn back and try what could be done at Zemandro Strait; after two days they reached the entrance. At noon, Sangi Island bore East of them, and with the strong current and the assistance of a 4-knot breeze they were clear through, and past the dangers at the northern end of the strait in $2\frac{1}{2}$ hours. The *Gossamer* on this occasion passed through Allor Strait.

The STRAIT of FLORIS, between the East coast of that island and the West coasts of Solor and Adenara, stretches N.N.E. and S.S.W., about 12 leagues. The southern part of the strait, along the coast of Solor, is generally called *Lobetobie Strait*, and the northern part the *Gut of Larantuka*. The narrowness of these straits and their strong currents make it unadvisable to resort to them unless in case of necessity.

If intending to pass through the Strait of Floris during the western monsoon, after passing Sandalwood haul in for the coast of Floris, and approach it pretty closely. In coasting to the eastward, *High* or *Hoog*, a high round island in the mouth of the strait, must be passed on the West side. The island is in about $8^{\circ} 40' S.$, and $122^{\circ} 51' E.$, and is steep-to, having no ground near it at 90 or 95 fathoms. There is a ledge of rocks a little to the eastward of it, part of which is visible above water, and other islands and rocks front the South part of Solor. At a small distance inside High Island two other rocky islets form the passage, which are seen when the strait is open; they bear W.S.W. and E.N.E. from each other, distant half a mile or more, having soundings of 40 and 30 fathoms mid-channel, but the common passage is on the East side of these two islets.

The S.E. point of Floris, at the foot of the high peak or *volcano of Lobetobie*, is of a green aspect, resembling a gunner's quoin, from which a reef projects with 9 fathoms near its edge. The peak of *Ilimandri* bears N.N.E. of the point.

At Larantuka, a village, where the Portuguese have a settlement, good water and refreshments for two or three vessels may be had. The anchorage in the Bay of Larantuka, about 1 or $1\frac{1}{2}$ cable's length off shore, is considered more safe than nearer Adenara, but the bottom is the same.

The *narrows* of Floris Strait are about 3 cables' lengths wide, with soundings in 16 fathoms, mid-channel, 12 and 11 fathoms nearer to Adenara, 14 and 15 fathoms on the Floris side of the strait, and deepening suddenly to 19 fathoms, no bottom when to the northward of the narrows.

The flood sets to the northward and the ebb South. The tides change regularly every six hours. H.N.M. frigate *Triton*, December, 1838, observed the ebb to run 2 or $2\frac{1}{2}$ knots, but the flood 5, the latter to set in very irregularly, with violent riplings, which make it dangerous to anchor in the entrance of the strait. It was high water at 12 o'clock two days before full moon.

Ships from the southward, when leaving the narrows, should haul in for Adenara, because the tide, setting strong round the point of Floris, will be

liable to drift them on the reef which projects from this point, or to horse them into the Bight of Floris outside the point, which is shoal all over.

Ships coming from the northward may anchor off the village of Adenara, either to get out the boats and take every precaution requisite before they proceed into the strait, or to procure refreshments. When Serbette bears N.W. by W., and Komba N.E. $\frac{1}{2}$ E., Adenara village bears S.E. by S.

Serbette Island, situated in the northern entrance of the strait, is $8^{\circ} 8' 30''$ S. and $123^{\circ} 1'$ E., bearing S.E. by E. $\frac{1}{4}$ E. from Floris Head, and N. by E. $\frac{1}{2}$ E. from Ilimandri Peak, is a low island, uninhabited, and visible from the deck about 8 or 10 miles. It is surrounded by an extensive reef, partly dry, from the eastern extremity of which Ilimandri Peak bears S.W. $\frac{1}{2}$ W., and Wokka Peak S.E. $\frac{1}{4}$ E. The reef extends about the same distance nearly 2 miles to the westward, and the channel inside between it and Floris is apparently clear.

KOMBA ISLAND, or *Batutara*, is high, and stretches North and South about 3 miles. The peak on the southern part is in $7^{\circ} 48'$ S., and $123^{\circ} 34'$ E. It is an active volcano, and was seen during an eruption by Captain the Hon. H. Keppel, R.N. From the West coast of this island Wokka Peak bears S.S.W. $\frac{1}{2}$ W., the N.W. peak of Lomblen S. $\frac{1}{2}$ W., and Lobetobie Peak S.E. $\frac{1}{2}$ E.; and from its East coast the two tops of the latter mountain bear S. by E. $\frac{3}{4}$ E. and S.S.E., and the West peak of Lomblen S. $\frac{3}{4}$ W. It is an excellent guide for ships coming from the Banda Sea and bound to the Strait of Floris, which bears S.W. $\frac{1}{4}$ W. It may be passed on either side in steering for the Strait of Floris during the eastern monsoon, because the currents are strong to the westward.

Jessie Shoal lies 24 or 25 miles N.E. $\frac{3}{4}$ E. of Pulo Komba. The high land of Lomblen is visible from it. The rock is level with the top of the water, but no breakers were seen. It must be the same danger as the Mackie Shoal, discovered in 1826.

SOLOR STRAIT.—Vessels bound to Timor, after passing through the Strait of Floris, generally proceed through the Strait of Solor, between the islands Solor and Adenara; it stretches about East and West, and is 3 miles wide. There is no anchorage, except close in-shore, and the Solor side of the strait is preferable, as the squalls are not so frequent there, Solor being less elevated than Adenara.

Lawang, on the North side of Solor, has the ruins of a Dutch fort. Good water may be had on the opposite shore, North of Lawang.

The village of *Lamakwera*, near the N.E. end of Solor, is in $8^{\circ} 26'$ S. and $123^{\circ} 9'$ E. The ebb sets to the northward and the flood to the southward; sea-breeze southerly, and land-breeze northerly and light. In approaching the anchorage, the lead ought to be kept going as the soundings decrease rapidly towards the village.

There is a reef a little to the westward of Lamakwera, of $2\frac{1}{2}$ fathoms, the

North and N.E. points of Solor bearing W. $\frac{1}{2}$ S. and S.S.E. $\frac{1}{2}$ E. There is a safe passage between the reef and Solor.

BOLENG STRAIT, the "*Dutch Gut*," was much frequented by the Dutch Company's ships, and, according to their charts, there are soundings all through it, and anchorage in 20 to 9 and 6 fathoms in the Bay of Lomblen. The northern entrance of the strait bears about S.S.W. $\frac{1}{4}$ W. from Komba Island. In the centre of this entrance are the Boleng Islets, about $2\frac{1}{2}$ miles West of the N.W. point of Lomblen, and surrounded by a reef. The N.W. end of Lomblen is also fringed with a reef, but in mid-channel the depth appears to be good—no bottom at 50 fathoms. Dutch charts show but an exceedingly narrow passage between the Boleng Islets and Adenara. The Lomblen side of the strait appears the safest, and it is said that there is anchorage in Lomblen Bay in 19 to 9 and 6 fathoms.

LOMBATA or *Lomblen Island*.—The S.W. point of Lomblen bears S. by E. $\frac{3}{4}$ E. from the N.E. point of Solor. The South and West coasts of this island are high and bold, volcanic, and of a barren aspect. *Soangie Island*, easily known by a hole which opens when it bears N.W. $\frac{3}{4}$ W., is in $8^{\circ} 35' S.$ and $125^{\circ} 13' E.$, and bears S.S.E. from the S.W. point of Lomblen, and W. $\frac{3}{4}$ S. from Lamarap Peak; it has a green aspect, and may be approached within a short distance.

ALLOR or *Maurissa Strait*.—In approaching the Strait of Allor, along the South coast of Pantar, the seaman is struck with the appearance of four islands, but the easternmost proves to be the high S.W. part of Pantar, the second the West part of the same island, joined to the body of the island, by a low land-tongue, though, according to Lieut. P. F. Uhlenbeck, D.R.N., it is detached; the next is *Nubatan* or *Babi Island*, which may be called low in comparison to the surrounding land; several rocks and reefs project from it, especially from the South point; another reef projects a considerable way from the North point in a N.N.E. direction. The fourth is Nabokam or Rusa, which has a reddish, rocky, and barren aspect, and is dangerous to 3 miles off its S.W. coast. When Little Island is in one with the West part of Pantar, the opening of the strait will be discerned.

The high S.W. foreland of Pantar has a reef running off in a southerly direction, on the outer edge of which lies a large rock with heavy breakers; the passage between Klein Island and Pantar is thought to be very dangerous, and seems never to have been examined. A high rock is joined by a reef to the westward of Middle Island. The western isthmus of Pantar and Little Island has nearly the same level aspect; but the N.W. point of the isthmus may be known by a group of seven trees on it. The N.W. coast of Pantar stretches about N.E., forming several bays, and a reef runs off the North point about 2 miles, with many rocky points visible above water:

Green Island is small, round, and high, consisting of reddish rock. It

appears from the eastward like a sand-hill, but when viewed from the southward it has a green appearance. *Flat Island* is very low ; its North side is covered with shrubs, but the southern part is barren. The *Pantar* perceived only one low island, but the *Hecla* saw two, possibly united at low water. A reef, with several ledges of rocks a little above water, projects about N.E., 4 miles from Green Island. The western edge of this reef runs along the West coast of Flat Island, and joins it to Green Island.

The N.E. point of Lomblen is fronted by a reef with heavy breakers ; but a little to the southward of this point the coast is clear as far as the next projecting point, which is also fronted by high rocks, and near which there are no soundings.

A $2\frac{1}{2}$ -fathom patch lies in the middle of the narrow part of the strait, between the N.E. point of Lomblen and the West point of Pantar.

The *Currents* in this strait are most violent at times, and render a ship quite ungovernable, should it fall calm, as is frequently the case. Added to these evils, the depth is usually unfathomable, and affords no anchorage. The Dutch sloop of war *Pantar* was thus drifted to and fro for several hours in the greatest peril, in June, 1839, and only saved by a southerly breeze springing up at midnight. These considerations should weigh with a commander before he ventures to take this strait.

The strait of Allor may be easily known, as well from the North as from the southward, by the high double peak *Lobetolle*, near the N.E. point of Lomblen, in $8^{\circ} 12' S.$ and $123^{\circ} 43' E.$, bearing N.N.W. $\frac{1}{4}$ W. from the middle channel. Green Island is also a good guide in coming from the northward ; and Lomblen and Pantar being both very high land, the strait will be easily discerned.

It is not advisable to attempt this passage, when bound to the southward during the eastern monsoon, as it would be difficult to get through in one tide, the winds then generally blowing strong from South to S.S.W.

Great care is requisite when sailing along the entrance of Allor Strait, not to approach Lomblen within 4 leagues distance, as ships are liable to be horsed in the strait by the current, as happened with the Dutch frigate *Maas*, in 1839. In general, great attention is to be paid to the currents when passing near any of the eastern straits, as ships have often been carried into them. The *Pantar* observed high water between 9 and 10 a.m., two days before full moon.

PANTAR, Putar, or *Pandai*, which forms the eastern side of Allor Strait, is but little known. Its western side was examined by Lieut. L. J. de Vrieze, in 1839. The people are rude, half-naked heathens, with dark brown complexions and frizzled hair, and are not to be trusted. It is high and most probably volcanic.

The STRAIT of PANTAR is formed between the island and the West

side of Ombay. The N.W. end of Ombay is high bold land, and the distance from it to the N.E. point of Pantar is 5 miles; but in the northern part of the strait there are three islands. The northernmost of these, called *Panjang* or *North Island*, in about $8^{\circ} 8' 40''$ S. and $124^{\circ} 17'$ E., is low, and on the middle of it there is a small hummock. Another island, in the form of a cone, bears S. $\frac{1}{2}$ W. from the former, and the third, called *High Island*, is much larger, and terminates in a double peak, nearly as high as the N.W. end of Ombay or the peak of Pantar; and the land abreast of it forms a bay on both sides the strait. There is a deep inlet to the N.E., and a Malay village near the beach in the back part of this bay. *Twerin* or *South Island*, situated in the southern entrance of the strait, in about $8^{\circ} 29'$ S. and $124^{\circ} 14'$ E., is high. The proper channel through is between the islands in the North part of the strait and the Ombay shore, and out to the southward on either side of South Island; but the passage West of the latter is preferable. The narrowest part of the channel is between the N.E. point of High Island and the North point of the inlet that stretches into Ombay, and is 2 or 3 miles wide.

A high mountain, forming a saddle, stands on the southern part of Pantar; its southern peak is in $8^{\circ} 32'$ S. and $124^{\circ} 6'$ E.

The **OMBAY PASSAGE**, between Ombay and the North coast of Timor, is 16 miles wide in the narrowest part. It has apparently deep water throughout, and there is no danger known, but it has not been surveyed.

The most eligible route for ships late in the season bound to China is by the Ombay Passage, to proceed to the westward of Buru, then through Pitt and Dampier Straits, or the Gilolo Passage. After making the East point of Sandalwood Island, pass between Timor and Ombay, and haul close round the East point of the latter island to the northward.

OMBAY, Ombai, or Allor, extends nearly E. and W., about 19 leagues; it is all high, but most so at the eastern part, and is covered with beautiful high trees to the summit of the highest ridges of its mountains. The inhabitants are of the Malay Negro race, with dark complexions and frizzled hair. Like the Dyaks of Borneo, they are ferocious head-hunters, but content themselves with the lower jaw. On the coast some of the people profess Mahomedanism.

It is about 50 miles long from West to East, and its West end is deeply indented by a large bay. It is of volcanic formation, but is not known to contain any active volcano. The S.E. point is formed by a bluff white rock, in $8^{\circ} 21'$ S. and $125^{\circ} 14'$ E. A sunken rock lies near this point; and off Biluka, 15 miles to the westward, two sunken rocks lie near the shore.

WETTA is also high and bold, extending E.N.E. and W.S.W. about 19 leagues. *Dog* (or *Honden*) *Island*, off the N.W. point of Wetta, is in $7^{\circ} 41'$ S. and $126^{\circ} 1'$ E.; and *Liban*, or *Babi*, is another high island, separated by a channel of about 2 miles broad from the S.W. end of Wetta. The West

coast of Wetta is faced by reefs, and the channel inside Babi is said to be unsafe. The mail steamer *Normanby* reports (in 1875) having struck on a reef extending three-quarters of a mile from the South end of Libau Island. A break was also observed on what was supposed to be a sunken rock, lying 3 miles East of the South point of Libau Island.

The *Nautilus Reef*, of 1839, N. by E. 3 miles from the North end of Libau Island, is partly dry, extends S. by W. and N. by E., about 3 miles, and a mile broad. The reef consists of sand and small rocks, with some dry coral patches, and there are soundings of 20 fathoms, 1 or 2 cables' lengths to the eastward of it, regularly decreasing towards the shoal, over a bottom of white sand.

The East point of Wetta is in about $7^{\circ} 45'$ S. and $126^{\circ} 47'$ E.; it is not advisable to approach this island closer than 4 miles, as H.N.M. schooner *Janus*, 1840, saw breakers near the S.E. part, about 2 miles from the shore.

H.N.M. sloop *Dourga* anchored abreast of the village *Sawu*, which is near the middle of the South coast, in 50 fathoms, and found it sheltered from south-easterly winds, by a projecting point of land.

KAMBING, an island which lies on the N.E. side of the Ombay Passage, is said to be about 12 miles long, North and South, and, like the rest of this neighbourhood, has not been surveyed. Its name means "goat island," and is applied to it from the number of a small species of deer found on it. Its surface is hilly, and near to its South end is a peaked mountain, on the summit of which is a mud volcano. This remarkable feature consists of twelve hillocks, from which, at regular intervals, is a discharge of gas and mud, the mud forms the cones, and the saline water trickling down the sides is a great attraction to the deer.

Kambing Island extends N.N.E. and S.S.W. about 8 miles; from its N.W. point the peak of Babi bears N.E. $\frac{1}{4}$ N. In 1844 Lieutenant Hooft's squadron approached the West side of this island, within 4 cables' lengths abreast a village situated in the mountains; the boats got no bottom at 65 fathoms, about two ships' lengths off shore, and had 9 fathoms rock bottom almost at the beach. The boats were at first received in a hostile manner, and the natives rolled large stones from the tops of the hills in order to impede the ascent along a steep path, but afterwards the commanding officer succeeded in establishing an intercourse with them. They appear to be but little civilized, and they had no firearms nor ornaments which might reveal any former intercourse with Europeans. In some parts of the West coast there are narrow beaches about 150 paces broad, but the land then ascends like a steep wall; wherever the ground permits cultivation, palm-trees and fields of jagon are seen. A sounding of 1,780 fathoms, mud, has been taken at 5 miles South of the S.E. end of the island.

H.N.M. steamer *Hecla*, with the other ships in tow, coasted within a short distance along the North and East sides of this island, without finding an-

chorage. The shore was found to be steep-to on all sides, except near the N.E. point, from which a reef projects about 2 miles. The North and East coasts appear to be still more inhospitable than the West coast, and do not offer even a landing-place. No villages are seen there, and no other boats than very small *lippas*.

The channel betwixt Kambing and Babi is 5 or 6 miles wide, and that between Kambing and Ombay about 5 leagues; both are subject to strong currents, and in the northern part of the latter, in lat. $8^{\circ} 10' S.$, long. $125^{\circ} 20' E.$, a rock has been reported.

KISSA or Kisser Island.—The centre of Kisser Island is in $8^{\circ} 6' S.$ and $127^{\circ} 10' E.$ The Dutch fort *Vollenhoven*, on the West side of this island, was evacuated long since, but is kept in good condition by the Malay inhabitants, who are Christians. Near the edge of the reef there is no bottom with 80 fathoms, and the soundings on it are very irregular, 5 and 10 fathoms, with overfalls of 30 fathoms.

Roma Island.—The West point of *Roma* or *Teralta* bears East about 11 leagues from the East point of *Wetter*, and is in $7^{\circ} 38' S.$ and $127^{\circ} 19' E.$ The *Dourga* anchored in 7 fathoms on a sandbank, which projects half a mile to the northward of *Medta Island*, which is very small, and bears South 3 leagues from the West point of *Roma*, and about 3 miles from *Kamong Dieroesoe* on *Roma*. During the north-western monsoon ships many anchor in the bight to the northward of that village, to leeward of the West point. It is necessary to moor the ship with a cable on the shore here as well as at *Kisser*, to prevent her being driven to sea when the land breeze blows hard.

TIMOR or TIMUR is the largest of this eastern range, being in area about one-fourth that of *Java*, or double that of *Jamaica*. It is about 370 miles long, and 50 in its greatest breadth. It lies in an oblique direction to the westward chain of islands, and unlike them, is of different geologic formation; instead of volcanic rocks, it consists of sedimentary clay slates and madreporic limestone, containing many caverns. But it is subject to frequent earthquakes, one of which, in 1794, did much damage to *Koepang*.

It is also very different in climate to the islands West of it; instead of the luxuriant vegetation there seen, *Timor* is covered with a stunted growth more resembling the northern part of *Australia*. This fact very much diminishes its value as a colony. The inhabitants seem to be a race intermediate between the Malay and Papuan Negro. They resemble in many respects the *Dyaks* of *Borneo*. They are seemingly divided into three tribes, differing chiefly in dialects. Their character and that of the climate and soil of *Timor*, have made it a comparatively unimportant possession of the European powers, the Dutch and Portuguese, who have settlements on it.

But it is interesting as a link between *Asia* and *Australia*, and it is this political view which has caused the above-named European powers to retain possession of their posts, although, probably, at a considerable annual

sacrifice. The western part is nominally at least, under the Dutch, whose chief port, and also the principal place on the island, is Koepang or Kupang, at its S.W. end. It forms part of the Banda Residentie, which extends hence to the Arru Islands, having the Banda Islands as their chief place. All the north-eastern portion is or was claimed by the Portuguese, but in 1860, according to the last cessions to the Netherlands, Portugal has now only the North coast with the Island Kambing. These, however, are far from profitable, for while, in 1867-8, the receipts of the government were £27,900, the expenses were £99,000.

The climate of Timor, especially the western portion of it, resembles that of northern Australia, differing essentially from the healthy climate of the Moluccas and from the islands to the westward of it. The westerly monsoon, which ordinarily sets in in the middle of November, continues till April, brings heavy rains and overcast weather, which is very detrimental to European constitutions. While during the easterly monsoon in the rest of the year, the weather is almost always clear, and the rains moderate, so that, notwithstanding the great heat, the air is not unhealthy. This great variation in climate, from extreme humidity to intense dryness, is much greater in Timor than in the adjacent countries. In eastern Timor, during the dry season, not a drop of rain falls, and the natives, their cattle, and the vegetation alike suffer from the intense drought. But it is free from wind, storms, and cyclones, although thunder and lightning are of daily occurrence in the wet season.

SAMAQ, **Semao**, or *Samauw*, a small island 20 miles long and 7 broad, lies off the S.W. end of Timor. The eastern side consists of a chain of mountains of moderate height, the rest is a sterile, sandy plain. A remarkable fig-tree, called by the natives Noemoek, making a small forest of three thousand stems, is an object of veneration. The native *raja* of Timor resides here.

The Strait of Samao, separating the island from Timor is about 3 miles broad and 15 miles long, affording good anchorage and shelter in the south-west monsoon, when there is none in the road or anchorage at Koepang, opposite to it. The strait has soundings of 30 to 60 and 70 fathoms in mid-channel. Between Bolk, and Tanal Point on the eastern side of the strait, also at Haiyina Sissi the N.E. point of Semao Island, long and dangerous spits project from the shore reefs; they are, however, easily seen when the sun is in a favourable position.

Point Oijsma, the S.W. end of Timor, is in lat. 10° 20' S., long. 123° 26'; it has a reef extending to the S.W. with heavy breakers, and soundings of 12 to 18 fathoms near its edge.

KOEPAHQ or **KUPAQ**, on the South side of a deep bay is, as above said, the chief Dutch settlement. They first took the place from the Portu-

guese in 1613, and erected the *Fort Concordia*, which remains to this day, but is in a ruinous condition. It is a port of call for the Netherlands' India Steam Navigation Company's boats. An aqueduct carries a good supply of excellent *water* to the beach. *Coal* can generally be obtained at a settlement on the South side of Koepang Bay; the price is about £5 the ton (1877). The flagstaff is in lat. $10^{\circ} 10' S.$, long. $123^{\circ} 34' 30'' E.$

A *red light* is shown from a post on a house at Koepang, elevated 40 ft.

Pakoela Point, the North point of the bay, is low, having sunken rocks extending nearly a mile from it, and may be known by a tree, which stands separate from the others, and is visible long before the low point can be discerned. *Tikoes* is a small, round, wooded isle, situated on the edge of the reef which lines the North point of the bay, and when the point bears E.S.E. $\frac{1}{2}$ E., it is seen just touching the islet. *Kera* is a low, sandy isle, in the middle of the entrance of the bay, surrounded by an extensive reef, on either side of which there are clear channels. When this island bears S.S.E. 1 mile, and Tikoes E.N.E. 3 or 4 miles, soundings will be got in 60 fathoms, sand and coral, decreasing to 50 and 38 fathoms about half a mile from Kera; come no nearer to it on account of its surrounding reef, which projects much farther from the West and S.E. sides. It is partly dry at low water, which is always discoloured.

Selamo Peak, in $9^{\circ} 57' S.$ and $123^{\circ} 39' E.$, has a remarkably rugged appearance, and may be seen long before Samao and Rotti are discerned in coming from the westward.

The reefs between Tikoes and Boerong, and those which project to the south-eastward of the latter isle, are partly dry at low tide, and they are steep-to from 10 or 8 fathoms to 2 or $1\frac{1}{2}$ fathoms. To avoid the first, these islands ought not to be brought in opposite bearings.

Good water may be easily got to the N.N.W.-ward of Boerong, where boats can approach close to the beach. There is also a small river near the village of Selamo, but boats cannot approach unless at high water. Captain Stokes says that the good water is above the fall, and that water should not be taken within the tidal influences; that so taken in the South corner of the bay is liable to produce dysentery.

Ships may procure here cattle, poultry, and fruits. They ought not to go nearer in than 16 fathoms, as it shoals rapidly from 9 to 2 fathoms. When it is blowing weather from N.W., ships are often obliged to leave this anchorage and to search for shelter near Boerong or under Samao; but the latter anchorage is foul, rocky, and steep, and, as the currents set with great strength through the Strait of Samao, ships are liable to be driven into deep water if the anchor should drag.

The channel to the southward of the island of Kera is also safe, and the reefs which surround that island are easily perceived by the colour of the water; they project about $1\frac{1}{2}$ mile to the westward, and the sea generally

breaks heavily on the northern edge. The northern passage is, however, preferable, there being soundings in it from 40 to 25 fathoms, which will enable ships to anchor when overtaken by a calm. In the southern passage the first soundings are got about 3 miles from Koepang.

The *tides* in the bay are weak. It is high water, at full and change of the moon, about 11 o'clock; the rise at the springs is 9 ft., and at neap tides only 4 or 4½ ft.; the flood comes in from the westward.

ROTTI lies 17 miles South of the S.W. point of Timor. Between them is the island of *Lando*, joined to Rotti by shoal water. It is a dependency of the Dutch Government of Koepang, but is governed by several (fifteen it is said) native princes or rajahs in a feudal manner, which the rugged nature of the country allows, each seigneur residing isolated in his rocky territory in the hill fortresses. They are industrious, and are a better looking race than the people of Timor.

The Strait of Rotti lies between Lando and Timor. Rotti is of middling height, visible 12 to 14 leagues distance; it is fronted by several islands, and has many fine bays and inlets.

With the exception of Beatrice shoal, the strait of Rotti seems to be free from dangers. In some parts there are soundings in 60 fathoms, decreasing towards Rotti.

Beatrice Shoal, in lat. 10° 31' 30" S., long. 123° 35' E., was discovered by Commander John Hutchinson, of H.M. Surveying Vessel *Beatrice*, and subsequently Mr. Waleson, the harbour-master of Koepang, succeeded in finding on it a knoll with only 5 ft. water, over which the sea almost always breaks. The shoal is an oval-shaped coral bank, lying E.N.E. and W.S.W., half a mile in extent. Soundings of 3 to 6 fathoms are found on its central part (where probably the knoll is), deepening to 8 and 10 at either end, where there is tolerable anchorage; outside this the reef falls steeply into deep water. The centre of the shoal is on the following bearings:—N.E. point of Oessoe Island (the island East of Landu) W. ½ N., 7½ miles; the conspicuous double hill over the point, W. ¼ N.; the high, flat-topped hill of Rotti, S.W. ¾ W.; S.W. point of Timor (entrance of Semaó Strait), N.W. ¾ N.; White Cliffs of Timor, N.E. northerly.

The West coast of Rotti is fronted by some islands between which there is a passage. These islands are low, the southern ones particularly so. The exception is a rocky islet with steep cliffs, lying in the channel between Dana Island and the main, which is conspicuous at 20 miles distance, when all the neighbouring land, except the hills of Rotti, has dipped. The only anchorage recommended about the islands is on the North side of Noesa.

Douw is the westernmost island, and is famous for its goldsmiths, the most expert in the archipelago. Their filagree ornaments are much prized for their beauty and neatness. Two smaller islands lie adjacent to the N.W. point of Rotti.

When passing the N.E. point of Oessoë the water was suddenly shoaled by H.M.S. *Serpent* to 5 fathoms, the point then bearing N.W., $1\frac{1}{2}$ mile distant. The shoal was not examined. An unexamined coral bank, on which the least water obtained whilst crossing it was 15 fathoms, lies $3\frac{1}{2}$ miles W.N.W. of Dana, the southernmost of the islands off Rotti. No examination was made of it.

The islands of Lando and Rotti form two safe roadsteads; the entrance to *Rango*, on the North side of Rotti, is from the eastward, and is difficult to go out during the eastern monsoon. The entrance to *Karbafo Bay* is from the westward, rounding the reef which projects from the S.W. point of Lando; ships lie there quite landlocked.

H.N.M. schooner *Circe* anchored, in 1846, in the road of *Baa*, on the North coast of Rotti, in 15 fathoms, with Tormana Rocks bearing N.E. $\frac{1}{2}$ E., the flagstaff S.E. $\frac{1}{2}$ S., and the extreme West point of the land seen between two islets W. $\frac{3}{4}$ S., in $10^{\circ} 44' 42''$ S., and $123^{\circ} 1' 40''$ E.

The English ship *Abercrombie*, bound to China, after being dismasted to the southward of Sandalwood, anchored in *Boykaai Bay* on the South coast of Rotti, January 1812, in 21 fathoms, soft bottom, 3 cables' lengths off shore, and procured there water and refreshments. This is perhaps the same bay which was visited by Captain R. Spratley, of the *Cyrus* whaler, which is formed by the islands *La* and *Mano*, fronting the coast, and inside of which there is safe anchorage in $10^{\circ} 52'$ S. and $123^{\circ} 5'$ E. It is high water in Cyrus Harbour, at full and change of the moon, at 12 o'clock, and the tide rises 5 or 6 ft.

There exist several shoal patches, and probably dangers, off the East side of Rotti, but they are very imperfectly known. The *Satellite Rocks* are about 4 miles from the nearest part of the island off the N.E. point of Rotti, a hummock on the centre of which bore W. $\frac{1}{4}$ S. and the S.W. point of Timor N. $\frac{1}{4}$ E.

The SAHUL BANK is said to be dangerous in some places, but there is reason to believe that it is not so extensive as laid down in the charts, where it reaches from $10^{\circ} 40'$ to $11^{\circ} 30'$ S., commencing near the East point of Rotti, and stretching to the eastward upwards of 2 degrees.

As the dangers of this bank have never been examined, it should be avoided, and vessels should not stretch over so far to the southward in sailing along the South coast of Timor.

The NORTH COAST of TIMOR extends for nearly 40 miles in an irregular N.N.E. direction to *Gomok Point*, E.S.E. of which is *Timu Peak*. *Nolloi* anchorage lies North of Timu Peak, in lat. $9^{\circ} 52'$ S., long. $123^{\circ} 52'$ E. At 15 miles to the N.E. of Gomok Point is *Sutrana* or *Sotroma Road*, which lies off the mouth of a small river S.E. of *Jula Island*. A sunken rock lies about a mile westward of the mouth of the river.

Menango, a sandbank or rock which appears only in old Dutch charts, has

since been seen by Captain C. Hart, who describes it as a small patch a little above water, or even with the water' edge, situated in lat. $8^{\circ} 41' S.$, long. $123^{\circ} 51' E.$ It lies 6 miles off shore, and 6 miles S.W. of Gula.

Gula or *Goela* is a small island of middling height in $9^{\circ} 15' S.$ and $124^{\circ} E.$, distant 6 or 8 miles from Timor, and bearing N. by W. from Timoe Peak, which is in $9^{\circ} 33' S.$

Tulang Ikan Bay is in long. $124^{\circ} 16' E.$ Sunken Rocks lie just off the shore at 2 and 5 miles westward of it.

Liefou, a portuguese settlement, in $9^{\circ} 12' S.$ and $124^{\circ} 24' E.$, or $24' E.$ of Goela Island, according to the observations of D'Entrecasteaux, has an open roadstead, which is separated from *Tolanican Bay* by a low point. There is anchorage near the village of *Koesie* in 22 fathoms, 2 cables' lengths off shore, the houses bearing about South, Liefou Point E.N.E., 2 miles distant, and Gula West. A vessel might anchor near Sotrana in 30 to 40 fathoms, foul and rocky ground, about $1\frac{1}{2}$ cable's length off shore, with the houses bearing S. by W., Gula Island N.W. westerly, extremities of the land N.E. by E. and W. $\frac{1}{2} S.$

Atapopa is a Dutch settlement, in lat. $8^{\circ} 59' S.$, long. $124^{\circ} 50' E.$, 28 miles eastward of Liefou, which cannot be seen at more than 2 miles distance, as the land rises immediately behind it. The land thereabout is remarkably rugged, in some parts rocky and barren, but generally wooded. To Dutch Point, 7 miles westward of Atapopa, the coast is foul, and for 5 miles to the eastward. The outer anchorage is in 36 fathoms, half a mile off shore, N.W. from the village of Dolilo, and with a tomb at Atapopa in line with a gap, S. by E. $\frac{1}{2} E.$ This is also the leading mark through the narrow entrance in the reef into the inner harbour.

Gedeh is a Portuguese settlement in $8^{\circ} 57' S.$ and $124^{\circ} 55' E.$, as observed on board H.N.M. frigate *Boreas*, in 1838. It lies in a valley surrounded by picturesque mountains, and is frequented by whalers. It is fronted by a rock, which bears N.N.E. from the flagstaff, and with soundings near it. The *Boreas*, coming from the westward, had no soundings till within 4 miles of the road, then 65, 55, and 50 fathoms, decreasing to 35 fathoms, a cable's length off shore; being becalmed, she was towed round the West point of the bay, and steered for the rock in soundings of 42, 50, 45 to 26 fathoms, brownish sand, where she came-to, the flagstaff bearing S.S.E. $\frac{1}{4} E.$, distant 2 cables' lengths, the rock N.E. $\frac{3}{4} N.$, N.E. point of the road N.N.E. $\frac{1}{2} E.$, and Pantar Peak N.W. by W. $\frac{1}{2} W.$ It is very tedious work to water here, on account of the great surf on the beach. The best landing place is abreast of the fort, where the boats come to their grapnel. The tides in this road and farther to the westward close in-shore, change, but are very weak. A sunken rock lies 2 miles off shore, on the North side of the anchorage, with Mount Sukekit bearing S.W. by S.

DIELLI, or Dilli, belonging to the Portuguese, is the principal port on

the North side of Timor, where the Netherlands India Steam-Navigation Company's boats and other ships proceeding through the Ombay passage sometimes stop for supplies. Lieutenant Kolff gave a sad picture of it in 1825, when he visited it in the *Dourga*, and Mr. A. R. Wallace, the naturalist, who visited it in 1861, says "it is a most miserable place compared with even the poorest of the Dutch towns. The houses, the custom-house, and the church are all built of mud and thatch; the fort is only a mud enclosure." Dilli is much frequented by whalers, and has a considerable trade in wax and sandalwood. The flagstaff is in $8^{\circ} 34' S.$ and $125^{\circ} 37' E.$ From the low situation of the town under the high land, it is with difficulty perceived when coming from the northward, but to the eastward of it there is a bluff projecting point by which it may be known. Off this bluff, at the distance of half a mile, is a reported 3-fathoms patch. The houses and the flagstaff will be visible when about 4 miles distant from the Timor shore, with the peak of Kambing bearing N. $\frac{1}{2}$ E. Large ships, which only stop for refreshments, should anchor at a fit distance outside of the reefs which form the inner harbour, as the channel between the reefs is very narrow, and there is little space inside of them.

A good outer anchorage is on the *Brilliant Bank*, on which 15 fathoms least water is found, with the signal-tower bearing E.S.E. 2 miles distant, and Fatukama, the East point of Delhi Bay, N.E. by E. $\frac{3}{4}$ E. This bank is three-quarters of a mile long E.N.E. and W.S.W., and was first made known by Captain Walker in 1867.

The inner harbour is formed by the reefs running off the bay points and another detached reef between them, which are mostly dry at low water, and consist of sand and coral. The western entrance, on the North side of which is a *white* buoy, is the widest and most used, but it is difficult to run out through this channel when there is no land breeze. The new lighthouse is on the reefs forming the South side of the western entrance, and the white buoy above mentioned, bears N.E., distant 2 cables' lengths from it.

To enter the harbour of Dielli from the westward, pass mid-channel between the lighthouse and the white buoy in soundings from 10 to 6 and 14 fathoms. The instant a ship hauls round the reef near the West point of the bay, sail should be reduced. Steer for the custom-house, which is a large building standing near the beach, to the westward of a high tree, and keep it in one with the gate of the church, which will lead you close to a coral patch, on which a bamboo has been planted in 10 or 11 ft. When inside of this patch, haul in for the West part of the harbour, and come-to in 9 fathoms at an equal distance from the custom-house, and the bridge to the westward, and abreast of a white house. The shore is here steeper and softer than near the custom-house, where there are two coral patches, with 3 and 6 feet water over them. Between the reefs the bottom is hard, but inside mud.

The eastern channel is only half a cable's length wide, but it has a leading wind during the western monsoon, both for ships entering or going out. To enter it, keep the high tree in one with the house standing between the church and the custom-house. There are soundings from 20 to 7 fathoms in this channel. Haul close round the point of the reef, to avoid the patches abreast of the custom-house. Another good anchorage is in 15 fathoms, with the flagstaff of the fort bearing S.E. $\frac{1}{4}$ E., the church S.E. $\frac{1}{2}$ S., the battery near the inner point W. $\frac{1}{2}$ S., and the South point of Kambing Island N. by W. $\frac{1}{2}$ W. It is high water, at full and change of moon, at 1^h 30^m, and the rise of the tide is 6 ft. at the springs. Cattle and vegetables may be had here, but rice and poultry are neither cheap nor abundant.

Between Manatuti Point and Laméh Point, 18 miles to the eastward, is a deep bay, in the western part of which is Mantotte, 4 or 5 miles southward of Manatuti Point. *Lamsana*, a snug cove a few miles farther to the eastward, sheltered by reefs from all winds, has good anchorage in 8 or 9 fathoms. Wemasee anchorage is just westward of Laméh Point. Laméh Point has sunken rocks off it. *Laga* anchorage is 10 miles to the S.E. of it.

Between the bluff point eastward of Dilhi and Manatute Point, 20 miles to the eastward, the coast should not be approached within 5 miles, as sunken rocks lie off it.

Abreast the S.E. point of Ombay is the narrowest part of the strait of Malloea, or the Ombay passage, which is there 5 leagues wide.

The *currents* in the Ombay Passage are noticed on page 31.

The **SOUTH COAST** of TIMOR, although little frequented, is safe to approach within a moderate distance. In coasting along this side of island during the night, keep at a moderate distance from the points of land, as several of them have projecting reefs. This coast stretches about N.E. by E. and S.W. by W.; the land is low near the coast, but gentle hills rise a little inland and a chain of high mountains is in the interior, which may be seen 27 leagues. The land is mostly covered with trees, except in some parts which appear cultivated. Ships in sailing along this coast have found many small islets that were safe to approach, and soundings of 15 to 25 fathoms within $1\frac{1}{2}$ mile of the shore.

Nusa Besie, or *Jackee Island*, in about 8° 25' S. and 127° 16' E., fronts the East point of Timor. It is low and flat, appearing as a land-tongue, before it opens with Timor. There is anchorage between it and Timor, but the currents set with great velocity through the channel.

H.B.M. ship *North Star* saw six remarkable white cliffs of different dimensions in 124° 17' E., probably Batoe Poetie, which H.F.M. sloop *Casuarina*, Commander L. Freycinet, made in 124° 15' 30" E.

Ships crossing over between Wetter and Amboina generally run in sight of Gunong Api, to secure the passage along the Lucipara and Turtle Islands.

GUNONG API, in $6^{\circ} 43'$ S. and $126^{\circ} 43'$ E., is a high conical mountain, visible 15 or 16 leagues. It is in a state of ignition, with smoke generally issuing from the crater at the summit, and is bold to approach.

DIRECTIONS.—In addition to the remarks given on pages 80—85 *ante*, the following will be useful. Leaving Amboina in the eastern monsoon (April to September) steer for Gunong Api, give a wide berth to the Lucipara Islands, on account of which it is preferable to pass to the westward of them, as the current generally sets strong to the westward during this monsoon. From thence, if bound to Europe, steer to make Honden Island, and proceed through the Ombay Passage and the channel to the eastward or westward of Savu. Being so far to the southward as Rotti or Savu, the S.E. winds will begin gradually to increase in strength.

If bound to Java, the passage through the strait of Salayer would be preferable; but when the route along the islands to the eastward of Java is be taken, steer for Komba Island, and proceed to the westward along the North coast of Floris, towards the Strait of Madura; or when on the meridian of Allas Strait, cross over so as to pass between Urk and Kangeang, or between the former and Takat Shoals, and proceed along the North coast of Madura, directions for which passages have been given in former pages.

The general passage for ships bound from Java to Amboina during the western monsoon, is through the Strait of Salayer.

Ships leaving Amboina for Europe or Java during the *western monsoon*, generally proceed by the northern route, i.e., to the northward of Celebes and Borneo, or in the latter part of the monsoon through the Strait of Makassar. Should Amboina be left in March, the southern passage may be adopted, i.e., to work along the North coast of the islands to the eastward of Java, as there, generally, the winds begin to shift and the currents to diminish in strength. It is advisable to stand up toward Buru, and from thence to work over near St. Matthew Islands. Having approached these and Veldhoen Island, a southerly or S.S.W. course ought to be followed in crossing over to the islands to the eastward of Java. If bound to Europe, pass through the Strait of Allor; and when clear of it, proceed through the channel between Sandalwood and Savu, or between the latter and Rotti.

Leaving Amboina in the strength of the western monsoon bound to the westward, and having occasion to take the southerly passage, though it may not be possible to weather the strait of Allor, nor probably the Ombay passage; yet a ship ought to use every means to pass on the North side of Timor, for if she fall to leeward, and be obliged to round the East of that island, she will find great difficulty in beating to the westward between it and the coast of Australia, where strong winds from W.N.W. to W.S.W., with squally weather and a heavy sea, usually prevail from November to April. If a ship should unavoidably fall to leeward, work to the westward along the South coast of Timor.

CHAPTER XVIII.

ISLANDS AND PASSAGES EASTWARD OF BORNEO.

WE are now advancing eastward into regions of which much less is accurately known than perhaps of any other part of the maritime world. The extensive archipelagoes which lie between the more frequented islands of Java and Borneo, and the North Pacific, are but little visited for commercial purposes by European nations. Their inhabitants, more or less uncivilized, have few European wants, and but few products for exportation. There has been no regular survey made of any large portion of this area. A few detached places have been well examined, and positions accurately determined, by Dutch and English officers. To fill up the voids which occur in our recent knowledge, we are obliged to have recourse to the older voyages, or to the recitals of scientific travellers not specially appertaining to hydrography.

What follows, therefore, in this chapter must be generally received with caution; neither the date of much of the information, nor its confessedly imperfect nature, can induce confidence. It will be needless to recite the numerous authorities consulted; but should more intimate knowledge, or greater detail be required, other works, not usually available at sea, must be consulted.

THE STRAIT OF MAKASSAR.

The great channel eastward of Borneo, which takes its name from the port or rather the nation, on the S.W. extreme of Celebes, is 360 miles long, and with a breadth varying from 150 to 65 miles, the narrowest portion being its northern entrance. This large area is separated into several channels by extensive shoals and numerous islands which lie chiefly in the central portion. Many of these are of the most dangerous character, and when it is

remembered that this strait and the coasts which limit it have not been properly surveyed, and that many dangers may, and probably do, remain undiscovered, it behoves every commander who passes through it to use more than ordinary caution.

It may be said, generally, that there are two channels most available, the one along the Borneo coast, which appears to be preferable, and that on the Celebes side, the latter having unfathomable depths close-to, and not affording any anchorage, while the reverse is the case on the opposite side.

The **EAST COAST** of **BORNEO** is subject to the Dutch, who exercise sovereignty over it, in virtue of several treaties with the native sovereigns entered into since 1816. The total area in Borneo thus claimed by the Netherlands as belonging to that nation, embraces two-thirds of the entire island, or a territory one-half larger than Great Britain and Ireland. But their sway over by far the greater portion is of the slightest character, and this sovereignty over a vast tropical wilderness can be but of little advantage to them.

The charts, or rather maps, which have been published by the Topographical Bureau at Batavia, show how little is known of the coast in question; and, therefore, the few remarks which follow are of a vague character, and are made in accordance with the charts published by the Dutch Commission.

PULO LAUT, or **Great Pulo Laut**, has been before mentioned, page 741, and the strait which separates it from the S.E. extreme of Borneo is there described. The island is 53 miles long North and South. Its N.E. part is lofty, forming a peak called *Gunong Seabeloeng*, and its eastern part is apparently clear of danger, with soundings of 13 to 15 fathoms, muddy bottom, at 6 or 8 miles off. Off its South point lies a small island, *Pulo Kunyit* (Koenjit), the South end of which is in lat. $4^{\circ} 6' 20''$ S., long. $116^{\circ} 5'$ E.

At 9 miles S.E. from this is a small island *Dwaalder*, and $6\frac{1}{2}$ miles farther in the same direction are the *Two Brothers*, or *Gebroeders*, all surrounded by reefs, but having 14 to 16 fathoms water between them. *Dwaalder* is higher at the East and West ends than in the middle, so that it appears like a saddle when seen from the southward. From its eastern side a reef projects about the length of the island. It is in lat. $4^{\circ} 13' 40''$ S., long. $116^{\circ} 11'$ E. At $7\frac{1}{2}$ miles due East of *Dwaalder* is the *St. George Bank*, with 12 and 14 fathoms close up to it. To the N.N.W. of this, and 9 miles East of *Kunyit*, are the *Bira Birakan Islands*, surrounded by an extensive reef.

Pulo Seboekoe, or *Sebuku*, an island 16 miles long, lies off the East coast of **Pulo Laut**, but we have no particulars of the strait within it; it is high in the centre. From its North point, *Tanjong Mangkop*, a reef projects for 2 miles. At 4 miles West of *Mangkop Point* is *Manti Island*, and 2 miles West of this small island is a sunken rock.

Tanjong Pamantyanan, the North point of **Pulo Laut**, has a reef around it,

but it may be rounded at the distance of $1\frac{1}{2}$ miles in 8 or 10 fathoms. In the bay formed by the North part of Sebuku and the projecting point of Borneo, Tanjung Dewa, $3\frac{1}{2}$ miles to the North of it, and facing the northern part of the Strait of Pulo Laut (see page 741), there is shelter from all winds, except those from North and East. The northern part of this bay is shoal, but the soundings are regular to the watering place under the high land on the West side, where you may anchor abreast of it in 6 fathoms, about $1\frac{1}{2}$ mile off shore, with the N.E. point of the bay bearing E. by S. $\frac{1}{4}$ S., and a small island covered with trees, on the East side of the bay, bearing S.E.. Oysters may be got, and the woods abound with wild hogs and deer; but care should be exercised when a party lands, as the natives are treacherous, although under Dutch supervision.

The **THREE ALIKE ISLANDS**, or *Pulo Sambarglap*, lie 15 miles East of the South end of Sebuku. Their centre is in lat. $3^{\circ} 39' S.$, long. $116^{\circ} 41'$. They bear N.E. 45 miles from Dwaalder, and form a group of three islands, *alike* in appearance, exclusive of an islet and some contiguous rocks, visible 5 or 6 leagues off. The channel between them and Sebuku is quite safe, and they are also quite clear to the eastward for 17 miles, where is the Twee Vrienden Reef presently described.

The southern entrance to the strait of Makassar has an extensive range of shoals and islets which lie to the northward of those existing off the North coasts of Bali, Lombok, and Sumbawa. Of these the following is a description as far as is known.

The Sibbald Bank appears to the south-westernmost. It is not extensive; but Captain Forbes sounded in from 20 to 5 fathoms, coral, so that there may be less depth now. Its shoalest part, 5 fathoms, is placed in $5^{\circ} 46' S.$, long. $117^{\circ} 4' E.$, or 83 miles N.E. by N. from Hastings Island. Around this shoalest patch is 6 fathoms at 2 miles to the S.E., 8 fathoms at 2 miles W.S.W., and 10 fathoms at 2 miles to the N.E. There is deep water beyond these depths, and another 5-fathoms patch lies 9 miles eastward, reported by Lieutenant Howe, R.N. This patch lies in lat. $5^{\circ} 45' S.$, long. $117^{\circ} 12' E.$ At 2 miles North of it is a depth of 7 fathoms, and for 5 miles S.S.E. of it the depths are 6 and 7 fathoms; outside these soundings is deep water, but a detached 7-fathoms patch lies 12 miles S.S.E. of the 5-fathoms patch.

The Aurora Bank, *coral*, with several casts of $4\frac{3}{4}$ fathoms on it, and perhaps less, is apparently about three-quarters of a mile broad, in lat. $5^{\circ} 25' S.$, long. $116^{\circ} 58' E.$

Nusa Komba, a low island, in lat. $5^{\circ} 14' S.$, long. $117^{\circ} 4' E.$, has a reef extending for 6 miles to the South of it. At 9 miles North of it is *Sibaru*, or *Sibaroe*, the southernmost of a group of four low wooded islands, called *Nusa Siri*, extending 5 miles to the northward, the northern one in $5^{\circ} 0' S.$ $117^{\circ} 5' E.$, and may be seen at a considerable distance. *Trinidad Shoal*, of $4\frac{1}{2}$

fathoms, lies midway between Sibaroe and Nusa Komba, and $6\frac{1}{2}$ fathoms has been reported at 6 miles S.W. by S. of Sibaroe. A 10-fathom bank, 8 miles wide from East to West, lies to the northward of Noesa Siri Islands, and on this bank are two $4\frac{1}{2}$ -fathom patches, one lying 6 miles North, and the other 6 miles N.W. of the northernmost island of the Noesa Siri Group.

Pudsey Dawson, a $4\frac{1}{2}$ -fathom patch, is in lat $4^{\circ} 42'$ S., long. $117^{\circ} 4'$ E.

Laurel Reef is a narrow reef, extending from an 8-fathom patch, in $4^{\circ} 20'$ S., to a $3\frac{1}{4}$ -fathom patch in $4^{\circ} 34'$ S.; the last-named patch is very steep-to, and at 5 miles northward of it is a $2\frac{1}{2}$ -fathom patch, named *Batu Batong*, in lat. $4^{\circ} 29'$ S., long. $117^{\circ} 7'$ E. At 9 miles eastward of the Laurel Reef another similar reef is marked, but its existence is very doubtful.

The *Martaban Shoal*, so named after the ship which discovered it, is placed in $4^{\circ} 11'$ S., long. $117^{\circ} 10'$ E., 20 miles to the northward of the Laurel Shoal.

The ship *Sea Serpent*, in lat. $3^{\circ} 56'$ S., long. $117^{\circ} 28'$ E., anchored on a coral bank about a quarter of a mile long, the least depth found being from 4 to 6 fathoms. There was no discolouration of the water.

A bank that dries, with a reef extending southward of it for about 1 mile, was discovered in lat. $3^{\circ} 31' 50''$ S., long. $117^{\circ} 29' 40''$ E.

At 10 miles E.S.E. and 11 miles S.E. of the last-named bank are two others.

Twee Vrienden Reef, about 2 cables in length, and in some places 6 feet above water, reported in 1876, was discovered by a vessel of that name striking on it. Its estimated position is lat. $3^{\circ} 40'$ S., long. $117^{\circ} 8'$ E.

Franklin Bank is in lat. $3^{\circ} 2'$ S., $117^{\circ} 33'$ E.

The *Triangles* or *Lari Larien Isles* are three small islands, nearly in the middle of the strait, of which the southernmost, in lat. $3^{\circ} 5'$ S., long. $117^{\circ} 50'$ E., is a small sandy island, with several bushes on it. At 4 miles to the northward of it are the two other islands near together. Union Bank, a small bank of 8 fathoms, is 25 miles eastward of the Triangles.

Laars (Dutch) the *Boot Bank*, is an extensive shoal, or collection of coral banks, of very irregular figure, the South end of which is in lat. $6^{\circ} 2'$ S., long. $118^{\circ} 14'$ E.; its West end, 10 fathoms, in lat. $5^{\circ} 44'$ S., long. 118° E. Between its western end and the Sibbald Bank are some 10-fathom patches. In lat. $5^{\circ} 47'$ S., long. $118^{\circ} 17'$ E., is a 5-fathom patch, S.S.W. 5 miles, S.E. 12 miles, and E.N.E. 15 miles from which, other similar patches have been reported. A low wooded island, *Saftana*, *Zalineff*, or *Pulo Dewakan*, is situated on the North end of Laars Bank, in lat. $5^{\circ} 26'$ S., long. $118^{\circ} 26'$ E. At 6 miles S. $\frac{1}{2}$ E. of it is another similar island, named Laars Island, islets and rocks lying between. Dangerous rocks also extend for 5 miles to the southward, and 10 miles to the westward of Laars Island. The general soundings on these banks are from 10 or 15 fathoms to 4 fathoms, which appears to be

the least water found, and that towards its northern part. A depth of 12 fathoms, coral, was found by the *Vittor Pisani*, to the southward of the Boot, in lat. $6^{\circ} 4' 30''$ S., long. $118^{\circ} 15'$ E. The bank appeared about a mile broad.

The best track for crossing the Boot Bank is southward of lat. $5^{\circ} 40'$; but in thick weather a wide berth should be given to the islands by keeping well to the southward, for there is probably no danger on the southern part, though the depths of 5 or 6 fathoms, when there is much swell, may not be pleasant for a large ship.

Tonyn Island, or *Benkoeloean*, is low and woody, in lat. $5^{\circ} 31'$ S., long. $118^{\circ} 36'$ E., or 7 miles East of Laars Island. It is surrounded by coral rocks.

To the westward and north-westward of Pulo Saflana, between the Laars Bank and those previously described, is a range of islands and banks, of which but little is known. The northernmost is shown on the Dutch charts, *Edam* or *Medemblik*, in lat. $5^{\circ} 0'$ S., long. $117^{\circ} 56'$ E., and to the southward, in an extent of 23 miles, are those named *Middelburg*, *Hoorn*, *Amsterdam*, or *Doandoenganketjil* and *Doandoenganbezaar*, the last in lat. $5^{\circ} 23\frac{1}{2}'$ S., long. $117^{\circ} 55'$ E. These southern islands have been called the *Hen and Chickens* in the old charts. To the westward of this range is *Rotterdam Island*, or *Kaloekaloekoan*, about 33 miles E. $\frac{1}{4}$ N. from Nusa Komba. It is said to have good water on it, and that there are two reefs 12 miles to the West, and 10 miles to the S.W. of it. Sunken rocks, discovered near the islands above mentioned, lie as follows. Rotterdam Island should not be approached, except with great caution, to within the distance of 2 miles; a sunken rock also lies $3\frac{1}{2}$ miles S.E. of it. Edom Island has a 5-fathom patch at 4 miles West of it, and a series of rocks extending 5 miles N.N.W. from it. Middleburg Island has a sunken rock 3 miles West of it, and between this island and the northern danger extending from Horn Island, the distance is 2 miles. Between Horn and Amsterdam Island is unsafe. At 7 miles W. $\frac{1}{2}$ S. from Doandoanganbezar is a sunken rock.

To the eastward of the islands and shoals just mentioned, the water was examined by H.M.S. *Nassau*, in 1872. *Marisindeh Island* is in lat. $5^{\circ} 5'$ S., long. $118^{\circ} 11'$ E.; at 6 miles to the southward of it is the northern end of a dangerous bank, which thence extends 3 miles to the southward. At 27 miles E.N.E. of Marisindeh is *Taka Bakang* or *Teignmouth Bank*, 3 miles in diameter; it lies 23 miles to the westward of the dangers of the Spermonde Archipelago.

The Brill Shoal, or *Taka Romata*, the south-easternmost of this range of islets and shoals, is very dangerous. Its South end is in lat. $6^{\circ} 8'$ S., long. $118^{\circ} 55'$ E. It is probably a coral reef, with very steep sides, about 5 miles long, North and South. The rocks are awash on its northern part, and in many parts the verge has only 2 ft. water.

The banks and islands which lie against the S.W. part of Celebes will be described presently.

The **COAST of BORNEO**, northward of Pulo Laut, is but little known, and has been very seldom visited by Europeans. A peculiar race, a kind of sea gypsies, live about the mouths of the rivers. They are called by Mr. Earl the Orang Badju, dwelling in boats of 8 or 10 tons burden, each boat containing a family of about 15 inhabitants, who employ themselves in catching and curing fish and trepang. They are very trustworthy, and are very useful in carrying despatches or any similar offices.

Kloempang, or *Kalumpang Bay*, lies immediately North of the point which protects the entrance to the Pulo Laut Strait. *Pulo Nanka*, and an islet to the North of it, lie in the entrance, round the North end of which is the channel which leads to an apparently well sheltered roadstead. A rock lies a mile off the East end of this islet. To the North of this the land is skirted by a broad shelf, with breakers on its outer edge 4 and 5 miles from land.

Shoal or Flat Point, Tanjong Mirra, in lat. $2^{\circ} 35' S.$, long. $116^{\circ} 32' E.$, is the southern extremity of a piece of wooded level land, about 9 leagues in length. To the South of it is the entrance to *Bamukan Bay*, a large bay, into which several rivers fall, and which form the outlet of the district of *Tamah Boemboe*. A reef projects from Shoal Point for $4\frac{1}{2}$ miles in a southerly direction, having some rocks and bushes above water, but the flat which fronts the point may be borrowed on with safety to 6 fathoms on the East side, about 2 leagues distant from the point, the bottom being soft, and the depth very gradually decreasing. Steering a direct course along the coast, the water shoals about 2 fathoms abreast the point, and returning to the former depth when past it.

Ragged Point, *Tanjong Ares*, is in lat. $2^{\circ} 8' 30'' S.$, long. $116^{\circ} 37' E.$, and 27 miles N. by E. from Flat Point. The land between them being level and moderately elevated, is terminated to the northward by Ragged Point, which is bluff, with some gaps among the trees, and surrounded by a reef.

Shoals.—This portion of the Strait of Makassar is the most intricate, as there are several shoals which contract the passage on this side to its narrowest part. These shoals have not been properly examined, and the soundings not being regular, there is great difficulty in avoiding them at night. The *Hercules Shoal* is one of these, in lat. $2^{\circ} 20' S.$, long. $116^{\circ} 45' E.$ It bears S. $35^{\circ} E.$ from Ragged Point, and N. $47^{\circ} E.$ from Flat Point, distant $11\frac{1}{2}$ miles from shore. It is composed of sand, coral, and stones, with from 3 to 9 ft. water on it, and from 15 to 17 fathoms close-to. At 7 miles to the N.E., and 8 miles N.W. by N. of the Hercules Shoal, are other detached dangers.

Addington Shoal appears to be the southernmost. It is a very dangerous coral patch of 14 ft. water, with Flat Point bearing N.W. $\frac{1}{4}$ N., distant 20

miles. It apparently forms part of an extensive series of patches, with deep water between them, the extent being nearly $2\frac{1}{2}$ miles in a N.W. and S.E. direction. There are several distinct shoals, one a patch of sand above water, on the N.W. side.

When abreast this dangerous shoal, it is best to keep within 4 or 5 leagues of the coast, and not to bring Flat Point to the westward of N.W., North, or N.W. $\frac{1}{2}$ N., until to the northward of its parallel, which is about lat. $2^{\circ} 50'$. Breakers were also seen to the N.E. of it, in lat. $2^{\circ} 40'$ S., long. $117^{\circ} 0'$ E., extending North and South about 5 miles.

The **LITTLE PATERNOSTERS**, or **Pulo Palabalagan**, lie in the middle of the strait off this part. They are called the Little Paternosters, to distinguish them from the other group North of Sumbawa. They are most vaguely placed on the charts, but are said to consist of thirteen small isles, with banks of sand and coral above and under water, scattered over a space 80 miles in breadth, on the parallel of $2^{\circ} 20'$ S. The southernmost isle is in lat. $2^{\circ} 42'$ S.; the north-easternmost in lat. $2^{\circ} 10'$ S., long. $117^{\circ} 56'$ E.; and the north-westernmost in lat. $2^{\circ} 8'$ S., long. $117^{\circ} 35'$ E. On these two isles there is fresh water; they are all covered with low trees, and should not be approached, as their neighbourhood is dangerous, breakers and shoals lying fully 8 miles to the northward of the N.W. islet, and for 30 miles East and West of them are numerous scattered reefs.

The *Blenheim Reef*, in lat. $2^{\circ} 24'$ S., at 21 miles E.N.E. of Flat Point, is apparently the westernmost of the above shoals, and therefore forms the eastern side of the fairway. The *Hannah Shoal*, about 26 miles E. by S. of Ragged Point, in lat. $2^{\circ} 18'$ S., long. $117^{\circ} 2'$ E., forms a portion of these western limits. *Emily Anina Islet*, in $2^{\circ} 4'$ S., long. 117° E., is doubtful.

Pasir or **Passier River**, on the coast of Borneo, the mouth of which is in lat. $1^{\circ} 51'$ S., is a considerable stream, about 40 or 50 miles up which is the town of Pasir, formerly of some importance, a considerable native trade being carried on with the Spice Islands; but it subsequently became a den of infamy and piracy. In 1772 the English proposed to establish a factory here, but did not carry it into effect. The anchorage off the mouth of the river or Kwala Pasir, is in $4\frac{1}{2}$ or 5 fathoms, 3 leagues off shore, to the northward of the river. There are some shoals in the South part of the bay, between Ragged Point and the river, from 3 to 6 miles off shore, to avoid which, in coming to Pasir, you should get into the latitude of the anchorage before approaching the shore, and then steer West for it. Supplies may be got at the town, but ships must be guarded against attack. At the N.W. part of the bay is the broad entrance of *Pasir Lama*, called *Adang Bay*. All the land is low and wooded near the sea, but inland it is hilly.

Jason Reef, off this coast, is 5 miles in extent, North and South, and 4 miles East and West; its N.E. end is in lat. $1^{\circ} 47'$ S., long. $116^{\circ} 55'$ E. The eastern part is 9 leagues eastward of the entrance to the Pasir River. There

is a depth of from 12 to 23 fathoms to westward, and 18 to 20 fathoms immediately to the eastward of them.

From *Tanjong Telakai*, the N.E. point of Adang Bay, the coast trends to the north-eastward for 26 miles to *Balik Papan Bay*; the coast is low, but at 30 miles N.W. of the bay a detached mountain is seen, *Gunong Balik Papan*, and to the North of Adang Bay the land rises in hummocks. A rock lies in the middle of the entrance to the bay.

The **RIVER KOETEI** or *Koti*, or **Mahakkan**, one of the most considerable in Borneo, forms a delta commencing in lat. $0^{\circ} 57' S.$, and extending thence for 40 miles to the northward, the low land intersected by its numerous branches and mouths, being called *Pulo Pamarang*, or *Pamarung*, or *Dondrekin Eiland*, by the Dutch, and it was surveyed by a Dutch officer, G. W. E. Moeth, in 1856. The various branches diverge from a point more than 25 miles from the bars of the southern entrances, and the town of *Sangason* stands on the South side of the stream. At 9 or 10 miles still higher up the river is the larger Bugis town of *Samarinda*, the capital of the state of Koetei; *Tengaroeng* or *Tongarron* being 30 miles in direct distance to the N.W., but much more following the windings of the river, which is here very tortuous. The Sultan of Koetei entered into a treaty with the Netherlands Government, October 12th, 1845, by which he acknowledged the sovereignty of that nation, and by which he undertakes to suppress piracy, and accords the free navigation of the river as high as *Samarinda*. A Dutch expedition under Major Muller, ascended the river in 1825, to cross the country to the West coast, but they were cut off by the Dyaks. Mr. Dalton, an Englishman, went up two years after, and lived 15 months among the Dyaks. The river in the rainy season brings down large drifts of trees and vegetation, carrying them out to sea, when they appear frequently at a distance like small islands or prahus under sail.

Pamarung Islands form the delta as before said. The south-westernmost mouth, *Muara Dyawa*, is in lat. $1^{\circ} 0' S.$, long. $117^{\circ} 20' E.$ It runs to the northward, and has 10 ft. least water on the bar, but is deeper within, although between the bar and *Sangason* there are some places with only 6 feet depth. Numerous branches debouche to the eastward of these, one of the largest behind *Oedjong Becapay*, 14 miles from *Muara Dyawa*. *Tanjong Bayor*, the easternmost, and central point of the delta, is in lat. $0^{\circ} 43' S.$, long. $117^{\circ} 38' E.$ The shoal water extends fully 6 to 10 miles outside the dry land to the northward and eastward, but its outer edge is here more steep-to than the southern portion of the islands and flats of the delta. The tides rise here from 8 to 9 ft. A detached $2\frac{1}{2}$ -fathom patch lies 14 miles S.E. by E. of *Tanjong Bayor*.

The Coast of Koetei, to the northward of the Pamarung Islands, is little known, and but seldom seen. At 25 miles North of them is a cluster of islets and rocks, which extend along the shore to lat. $0^{\circ} 10' N.$ A slight

projection of the land, *Oedjong Santang* lying on the equator. In lat. $0^{\circ} 22' N.$, and at 8 miles off shore, is a detached rock, *Karang Sangatta*; and in lat. $0^{\circ} 35' N.$, long. $117^{\circ} 55' E.$, is Bungalun Rock, marked doubtful in position on the chart. These should be thought of should a vessel venture into this great bay, at the head of which, in lat. $0^{\circ} 45' N.$, there is anchorage in 5 to 10 fathoms, muddy bottom, near the shore, but be careful of another detached rock, $1\frac{1}{2}$ mile from the land. The coast from this trends to the eastward for 68 miles, with no place worthy of remark except a large bay in long. $118^{\circ} 0'$, called *Sankoelirang* or *Telokh Saka Bay*, at the back of which is a mountain of the same name. *Bira Birahan*, a small islet, lies 8 miles off shore, in long. $118^{\circ} 27' E.$ At 6 miles E.S.E. of it is a shoal, varying from 10 fathoms to 18 ft., in lat. $0^{\circ} 42' N.$, long. $118^{\circ} 35' E.$ It was discovered in 1869 by the Dutch barque *Johanna Anthonia*.

TANJONG KANIONGAN is the north-western limit of the Strait of Makassar. It is in lat. $1^{\circ} 4' N.$, long. $115^{\circ} 56' E.$ It is the eastern extremity of a range of high even land, which extends to the westward, joining the great central chain of mountains. At 7 miles south-westward of it a rocky shoal lies against the shore, and immediately around the cape itself there is shoal water, but outside this the depth is very considerable. From the cape the land trends to the W.N.W., and has some extensive shoals and several islets, with channels intersecting them at 8 or 10 miles distant. These islands, and the rest which lie off the northern side of the peninsula, are very differently represented in the more recent Dutch charts, to what is given by older authors, and they cannot in any way be considered as forming the entrance to the strait.

The **ISLAND of CELEBES**, one of the most singular in the world, forms the eastern limit of the strait. Except in some small portions, it has never been surveyed, but on the coasts not examined there appears to be few dangers to navigation; the water is very deep close-to as far as is known, but the paucity of observations will give but little knowledge of its real character.

The grotesque form of the island, four long peninsulas joined together, is familiar to every schoolboy. From this cause it has few or no rivers worth mentioning, and its mountainous character is such, that the fertilizing effects of these streams is carried at once into the deep waters of the ocean. Thus there is but little agriculture, and the total population of the island does not much, if at all, exceed a million, while, if it were as fertile as Java, it ought to be fifteen times as many, the area of Celebes being one-half larger than Java. The best known portion of the island, is the southern peninsula, and it is by far the most populous and important. A chain of mountains runs through it, and terminates to the southward in the highest point of the island, *Lompoe Batang*, 8,200 ft. high, and near to the southern coast.

The people of Celebes are of the same race as those of Sumatra, Java, and Borneo, but are divided into a very great number of tribes, possessing every variety of civilization, from the savage cannibal and head-hunter to the man of letters. The most civilized portion is that in the S.W. peninsula. The great feature of the natives of Celebes is their propensity for the sea. This probably arises from the proximity of every part of the island to the sea, its sterility, and the abundance of fish which may be caught around it. From whatever cause it proceeds, the inhabitants of Celebes are at present the most skilful and adventurous native mariners and merchants of the archipelago. Their little vessels of peculiar build, called *Padewakan* by the Malays, and of the burden of from 40 to 50 tons, conduct the carrying trade from one end of the archipelago to the other, their outward and homeward voyages being guided by the monsoons. Besides the trade conducted in Celebes itself, the people of this island are to be found as settlers in every part of the archipelago where there is trade and protection, and many vessels belonging to them sail from such settlements."—*Crawford*.

The whole of the island is, nominally at least, subject to the Dutch, and it is divided into three provinces. The government of Mangkasser, embracing the southern and part of the south-eastern peninsula; the Residence of Ternati, attached to the Moluccas, around the shores of the eastern Gulf of Tomaiki, and the residence of Manado, embracing the shores of the Gulf of Tomini and the long northern peninsula. The capital of the whole is Makassar or Mangkasser.

BONTHEIN, on the South coast of the southern peninsula, is a Dutch town, at the head of a bay, in lat. $5^{\circ} 32' S.$, long. $119^{\circ} 55' E.$ It is connected by a post road with Macassar, 50 miles in length. Behind it rise the highest mountains in Celebes, *Gunong Loempoe*, *Ballang*, or *Bonthein Peak*, before mentioned; its summit is 11 miles due North of the town. There is good anchorage in 7 or 8 fathoms, sandy bottom, at about 2 miles off from the village. The land rises from the shore towards the slopes of the mountains, and on its upper portion potatoes and European vegetables are grown.

Boelecomba, another Dutch village, is 14 miles eastward of Bonthein. Boelecomba Hill, in longitude $120^{\circ} 8' E.$, is not very conspicuous when first seen in coming from the westward; but when abreast of it, it becomes an excellent mark, being a high conical hill standing by itself on the low land near the sea to the N.W. of the village. There is good anchorage off it with the bell buoy N.N.W. $\frac{1}{4}$ W. and the flagstaff of Boelecomba N.N.W. $2\frac{1}{2}$ or 3 miles in $6\frac{1}{2}$ or 7 fathoms, sand and mud. Water may be procured in the river on the East side of the bay, by sending boats about a quarter of a mile up it. A coral reef projects nearly 2 miles from the western point of the watering bay, and is steep-to.

Melassar Bay is 20 miles westward of Bonthein, *Cape Boelo Boelo*, the southernmost point of Celebes, lying between. Its eastern extreme point is

called *Klambang*, in lat. $5^{\circ} 40' S.$, $119^{\circ} 40' E.$ Between this and an islet on the West side, the bay is 3 miles wide at the entrance. Shoal water extends for $1\frac{1}{4}$ mile westward of Tanjong Klambang, but 3 and 4 fathoms are found close to the island on the West side. *Toeratte Bay* is to the westward of Melassor Bay, but appears to be foul and rocky. The southern coast of Celebes is fronted by a bank of tolerably regular soundings, 2 or 3 leagues broad in some parts, which is a good guide by night, but 12 to 15 fathoms are found close to the headlands.

POINT LAYKAN, or *Tanjong Laikan*, the south-westernmost point of Celebes, is in lat. $5^{\circ} 36' S.$, long. $119^{\circ} 26' 30''$. It should have a berth of 3 miles on account of a coral bank which extends for $1\frac{1}{2}$ or 2 miles from it, but the water shoals near it to 15 or 12 fathoms, and there are 4 and 5 fathoms on its edge.

TANA KEKE, an island about 3 miles in diameter, lies 10 miles north-westward of Point Laykan. It has a level appearance, and may be seen 18 or 20 miles off. It is separated from the S.W. part of Celebes by a navigable channel about 2 miles wide, with 10 fathoms least water between the reefs on either hand, soft bottom, but frequently coral. A *black conical* Herbert's buoy, 8 ft. high, is placed on the N.E. part of the reef, against Tana Keke Island, in $4\frac{3}{4}$ fathoms water; and a similar buoy, but painted *white*, lies on the westerly projecting point of the Malang Beang Shoal in $3\frac{3}{4}$ fathoms. Between these two buoys there is a safe channel through the Tana Keke Passage.

There is a 6-fathom patch about in mid-channel in the southern entrance. Avoiding this on passing through, keep in mid-channel, or rather nearest to Tana Keke. Three islands, called the *Three Brothers*, lie to the N.W. of Tana Keke. The bank of soundings stretches to the West of these for 6 leagues, the outermost patch of $4\frac{1}{2}$ fathoms lying in lat. $5^{\circ} 22\frac{1}{2}' S.$, long. $118^{\circ} 55' E.$ At 18 miles southward of this patch, and about the same distance south-eastward of Tonym Island, is a bank of 13 to 17 fathoms, surrounded by deep water.

Cape Magindari is 12 miles N.N.W. from Cape Laykan, and forms the eastern limit of the strait within Tana Keke. From this the coast trends to the northward, and at 6 miles from it is a small island, *Glissong*, close to the coast.

MAKASSAR or **MANGKASSER**, the metropolis of Celebes, was surveyed by Sir Edward Belcher, in 1844. He established an observatory near to the North angle of the fort, in lat. $5^{\circ} 8' 9'' S.$, long. $119^{\circ} 21' 18''$.

The Fort of Makassar, *Kasteel Rotterdam*, stands on the S.W. angle of the town, disconnected by a ditch and high rampart, within which the military reside. The town, which is walled, is very regularly built, extending about one-quarter of a mile by half a mile over its squares, and having 3 gates on its southern face, which were closed at 9 o'clock. The Chinese appear to con-

stitute the majority of the population of the town, but the huts of the natives extend far to the northward, and appear to be thickly inhabited, as are all the coast and the islands. The fishing propensities of the natives are evident everywhere. The beacons, which are frequently found in 16 and 17 fathoms, induce a belief in shoal water. Makassar is reckoned particularly salubrious. The atmosphere is very dry; it seldom rains, and is similar to the climate of Lima. Nevertheless the horizon and atmosphere on the mountains is very hazy. The sea breeze generally sets in regularly about 10 o'clock, commencing from the southward, and veers to the westward before sunset, when it fails, and is succeeded about 10 o'clock by a cool land breeze. Stock is plentiful and reasonable in price, as well as vegetables.

Makassar is a port of call for the Netherlands' India Steam Navigation Company's boats. It was declared a free port by an ordinance from the Dutch Governor-general, dated September 9th, 1846, which took effect on January 1st, 1847. The roadstead of Makassar, though only an open one, is not subject to storms, and has safe anchorage, and the native trade has always been considerable. Subsequently to the enfranchisement of Makassar two other places on the N.E. end of Celebes, *Menado* on the North side and *Kema* on the opposite side were declared free ports on September 28th, 1848. In entering these roads all vessels are required to hoist their national flag, which will be responded to on the shore, and a correct description of the ship and her destination must be handed to the officers.

Lights.—On Fort Rotterdam a *fixed bright light* is shown, which is visible 11 miles off, and about $1\frac{1}{2}$ mile to the southward a second light was established in 1870. Previous to the establishment of this light a lightvessel marked the South end of the Great Lelij Shoal. It illuminates in a seaward direction an arc of 180° , divided into three sections, of which the central one, measuring 30° , shows a *red* light, and the others, each of 75° , a *white* light. The lantern is placed at an elevation of 39 ft. above the level of high water; the red light being visible 3 miles, and the white light 8 miles.

From the lighthouse, the beacon on Pienjing Shoal bears $S. 67^\circ 30' W.$, and the beacon on South end of Great Lelij Shoal $N. 65^\circ 30' W.$; the red sector of light being about midway between these beacons.

The new light will serve, in conjunction with the harbour light at Macassar, to render Macassar roads easy of access from the South and S.W. For this purpose, having entered the red sector of light, steer for the light on an easterly bearing, until Macassar harbour light bears N.E. by N., when steer for it, taking care, on approaching the latter light, to alter course more to the northward, in order to enter the roads.

The anchorage is within a line of shoals, the southernmost of which is called the *Great Lely*, or *Lelei*, a mile in extent, and for a great part nearly awash, its eastern angle being more than half a mile West of the castle, the depths between varying from 7 to 10 fathoms. It is a coral reef covered

with sand. The *Little Lelei* and other shoals extend for more than 2 miles to the northward, but leave a clear channel of 9 fathoms depth between them, which can be taken by bringing the North angle of the castle to bear E. by S. $\frac{1}{2}$ S. In coming to it from the southward the castle should not be brought to the northward of N.N.E. $\frac{1}{2}$ E. till past the dangerous *Pienjing Reef*, marked by a beacon, which lies off the extremity of a sandy spit jutting out to the westward three-quarters of a mile on the South side of the Goa River, and $2\frac{1}{4}$ miles distant from the castle. The anchorage is abreast the town in 7 or 8 fathoms.

The South end of the Great Lelij Shoal is marked by a beacon with a triangular head, and Hoofd Reef, the S.E. extreme of Little Lelij Reef, is marked by a *black* buoy, moored in 2 fathoms, with a pyramid on the shore bearing E. by N., and the Fort lighthouse S.S.E. $\frac{3}{4}$ E., half a mile distant. The eastern end of Little Lelij Shoal, and also the reef extending off Fort Rotterdam, are each marked by a beacon.

In advancing from the westward, care must be taken to guard against a sunken rock, marked on the Dutch charts at $2\frac{2}{3}$ miles nearly due West of the fort; it is there called *Bonie Banko*. At 4 miles W. by N. from the fort is *Sammalona* or *Devil's Island*, surrounded by a reef. There are several other islands scattered on the great flat which extends from 20 to 30 miles off the coast for 70 miles northward of Tana Keke.

The SPERMONDE ARCHIPELAGO, as these islands are called, are best understood by the chart; it would be impossible to describe them verbally. The whole of the space for 50 miles North of Makassar, and for 20 to 33 miles off shore, is a complete labyrinth of shoals. The westernmost of these is *Pulo Kapo Posang*, in lat. $4^{\circ} 43' S.$, long $118^{\circ} 55' E.$, and this bears N.W. $\frac{1}{2}$ W. 36 miles. A sunken rock on the reef which surrounds it lies nearly 2 miles westward from it, and at $2\frac{1}{4}$ miles still farther West is a rock which dries at low water, but separated from the main reef by a deep channel. To the N.E. of this the limits of the reef have not been traced, but the northern edge trends generally East and West, on the parallel of $4^{\circ} 18' S.$, and is very steep-to, the depths at a short distance outside being unfathomable.

There are channels through the Archipelago towards Makassar, and at the northern entrance to this a Herbert's *buoy*, painted *black*, with a white horizontal band, is placed on the N.E. part of the *Tomisa Reef*, in 5 fathoms water. There are also some white stone beacons marking the reefs.

Pareh Pareh Bay, at 68 miles northward of Makassar, has a landlocked basin at its head. The channel leading to it runs to northward 2 miles, and is clear on the port side, but has some shoals on the opposite shore, abreast of the village of Pareh Pareh, in lat. $4^{\circ} 1' S.$, long. $119^{\circ} 34' E.$ From this the coast trends to N. by W. for about 33 miles, when it assumes a westerly direction for 27 miles, forming an extensive bight, terminated on the N.W. by Cape Mandhar. At 8 miles eastward of the cape is an anchoring place

off the village of *Balanipa*, lat. $3^{\circ} 32' S.$, long. $119^{\circ} 5' E.$ The anchorage is on a projecting spit of $2\frac{1}{2}$ to 6 fathoms, with the village or rather the mouth of its river, bearing N.W. three-quarters of a mile distant. Immediately East of Cape Mandhar is *Madyena Road*, an anchorage open to the southward, but there is an opening through the reef opposite the village, which is in lat. $3^{\circ} 32' S.$, long. $118^{\circ} 59' E.$

CAPE MANDHAR or *Mandar*, lat. $3^{\circ} 35' S.$, long. $118^{\circ} 54'$, is high land, and on its western side is quite bold-to, but shoal water extends some distance to the southward and eastward from it. The coast trends to N. by W. from it for 7 miles to *Penamboeang*, a village facing a bay open to the westward, in lat. $3^{\circ} 27' S.$, long. $118^{\circ} 51' E.$ There is anchorage in this bay in 12 to 20 fathoms within 300 yards of the shore, protected from the northward and southward. *Tynrana Bay* is 10 miles northward of *Penamboeang*, and has two lofty islets on its West side, *Taai Manoe*, to the South of which is the village in lat. $3^{\circ} 19' S.$ The depth in the bay, open to the N.W., to the East of these is from 10 to 20 fathoms. From this the coast of Celebes, but little known and unsurveyed, trends irregularly to lat. $2^{\circ} 52'$, where on the northern side of *Lebanie Bay* are the anchorages of *Tapullang*, to the East of a cape of that name, and of *Kait*, a mile to the westward of it. The bank is very steep-to, and has 30 fathoms within a quarter of a mile of the shore. Good water may be procured here. H.M.S. *Virginie* watered here in 24 hours, and could have procured buffaloes and other stock by waiting for them.

Cape William, in lat. $2^{\circ} 40' S.$, $118^{\circ} 47' E.$, is 12 miles northward of Cape Kait, and is a high projecting headland, having a large bay to the eastward. When this cape bears East 10 leagues distant, the south-easternmost of the Little Paternosters will be seen, and should be avoided. *Meindert's Shoal*, of 5 fathoms, lies 7 miles W. by N. of Cape William. *Mamoedya Bay*, to the eastward of Cape William, is protected from the northward by an island called by the same name. It affords good anchorage either with the village bearing E.S.E. a mile distant, or inside a rocky shoal, in 11 fathoms three-quarters a mile to N.E. of the centre of the village.

The coast to the northward of this for many miles is unknown and unvisited. The first place of which we know anything is *Kajeli* or *Kayeli*, in lat. $1^{\circ} 40' S.$, said to be famous for gold, sheep, &c., but anyone landing here, or on any part of this coast, should use the greatest caution against treachery.

The **BAY of PALOS**, the entrance to which is in lat. $0^{\circ} 37' S.$, has been examined by officers of the Dutch navy, and its several anchorages have been surveyed by Lieuts. Van Loo, Castendyk, &c. It is a deep gulf penetrating the coast in a S.S.E. direction for nearly 20 miles, with a breadth of from 4 to 6 miles, thus affording much shelter. Its shores, especially the eastern side, appear to be thickly peopled. On the eastern side are the

anchorages or bays of *Wari*, 6 miles within the entrance points, *Membora* 10 miles farther South, and *Palos* at its head. The anchorage here is to the eastward of the village, which is in lat. $0^{\circ} 57' S.$, long. $119^{\circ} 49' E.$ A high table mountain lies E.S.E. from the village. Near the entrance of the bay, on the western side, is the roadstead of *Dangola*, abreast of the village. A rock is shown in the Dutch maps as lying about 13 miles N.N.W. from the western headland of the bay, but its position is uncertain.

The northern peninsula of Celebes here separates from the main body of the island, assuming first a northerly and then an easterly direction. The isthmus connecting it is here very narrow, but of undetermined breadth, as the head of the great Gulf of Tomini is very little known. Melville van Carnbee makes its breadth to be only 10 miles.

CAPE TEMOEL or *Samsa* is the West extremity of a peninsula of high land, projecting considerably from the line of coast, on the equator, in longitude $119^{\circ} 36' E.$ When first made from the northward it makes like islands, as the land which connects it with the coast is lower than the hills which form it. Captain Horsburgh states that he was all the month of February endeavouring to round it to the northward. A shoal extends to the northward of the cape about $1\frac{1}{2}$ mile. About 5 miles N. by W. from the cape lies a small round island, the *South Watcher*, or *Zuid Wachter* of the Dutch, having a reef projecting from its South end, and from its N.E. end a reef of rocks and sand extends towards the Celebes shore more than one-third the distance between them. It is not advisable to go inside the island, as it seems unsafe. A shoal, seen by Captain Spratley, bears S.W. $\frac{1}{2}$ S. from the South Watcher and West from Cape Temoel $3\frac{1}{2}$ miles distant. It is about 2 miles in length E.N.E. and W.S.W., and deep water within a mile of it.

The **Seven Islands**, in lat. $0^{\circ} 32' N.$, are flat, low, and woody, not easily distinguished unless when near them, except the outermost, called the *North Watcher* (*Noord Wachter*), in about lat. $0^{\circ} 36' N.$, long. $119^{\circ} 42' E.$, distant 13 miles from shore, and seems not so large as the others, but may be seen 15 or 18 miles off. This island is surrounded to the distance of a mile on its West, North, and East sides by a coral reef; beyond this reef the channel between it and *Pulo Pangalasian*, 6 miles to the S.E., is clear of danger. At 15 miles E.N.E. from the North Watcher, and 3 miles off shore, the Dutch charts mark a danger, called *Rynsdroogte*.

CAPE DONDA, or *Dondo*, which may be taken as the N.E. limit of the strait of Makassar, is in lat. $0^{\circ} 59' 30'' N.$, long. $120^{\circ} 12' E.$, $22\frac{1}{2}$ leagues N.E. by N. from Cape Temoel. The mountains over this cape being very high and bold, and having a steep declivity to the water's edge, terminating in several bold headlands, make it difficult to distinguish this cape. The cape or N.W. extreme of the peninsula, according to the Dutch charts, is an island, with a rock 2 miles westward of it. A doubtful rock is marked at 9

miles to the N.W. of it. Some shoal water is said to exist to the southward of it, but generally along this coast no soundings can be got close to the shore, nor does there appear to be any in the bays with sandy beaches near the Seven Islands or Cape Temoel.

DIRECTIONS for the Strait of Makassar.—The great extent of this strait and the breadth of its channels prevent any specific directions being given for it, or marks for avoiding its dangers. The imperfection of our knowledge adds to these difficulties. A few general remarks must suffice.

The Little Paternoster group, as before stated, separates the strait into two channels, of which the western one, along the Borneo coast, is 10 or 11 leagues broad, and the other about 12 leagues. There are some dangers in the former, but still it is more frequented and preferred to the eastern side, along the Celebes shore, as the depths are moderate, and anchorage may be found in most parts, whereas the coast of Celebes is almost entirely steep-to, and the offing, as far as is known, unfathomable, besides which there are but few anchoring places, as will be seen from the foregoing directions.

In October and November it is probable that the Celebes side is preferable, for light southerly breezes prevail here at this time, when the wind is different on the Borneo side, and when strong southerly currents prevail in the middle of the strait, their velocity has been found to decrease a little as the Celebes shore is approached.

To sail along the Celebes side, and coming from the southward or westward in the westerly monsoon, approach the S.E. part of Great Pulo Laut as if you were proceeding along the Borneo side, and thence by an E. by N. or E.N.E. course, traverse the strait and make the coast of Celebes, about Cape Mandhar, taking care to avoid the Triangles, the Union Bank, and the cluster of little known banks which lie in about $117^{\circ} 30' E.$, and which should be left to northward, avoiding also the Martaban and Laurel Shoals to the southward. The lead should be kept going, and a good look-out kept for these dangers. Proceeding along the coast of Celebes, northward of Cape Mandhar, you should keep at least 2 or 3 leagues off shore in light winds, to prevent being drifted near the shore; but when beating to the northward against a steady wind and lee current, you should work near the coast in most places, particularly in the bay to the South of Cape Temoel, where you will be out of the strength of the stream. Ships coming from the southward in the easterly monsoon should pass between Tana Keke and the S.W. part of Celebes, if intending to touch at Makassar.

The Borneo side is generally preferred, as above stated, until the Little Paternosters are passed. To proceed by this route, and having passed the S.E. part of Great Pulo Laut, the channel on either side of the Three Alike Islands, may be chosen according to circumstances, and a course steered towards Flat Point, avoiding the Addington Shoals.

The best track between these points with a working wind is to stand out into 15 or 16 fathoms, about 4 or 5 leagues from shore, and back again into 7 or 8 fathoms, about 2 or 1½ leagues distant. The bottom is generally soft mud, but in some parts overfalls may be got from 10 to 7 fathoms in the fair channel, about 4 or 5 leagues from shore.

The **NORTH COAST** of **CELEBES**, 320 miles long, is very little known. The peninsula forms the Dutch Residentie of Menado, the chief port, at its N.E. extremity. This peninsula varies in breadth 20 to 50 miles. A range of mountains traverses its whole length, rising into some lofty peaks at its East end. The North coast is steep, and the land falls more gradually towards the Gulf of Tomini, on the South. From its character there are no rivers properly so called, but numerous streams descend from the mountains. The country is very thinly populated, not with aborigines, but with Bugis and immigrants from Ternate and Tidore. There is little or no trade, and that is all centred at the free port of Menado. Although most of its mountains are not volcanic, yet earthquakes are frequent, and some active volcanoes are found near Menado. Gold is procured near Gorontalo; rice is also grown, and excellent cordage is made near Menado.

CAPE RIVERS, 40 miles N.E. by E. from Cape Dondo, may be taken as the N.W. Cape of Celebes. It was surveyed by Rear-Admiral Sir Edward Belcher. It has two small islets close to it, and the land that forms it having a regular declivity, with a gap not far from its extremity, gives the cape an isolated appearance when first seen. To the eastward, between it and Trees Cape, there is a projecting headland with white cliffs fronting the sea.

Slime Islet, the outermost islet off the cape, is a high rocky pile of apparently upheaved grey basalt, about 80 ft. above the sea level, with a few shrubs on it, the whole being coated and whitened by the dung of marine birds, hence its name. Its position was established as 1° 20' 24" N., long. 120° 43'. Immediately within this is another islet of similar construction, and about 150 ft. high, and a space of half a mile, with a deep channel, intervenes between it and Cape Rivers. The reefs extend southerly from those islets as far as the eye can reach, and the coast from the cape suddenly receding into deep and lonely bays, leaves a good harbour or channel within. The coast between it and Cape Dondo forms a concavity, and is mountainous at a short distance inland. At 15 miles South of Cape Rivers, and in the S.E. angle of the bay is the anchorage of *Negri Baru*. The tide rises at Slime Island 9 ft.

Kabitan Island, 20 miles south-westward of Cape Rivers, is 7 miles long

W.N.W. and E.S.E., and about a mile broad. Its eastern end is in lat. 1° N., long. $120^{\circ} 35'$ E., and 2 miles off the South side of the island, at 2 miles West from its eastern end is a sunken rock. Between Kabitan and Cape Rivers there are some islets extending to a distance of $3\frac{1}{2}$ miles from the North side of Kabitan, and three patches of sunken rock in $1^{\circ} 6'$ N., $120^{\circ} 36'$ E., $1^{\circ} 10'$ N., $120^{\circ} 35'$ E., and the most extensive is $1^{\circ} 13'$ N., $120^{\circ} 38'$ E. *Dondo Islets* lie close to the coast, in lat. $1^{\circ} 10'$ N.

The richness of the mountainous regions of Celebes afford many interesting views along the North coast to the eastward; here there are many cultivated spots both on hill and dale, which, by their bright grassy tints and contrasts of colour exhibit an effect scarcely less interesting than that of more civilized regions.—(Sir Edward Belcher.)

At 5 miles eastward of Cape Rivers a sandbank fills the head of a small bay, and off the eastern point of the bay lies a small islet named Da Iangan. A sandbank lies a mile off the shore at 3 miles eastward of the islet. Several small islets lie off the coast to the eastward.

Cape Kandi is 40 miles eastward of Cape Rivers, and the coast here turns to the southward for 10 miles to the anchorage of *Bool*, where it is said that fresh water may be got, but some dangers project from the shore, and there is a 3-fathom rock on which a ship has struck.

At 17 miles eastward of *Bool*, and within a mile of the shore, lie the two small *Radya Islets*; between these and *Palelee Bay*, 9 miles to the eastward, is *Lintido Point*, which is high. Off *Kaboe Point*, the eastern point of the bay, distant a mile, is a sunken rock, in lat. $1^{\circ} 7' 30''$ N., long. $121^{\circ} 53'$ E. Between *Kaboe Point* and *Huledebongo Point*, 10 miles to the eastward, a rock is marked doubtful at 3 miles off shore. Between *Huledebongo Point*, which has rocks extending $1\frac{1}{2}$ mile from it, and *Bolole*, a high point 8 miles to the eastward, is *Beau Bay*. At 4 miles northward of *Bolole Point* is the South end of a reef which thence extends 8 miles to the north-eastward to a point in lat. $1^{\circ} 15'$ N., long. $122^{\circ} 19'$ E. *Bolontio Point* is 8 miles eastward of *Bolole Point*, and 6 miles E.S.E. of it are the *Damuma Islands and Reefs*, extending to a distance of 3 miles off the shore.

Timor Bank, of $2\frac{3}{4}$ fathoms, is in $1^{\circ} 5'$ N., $122^{\circ} 31'$ E. It lies 5 miles North of the two small *Radya Isles*, which lie East and West of each other, 3 miles North of *Donda Point*, a rock lying in the channel between them and the point.

Kwandang Bay is between *Dondo Point* and *Cape Besar*, 16 miles to the eastward of it. It is very extensive and very foul. Two islets lie at 1 and 2 miles North of *Cape Besar*, and outside the line joining *Cape Dondo* and *Cape Besar* are three isolated patches lying off the mouth of the bay. One of these lies 5 miles W. by N. of *Cape Dondo*, another 7 miles E. by N. of *Dondo Point*, and the outer one 12 miles E.N.E. of *Dondo Point*, and 7

miles N.W. of the outer islet off Cape Besar, which is in lat. $1^{\circ} 1' N.$, long. $122^{\circ} 46' E.$ A *doubtful patch* is marked at 6 miles N.E. of Cape Besar.

Bongkie is a small islet in lat. $1^{\circ} 5' N.$, long. $122^{\circ} 52' E.$, 8 miles off shore, and for 25 or 30 miles eastward of this the shore should not be approached but with the greatest caution, on account of the imperfectly examined *Josina Reefs*, which extend to a distance of 10 miles from the shore. There is some very high ground southward of the *Josina Reefs*, 12 miles inland. *Domisil Bay* is in long. $123^{\circ} 43'$, and some islets extend 2 miles off its eastern point. *Oekie Bay* is 8 miles eastward of this, and *Moloro Islet* $1\frac{1}{2}$ mile off shore, 5 miles eastward of *Oekie*. *Bolano Bangka* is on a point 7 miles eastward of *Moloro Islet*, and at 3 and 5 miles eastward of it are two rocks. Midway between *Bolano Bangka* and *Lombok*, 10 miles to the eastward, are two islets 2 miles from the shore. Two rocks lie at 1 mile North and $2\frac{1}{2}$ miles N.N.W. of *Maririe Point*, the western entrance point of *Lombok Bay*, which is small.

From *Lombok Bay* the coast trends to the N.E. 16 miles to *Sapa Point*, between which and *Talapan Point*, 9 miles to the N.E., is the entrance to *Amurang Bay*, 10 miles deep. For 15 miles to the eastward of *Talapan Point* the shore is bordered by rocks to 7 miles distance. *Talapan Point* is in lat. $1^{\circ} 20' N.$, long. $122^{\circ} 25' E.$

The *District of Minahasa* or *Menado*, which embraces the eastern extremity of the peninsula for a distance of 55 miles, is a romantic region of volcanic mountains, some of which are in a state of activity. The highest is *Klobat*, 6,694 feet in height, the volcano *Seputan*, 5,570 feet, and *Mount Sempo*, 4,744 feet. Cacao and coffee have been extensively cultivated, the latter of very fine quality.

MENADO, or **Manado**, a **Free Port**, and port of call for the Netherlands India Seam-Navigation Company's boats, is the chief place. It was constituted so, with *Kema* on the opposite side, by the Dutch Governor-General of the Indies, by an ordinance dated *Batavia*, September 28, 1848. The Dutch first built a wooden fort here in 1655. *Manado Tua*, a very steep, conical, well wooded island, apparently an old volcano, about 2,750 feet high, is the westernmost of a cluster of islands which lie N.W. of the Bay of *Menado*. It is 17 miles N.W. from the town, and is a good guide for making it.

The whole bay of *Menado*, which faces the N.W., is steep-to, decreasing suddenly from 150 fathoms to 60, 10, and 1 fathom. The anchorage should be approached *along* the beach obliquely; let go the anchor when the line at the taffarel gives 60, veer eight shackles, and secure by stream anchor on the reefs. This will berth you in 15 fathoms, and the operation must be completed before 4 p.m., or the land squalls may drive you off into 150 fathoms. The holding ground off the mouth of the river is best, and affords better scope. In the months of November, December, and January, the

rollers are said to be terrific, but no instance has occurred of a vessel being wrecked or driven on shore. The fort, called *Fort Amsterdam*, is at the North end of the place, and is in lat. $1^{\circ} 29' 25''$ N., long. $124^{\circ} 46'$. Rise of tide 6 ft. High water, full and change, nearly noon.

North Cape, or *Papalumpongang*, is 17 miles north-eastward of the North point of Menado Bay. From this to *Cape Coffin* or *Polisan*, the N.E. extreme of Celebes, the distance is $13\frac{1}{2}$ miles. The whole of the land is composed of lofty ranges, surmounted by peaks, of which Klabat is the most conspicuous. It has been seen clearly from Ternate and Meyo, and from 60 miles to the westward.

The **STRAIT of BANKA**, which is formed by this coast and a cluster of two larger and five smaller islands, is from 3 to 6 miles wide. About the middle are two rocks, one of which is $1\frac{1}{4}$ mile from the South side, the *Koerier Rock*, of 19 feet, the other 2 miles to the North of it. *Banka Island*, the largest and easternmost of the group, is about 1,100 ft. high.

Limbe Island lies against the East end of Celebes, and forms a narrow and somewhat intricate strait. It is about 12 miles long, and in the middle there is an island encircled by a reef, which occasions an eddy; and the tides being very strong, the passage through the strait is not advisable in a large vessel. Close on the West side of the strait is a lofty volcano, the lava from which has extended to the eastern point of Celebes, called by the Dutch *Verbrandehoek*. To the S.W. of this peak rises the lofty peak of *Gunong Sodara*, or the *Two Sisters*, 4,300 feet high, and still farther to the S.W. is *Mount Klobat* or *Klabat*, before mentioned. In the South part of the narrows of Limbe Strait there is good anchorage, where ships caught in Kema Road with S.E. winds may find shelter.

KEMA, a *free port*, and, like Menado, regularly visited by steamers, lies at the S.E. foot of Mount Klobat. It is in lat. $1^{\circ} 21' N.$, long. $125^{\circ} 3' E.$ There is a good road from it to Menado. There is good anchorage in the road abreast of the fort, in 10 or 12 fathoms, with Mount Klobat bearing N. $36^{\circ} W.$, and the Two Sisters N. $28^{\circ} E.$, about a mile off shore, the depth thence gradually decreasing to the town, where good water and other refreshments are to be procured. The tides rise 5 and 6 ft. about this part.

From Kema the coast trends to S.W. by S. for 25 miles to the *Boentin Isles*, a cluster which extends some distance from the shore, the track being outside of them. The coast may be approached within 3 miles, and in most places nearer. From this to *Cape Tolo* the distance is 80 miles; we have no particulars of it beyond the Dutch maps.

The **GULF of TOMINI** or of Gorontalo, is the great bay which separates the northern and eastern peninsulas of Celebes. From Cape Tolo to its head it is 230 miles deep, and is 50 miles wide at the entrance, and 90 miles at its head. It is very little known, especially at the western part.

Gorontalo, on the North side of the gulf, 63 miles westward of Cape Tolo,

is the chief port of the gulf, and the residence of the Dutch Commissioner. The country around it produces gold dust, wax, &c. Its position is given as $0^{\circ} 25' N.$, long. $122^{\circ} 50' E.$ by Melvill van Carnbee. There are two small coves just within the entrance of the river on the eastern side. Into either of these a ship may haul, and moor to the large stones that lie on the beach, protected from the rapid stream that runs down after much rain; or she can anchor in mid-channel close to the fishing stakes in the entrance to the river. The village is about 2 miles up, and abounds with refreshments of all kinds. A *red light* is or is to be shown at night from an iron post at Gorontalo. *Pagowat* is 62 miles westward of Gorontalo, in long. $121^{\circ} 55' E.$; the anchorage is within the reefs that border the shore, in 9 to 20 fathoms. *Tomini* is in the N.W. bight of the gulf; we have no particulars of it. *Parigi* is at the head of the gulf, with the Table Mountain, which overlooks the head of the Bay of Palos, rising in its rear. The *Togean Islands*, on the South side of the gulf, are frequented by the fishermen for trepang and tortoise shell, which are carefully prepared.

Cape Talabo, the eastern extremity of the eastern peninsula, is in lat. $0^{\circ} 46' S.$, long. $123^{\circ} 27' E.$ It is a steep headland.

The GULF of TOLO or Tomaiki is almost unknown, and there is no port or place of any interest on its northern shore. A cluster of islands lies to the southward of Cape Talabo, of which the principal is *Bangaai*. A chief deputed by the Sultan of Ternate resides here, and a considerable native trade is carried on from it with the shores of the Gulf of Tolo and the adjacent islands in wax, tortoise shell, and trepang. Of the other islands, *Peling*, *Lububa*, *Bankela*, &c., the charts must furnish descriptions.

Cape Nederburgh forms the S.E. limit of the Gulf of Tomaiki, in lat. *about* $2^{\circ} 54' S.$, long. $122^{\circ} 16' E.$ To the southward of this the coast is fronted by numerous islands, of which *Padea* and *Manui* are the principal. The inhabitants of the latter construct the fishing-boats, which are sold to the baju fishermen. Wowoni (Weywongy of the old charts), 28 miles to the southward of Manui, is larger and more mountainous than the former islands, and was formerly inhabited by a peaceable industrious people, but it has been depopulated by the incursions of pirates.

Kendari or Vosmaer Bay, in $3^{\circ} 57' S.$, $122^{\circ} 32' E.$, was discovered by the enterprising Sub-Resident M. Vosmaer, in 1831, during his examination of these shores. He gave an interesting account of the country around it, and of its warlike people continually "head hunting." In 1835 he established here the elements of a permanent factory, under the hopes of creating a trade in its neighbourhood.

BOETON or Buton Island lies off the S.E. extremity of the peninsula, and is the residence of the Sultan of this and the surrounding islands. The Dutch Government have also an assistant resident here. The island is about 80 miles in length, and is generally of moderate height, and hilly in the

southern parts. The South point is in about $5^{\circ} 41'$, long. $122^{\circ} 48' 30''$ E. The island is composed chiefly of a coralline limestone; the soil is not fertile, but produces the finest cotton in the whole Indies. In the North part facing Celebes the shore is marshy and covered with mangrove swamp. Along the West and South coast the shore is often abrupt and rocky, except in the bays which have generally a beach of white sand.

The *East Cape* of Boeton is a long, low, level point, in lat. $5^{\circ} 15'$ S., long. $123^{\circ} 16'$, projecting far into the sea, and having behind it, in the interior, a piece of remarkable table land close to its western side. To the northward of this is an extensive bay, called on the Dutch charts *Kaliesusu Bay*, formerly *Dwaal Bay*. In its North extreme there is a road or harbour, with soundings of 30 to 55 fathoms at the entrance. Care is required in entering between the shoals on the East and those fronting the islands which bound the western side of the road, which seemed to be sheltered from the sea by shoals projecting from the point on the East side. Refreshments may be procured at the village on the N.E. side of the bay. The *N.E. Coast* of Boeton appears to be safe, and may be coasted within moderate distance. A little inland from the N.E. point of Boeton there is a small peaked hill like a sugar-loaf. The North point is in lat. $4^{\circ} 23'$ S., long. $123^{\circ} 4'$ E.

BOETON STRAIT, which separates Boeton from Moena or Muna, is about 66 miles in length, and is very narrow in some parts, although the depth does not appear to be less than 10 or 12 fathoms. In early times it was much used, but now the more open passage around the South end of Boeton is generally followed. The southern entrance is on either side *Kadalua Island*, from which reefs extend to some distance.

Off the S.W. part of Boeton are two small islands. The southernmost is *Siumpu*, the *South Island* of the old charts. According to Melvill van Carnbee it is in lat. $5^{\circ} 40'$ S., long. $122^{\circ} 30'$ E. It is of moderate height, formed of stratified rock, and not well made out in coming from the westward. A coral patch, with 3 fathoms, lies with the East end of *Siumpu* bearing N.N.E. and the South point of Boeton N.E. by E. $\frac{1}{2}$ E. A reef of black rocks was reported in 1870 as lying 2 miles North of the West end of *Siumpu*. *Middle Island*, a small island, lies between *Sempoe* and *Kadalua*, or *North Island*, $7\frac{1}{2}$ miles to the northward. *Kadalua* should not be approached within a mile, as sunken rocks exist off its South, West, and N.E. points.

(The groups of islands to the south-eastward of Boeton, and those scattered over the Banda Sea, will be described hereafter.)

Boeton, the chief place on Boeton, is just inside the strait on the East side, in lat. $5^{\circ} 28'$ S., long. $122^{\circ} 36'$ E. It is the residence of the Sultan, and some Dutch officials are to be found here. Poultry, vegetables, &c., may be got. The tides are moderate, and will assist a vessel in drifting through in light winds, and convenient and good anchorage may often be got. A shoal pro-

jects a little way from the N.W. end of Boeton, and, when clear of it, the channel leading out takes an easterly direction, passing between Wowoni (or Weywonij) and Boeton. The strait is not made out from the northward until you are up with it; a remarkable rock, hollow below, with bushes on it, lies against the Boeton shore; both sides of the strait rise perpendicularly from the sea.

Passing along the S.E. end of Boeton, if the wind is westerly, keep the Boeton coast on board to the East point, to prevent being set over toward Wangi Wangi and the Tukan Bissi Isles by southerly currents and light airs, which frequently prevail in the offing. It is said that the ship *Noordbeck* was wrecked on a reef which lies 15 miles S.E. of the East cape, in lat. $5^{\circ} 30'$. Care is also required when between the latitudes of $6^{\circ} 39'$ and $6^{\circ} 31'$, as *Penguin Reef*, with as little as 9 ft. water on it, leaves a channel only 4 miles wide between it and the S.E. coast of Boeton.

Moena, *Muna*, or *Pangasané*, the island westward of Boeton, is 50 miles long North and South, and is subject to Boeton. Its chief town is in the interior, but its only port is at the North end, called *Tiora*, or *Tiwora*, which gives its name to the strait between it and the southern part of this peninsula of Celebes.

Tiora Strait is intricate and unknown to European navigators. The shoals and islands are very numerous, and there are no inducements for taking it, especially in a large vessel.

Kabeina, or *Cambyna*, is a large island to the westward of the South end of Moena. It rises steeply and rugged from its western extremity towards a high peak in its centre, which is about 4,000 ft. high, lat. $5^{\circ} 19'$ S., long. $121^{\circ} 54'$ E. The island is about 12 miles in diameter, and off its South and S.E. ends there are one or two small islands, with rocks 2 or 3 miles S.E. of them. About 2 or 3 miles from its West end lie three islands, very low, with breakers projecting 2 or 3 miles South from them. A rock also lies $1\frac{1}{2}$ mile off shore, S.W. of the central peak. In coming from or to the Strait of Salayar, these rocks should be guarded against.

The GULF of BONI separates the two southern peninsulas of Celebes, and is 90 miles wide at its entrance, and extends 150 miles northward. It has been visited by Sub-Resident Vosmaer, in 1831, but had not been circumnavigated till James Brooke, Esq., afterwards the Rajah Sir J. Brooke, sailed around it in his yacht the *Royalist*, between November 29th, 1839, and May 1st, 1840. In the first chapters of his interesting work, published in 1848, a narrative of this cruise is given, and affords much information.

CAPE LASSA, or Berak, is the S.W. point of the gulf, and the northern point of the Strait of Salayar. It is in lat. $5^{\circ} 36'$ S., long. $120^{\circ} 29'$ E. It is 18 miles eastward of Boelecomba, mentioned on page 802, *ante*. *Balunruéh*, or *Balanranga*, an island 400 ft. high, is 27 miles due North of Cape Lassa; off it are several coral reefs. The village of *Songi* is up a river abreast of

this. The course to the northward was among numerous reefs and shoals, threading the way with some difficulty. Of the outlying known dangers, *Boni Rock* is 20 miles N. by E. of Cape Lassa. *Rykdorps Bank*, 10 miles in extent E. and W., is nearly 30 miles N.E. by N. of Cape Lassa. *Limpogeh Island*, in lat. $4^{\circ} 55'$ S., long. $120^{\circ} 45'$ E., is small, and has a sunken rock 2 miles South of it, and numerous isolated dangers between it and *Lambeina Reef*, 21 miles to the N.N.W. of it.

Point Patiro, lat. $4^{\circ} 39'$ S., was passed half a mile distant; off it is a patch of white sand and coral, the channel being inside it; off this cape the flood comes from the South, the ebb North, but not strong, though the rise is considerable.

Boni, the chief town of the district, is two hours journey inland from *Bajue*, or *Badyoa*, which is 10 miles W.N.W. of Cape Patiro. The State of Boni, once the most powerful in Celebes, presented the curious spectacle of an aristocratic elective monarchy. *Palette*, 11 miles North of Point Patiro, is wooded, and superior in elevation to the adjoining coast. Between these points the Lambeina Reef extends off shore to a distance of 10 miles; a small islet is situated on its eastern part. *Chinnana River* is 7 miles North of Palette. The town is some distance up the stream, which drains some large lakes, the only ones known in Celebes. *Peneki Bay* is 14 miles northward of the mouth of the Chinnana River; the coast here is a low mangrove flat.

Cape Marasanga or *Siva*, in lat. $3^{\circ} 44'$ is low and covered with light green trees, but beyond this the scenery changes its character, and the low shore is replaced by lofty hills and wooded mountains, *Mount Latimojong* crowning all. The whole of the coast South of Cape Marasanga is embarrassed by coral reefs of unknown extent. The district of *Luwu*, which surrounds the head of the gulf, is one of the most ancient of the Bugis States. It is a mountainous region, but the shores are more clear of outlying shoals. *Jenemaiji*, or Red Water Point, in lat. $3^{\circ} 18'$ S., is so named on account of a discoloured stream which discharges itself near it. From this the coast runs N.W. 20 miles to the town of *Palopo*, at the head of a bay in the N.W. part of the gulf. It is the capital of Luwu, but is only a miserable collection of 300 houses. At 12 miles N. by E. from Cape Dyenee, are two sunken dangers, and N.N.E., at the distance of 15 miles, is another.

Beraoe, or *Buru*, at the head of the gulf, in lat. $2^{\circ} 41'$ S., long. $120^{\circ} 41'$ E., seems to be the chief place of the neighbourhood. Two sunken rocks lie to a distance of 2 miles from shore, at 2 miles S.W. of Beraoe. In the N.E. angle of the gulf is the town and river of *Usu*. It lies on the North side of a bay, the southern side of which is entirely distinct in character from the northern, the former being bold and abrupt, the latter an alluvial plain. *Pulo Paloeih* (or separated mountain) is an island off the South point of Usu Bay. It is bold and wooded, and divided from the main by a moderate channel.

At 5 miles S.W. of it a *doubtful rock* is marked. The scenery of all this coast to the southward is most picturesque, bold wood-covered hills, with high mountains behind. *Cape Tabako* is in lat. $3^{\circ} 20'$ S. *Cape Susua*, lat. $3^{\circ} 27'$, is bold and prominent, as are two others, *Libnandala* and *Labekara*, to the southward; the coast is very bold-to. Midway between Capes Labuandata and Labekara is a reef 3 miles off shore. *Batu Lakie Head*, a slightly projecting headland, 18 miles S.E. of Cape Labuandata, has a rock marked doubtful at 3 miles S.S.E. of it. *Cape Bungie*, in lat. $3^{\circ} 54'$ S., is a projecting promontory, in the bay northward of which is the small island of *Roko*. Off its western side is another small islet. In $4^{\circ} 8'$ S. is *Padamarang Island*, 5 miles in diameter. *Lambasina Islet* lies a mile West of its N.W. point, and a second islet, W.N.W. 6 miles from its N.W. point, has a rock off each end and another, 5 miles W.S.W. from it. Within Padamarang Island, is *Kongka Bay*, nearly filled by reefs. *Maniang Islet*, 5 miles S.E. of the S.E. point of Padamarang, and 4 miles off shore, forms the outer western point of the channel leading up to *Pasatue*, a village at the head of Kongka Bay.

The *Minkoka District*, the Baaikonka of the Dutch, occupies the head of this bay. The country is attractive, and partially cleared. The mountains sink to a strip of alluvial plain near the sea. The people resemble the Bugis in person, but are a separate race.

Cape Takarie is 36 miles South of Padamarang Island. There is a small bay just northward of it. Sunken rocks lie 1 or 2 miles off shore at intervals for 15 miles northward of Cape Takarie, and 11 miles westward of it is the North end of a reef, in lat. $4^{\circ} 42'$ S., long. $121^{\circ} 17'$ E., which thence extends 7 miles to the southward. *Bassa Island* is low, 15 miles southward of Cape Takarie, rocks lie to 2 miles W.N.W. and to 8 miles N.N.W. from it.

Cape Boenging Katto, the S.E. extreme of the gulf, is in lat. $4^{\circ} 55'$, long. $121^{\circ} 45'$ E., and is 15 miles East of Bassa. A *sunken rock* is reported 7 miles S.W. by W. from it.

SALAYAR or SALEYER STRAIT, between Cape Lassa, on the S.W. side of the Gulf of Boni and the North end of the island of Salayar, is a great highway for the commerce between the Moluccas and the Java Sea. Several islands lie in the strait, and in the old charts are called North, Middle, and South Islands. *Sarontang*, a small islet, lies 5 miles S.S.E. of Cape Lassa, and should not be approached within a mile on its South side. *Lukan Loweh* is another islet, 5 miles S.W. of Cape Lassa. There appears to be a clear channel 3 miles wide between these islands, but the channel generally used is 5 miles wide to the southward of Sarontang, between it and *Doang Island*. This latter island is $1\frac{1}{2}$ mile in diameter, and lies 2 miles from the North point of Salayar Island, the channel between being dangerous because of sunken rocks.

Dangers in Salayer Strait.—At 5 miles westward of Lukan Loweh is a $6\frac{1}{2}$ -fathom patch, 4 miles off shore. A sunken rock lies between this and the shore. *Rankap*, a 4-fathom patch, lies 8 miles West of Lukan Loweh.

The **Mansfield Shoal**, in lat. $5^{\circ} 43\frac{1}{2}'$ S., long. $120^{\circ} 13\frac{1}{2}'$ E., lies to the westward of the strait, is not very well known, and is dangerous. It is extensive, and lies about 18 miles W.N.W. of the North end of Salayar; Sarontang, just seen from the mast-head, about E. by N. $\frac{3}{4}$ N.; and Boelecomba, or Peaked Hill, on Celebes, N. by W. It is said to have on some parts not more than 3 to $3\frac{1}{2}$ fathoms, with deeper soundings up to the Celebes shore, but none to the southward.

A 7-fathom patch, probably the same as *Amboina Shoal*, which was reported as dangerous, lies 8 miles eastward of Mansfield Shoal.

To sail through the Strait, intending to pass outside of the Mansfield Shoal, which is the best track with a S.W. wind, keep out of soundings, about 16 or 18 miles from the Celebes coast, when Bonthein Peak bears between N. $\frac{1}{2}$ E. and N. by W.; and when the North end of Salayer is discerned, by keeping its extreme point East, but nothing to the southward of this bearing, you will clear the shoal to the southward. Steer direct for Sarontang Island, and pass it well to southward. Along the Celebes coast, inside the Mansfield Shoal, there are moderate depths for anchoring.

SALAYAR ISLAND is about 40 miles long, North and South, but is narrow. It is very populous, and is a dependency of Celebes. The people are industrious, and raise considerable produce. The teak tree has been planted, and flourishes. It is said that this island is the division of the climate systems of the eastern and western parts of the Archipelago (see page 20 *ante*), the rainy season being reversed, and by which they conform to the West with the north-westerly, and in the East with the south-easterly monsoon.

The **North Point** of Salayar is in lat. $5^{\circ} 47'$ S., and the land over it being rather higher than the islands adjacent, and joined to the main body of the islands by a low neck, makes the North point appear isolated when first made either from the eastward or from the westward, a fact that should be attended to in making for the strait. There is a large village on the N.W. side of the point, but with shoals and rocks stretching out from it, consequently it is a very bad anchorage. *Pasi*, or *Hoog Island*, an island of considerable length, lies on the S.W. side of Salayar, parallel with and a short distance from it.

In the northern part of the strait, dividing it from Salayar, and on the eastern side, is a kampong and fort, abreast of which is good anchorage in 10 to 12 fathoms. There is a reef around the North end of Hoog Island, and to the West of it is the *Whale* or *Souteland Reef*, about a quarter of a mile in extent, with 12 ft. on it, and $4\frac{1}{2}$ fathoms close-to, and reported by the master of the *Evelyn* to lie about 4 miles W.N.W. from the North end

of Pasi Island, otherwise known as Hog Island. From the shoalest part of Whale Shoal the North end of Pulo Salayer bears N.N.E.; and the S.W. extremes of Pasi Island and Pulo Salayer are in line. It is of undetermined extent, but is about 9 miles West of Hoog Island. A 2-fathom patch lies 5 miles off the West coast of Salayar, in lat. $6^{\circ} 18' S.$

The *South Point* of Salayar is in about lat. $6^{\circ} 27' S.$, long. $120^{\circ} 28' E.$, and is surrounded by an extensive reef. At 3 miles westward of it is *Baoloeang*, a small island, with a reef projecting far off from its N.E. point, but leaving a deep channel, 35 to 38 fathoms, between it and Salayar.

The *Tiger*, or *Tyger Islands* of the old charts, lie to the southward of the Gulf of Boni, and southward of the track eastward from Salayer Strait. The steamer *Hertog Bernard*, when steaming to the eastward of Salayar, in 1871, in search of the American whaler *Xantho*, stranded near an island group which appears on old charts under the name of the Tyger Islands. This group consists of a large number of coral islands, mostly high, surrounded by far extending reefs, and visible from on deck to a distance of from 2 to 3 geographical miles. The largest and most north-easterly, named North Tiger Island, lies in $6^{\circ} 21' S.$, and $121^{\circ} 3' E.$ from Greenwich. From North Tiger Island, a chain of reefs stretch out S.S.E. to Kala Tua; to the East of these reefs is no anchoring ground; they rise up steep from a depth of 100 fathoms. The wreck of the *Xantho* was found on the eastern side of these dangers, and lies in $6^{\circ} 30' S.$, and $121^{\circ} 17' E.$ from Greenwich. The commander of the *Xantho* has reported that to the East of the reefs a safe passage exists between Kala Tua and Post-horse Island, in a N.N.Westerly direction.

Tamboeloengan, or *Tambelaoeang*, a little known island, lies 8 miles S.S.W. of the South point of Salayar, and is about 3 miles long; 2 miles farther South is the North end of *Roesah*, or *Roessa*, another undescribed island, with a peak at its North end. Between this small island and the low islet of *Sisir*, 17 miles to S.S.E., and described on page 773, there are several reefs, with probably clear channels between them. *Mamalakkie*, described on page 773, is 10 miles westward of Roesah. These islands were formerly marked as the *Tonyn* or *Tonin Islands*, but they are not now known by that name. The islands to the southward and eastward are alluded to on pages 772, 773 *ante*.

The whole of these islands and groups which lie between the Java and Floris Seas, do not appear to have been examined for many years, and, therefore, the very imperfect accounts we have of them can be of little service.

There are two groups still to be mentioned, which lie to the westward of those just described, to the North of Sumbawa.

The **POSTILIONS** lie about 70 miles S.S.W. of the S.W. point of Celebes, and the same distance North from Sanjeang, off the East end of Sumbawa

(page 764). They consist of an extensive range of low islands extending 36 miles in a S.E. and N.W. direction, and are almost entirely unknown. The North island is in lat. $6^{\circ} 31' S.$, long. $118^{\circ} 42' E.$ The N.W. island has a small lump in the centre. The easternmost limit of the islands is in lat. $6^{\circ} 48' S.$, long. $119^{\circ} 12\frac{1}{2}' E.$ There is apparently a safe channel between them and the Great Paternosters, but little is known of it, and a series of islands extends for 60 or 70 miles S.W. of the South end of the Postilions.

At about 40 miles West of their south-westernmost point is the N.E. end of a more extensive range, the Great Paternosters.

The **GREAT PATERNOSTERS** consist of several groups of coral islands, mostly low and wooded, extending nearly N.E. and S.W. 110 or 120 miles. They are but little known, and should be avoided till they are better described. Many of them are surrounded by reefs and shoal coral patches. The S.W. isles are about $6^{\circ} 56' S.$, long. $117^{\circ} 5' E.$ The N.E. Paternoster is in about lat. $6^{\circ} 36' S.$, long. $118^{\circ} 17' E.$ Near the N.E. Paternosters, in lat. $6^{\circ} 30' S.$, and long. $118^{\circ} 18' 30'' E.$, the water was observed to be discoloured, and a coral reef supposed to exist.

THE MOLUCCA ISLANDS.

The designation of Moluccas has been extended to all the islands between Celebes and New Guinea, but properly it should be confined to the chain of *five* islands running North and South on the West side of Halmahera or Jilolo, having Ternate to the North and Batchian on the South. These islands are the native country of the **CLOVE**—a spice considered to be of such value in the middle ages, that the search for it was one of the chief incentives to the first voyages of Columbus, which, in addition to giving us the knowledge of a new world, have also attracted a navigation which has made known to us regions equal in extent to that new world. These small islands, unattractive in themselves, have therefore played an important part in the progress of navigation and hydrography.

The Moluccas, as now understood, are claimed by the Dutch, who hold the sovereignty over the whole of them with greater or less power. They are divided into—1. The *Residentie van Amboina*, which embraces that island, the West part of Ceram, Buru, and the neighbouring islands; 2. The *Residentie van Banda*, comprising that small group, the East part of Ceram, and all the groups to the South and S.E.; 3. The *Residentie van Ternate*, embracing the three Sultanats of the Moluccas or Spice Islands proper, the islands of Jilolo or Halmahera, a portion of Celebes, and the islands to the S.W. of them. The details of the area and population of these several provinces was given for the first time with any accuracy by that accomplished

hydrographer Melvill van Carnbee, in the "Moniteur des Indes" for 1846-9. The interesting figures there given must be the guide to those who require further information.

This section will be a description of the islands and passages as far as they are known, commencing with the westernmost. The authorities for these are, besides the numerous notices collected and issued by the Dutch commission for the improvement of the Indian Sea charts, the surveys of Lieut. Gregory; the voyage of M. M. Modera, S. Müller, &c., in the Dutch corvette *Triton*, in 1828; that of M. Kolff in the *Doerga*, in 1825-6; Freycinet, in 1822-5; Dumont d'Urville in the *Astrolabe* and *Zeléé*, in 1837-40, when a large number of important observations were made; Sir Edward Belcher's voyage of the *Samarang*, 1844, Capt. Owen Stanley, R.N., 1839; Mr. A. S. Bickmore, 1865; Voyage of the *Challenger*, 1874, &c., &c. Besides these, the works of Temminck, Eysinga, &c., have been consulted, and many particulars are extracted from our old Oriental Navigator of 1806.

The **XULLA ISLES**, a group of four or more islands to the eastward of the eastern peninsula of Celebes, do not appear to be at all known, as no good account is to be found of them. Their name is apparently given by the Portuguese, and is sometimes written *Zulla* or *Soela*.

Xulla Taliabo, the westernmost, is high and bold, with but few inhabitants. Its north-western point is marked as in lat. $1^{\circ} 45' S.$, long. $124^{\circ} 19'$, from whence it extends eastward for 60 miles, and is separated from the next island by the strait of *Sapaloeloe* or *Surinam*.

Xulla Mangola, the next to the eastward, is generally high, especially at its N.W. end, where it is lofty and rugged. It is about 50 miles long. Off its East end is the smallest of the group, *Lifa Matoelah* or *Lissamatula*, separated by a narrow channel. It is moderately high and level, having along its North and East sides several white cliffs, which are conspicuous at a considerable distance. The S.E. point is in lat. $1^{\circ} 51' S.$, long. $126^{\circ} 30' E.$, and off it is an isle which forms like a saddle in coming from the northward.

Xulla Bessi, the southernmost, is of considerable height, and may be seen 12 or 13 leagues off, and has a level appearance when seen at a distance. It is about 30 miles long, and its S.E. point is in *about* lat. $2^{\circ} 28' S.$, long. $126^{\circ} 2' E.$ It is well cultivated and inhabited, producing much wax and honey. There is a village, *Sabi*, near the S.E. point, where a ship may procure some refreshments. There is a Dutch resident here.

Sannana Bay, on the N.E. coast of Xulla Bessi, was surveyed by Lieut. J. C. G. Brennwalla. It is a good harbour, half a mile in diameter, almost surrounded by coral reefs, with a narrow entrance facing the East, with 7 to 11 fathoms in it. Immediately opposite the entrance is a building called the large mosque, which, bearing West, would lead through. At a short distance North of this is the *Fort de Verwachting*, which is W. by N. $\frac{1}{2}$ N. from the entrance, and in lat. $2^{\circ} 2' S.$, long. $125^{\circ} 56' E.$ Inside the harbour the

depths are from 7 to 14 fathoms, clay bottom, and good anchorage in the centre, with the fort bearing N. 67° W., the great mosque West, and the little mosque on the South side S. 40° W. Tides rise 9 ft.

The *channel* between Bessi and Mangola is about 3 or 4 miles wide between the coral reef which extends North of the former island, with anchorage in from 30 to 35 fathoms near the Mangola shore, which is bold to approach. The currents are strong in the channel, and influenced by the tides. In coming through from the eastward, keep on the eastern side until near the small island West of the passage, when you may haul to the southward.

Greyhound Strait leads past the western end of Taliabo. The western coast of this island trends nearly North and South about 13 miles, having a haycock island, *Seho*, in lat. $1^{\circ} 58'$, close to its S.W. point, and another island off its N.W. point; from the latter, several islands lie near the Taliabo shore, to the N.E. and eastward. *Masunie* or *Middle Island*, which separates the straits into two channels, bears West 9 miles from the North island above mentioned. It is low, swampy, and covered with trees, and surrounded by shoal water.

A *sunken rock* lies at 2 miles westward of the South end of the western islet, lying off the N.W. extreme of Taliabo, and the *Quintet* touched on a shoal of $1\frac{1}{2}$ fathom, lying 3 miles south-westward of the sunken rock. From the shoal Pulo Massuni bore N. 59° W.; Pulo Lembau, E.N.E.; and Pulo Seho S. 28° E. There are 3 fathoms water on the edge of the reef, S.E. of Pulo Massuni, and it is 3 miles East of the eastern side of the island.

BOURO, Boeroe (Dutch), or *Buru*, a large and lofty island, is 42 miles south-eastward of Xulla Bessi. It is 80 miles long by 50 in its greatest breadth, and is therefore one-half larger than Bali or Lombok, but compared with them is of but little value. It is a vast mass of mountainous land, rising to the height of from 7,000 to 8,000 ft., the most elevated in the Molucca Sea. *Mount Tomahoe*, 8,530 ft. above its N.W. point, is very lofty. *Cape Balatetto* or *Palpatu*, the N.W. cape, is in lat. $3^{\circ} 6'$ S., long. $126^{\circ} 4'$ E. The West coast trends about South for 32 miles to *Cape Lisateke*, 6 miles to S.W. of which is a *rock* awash. The southern coast curves irregularly E.S.E. and E.N.E. for 88 miles, and then northward toward Cayeli Bay.

Cayeli or Cajeli Bay, on the N.W. coast, is the chief place of the island. *Fort Defensie*, in the S.W. part of the bay, according to Admiral Sir E. Belcher, is in lat. $3^{\circ} 22' 49''$ S., long. $127^{\circ} 6' 27''$ E. The southern and western shores are fronted by an extensive coral reef to the distance of about a mile, and on the eastern side lies a large coral reef, which extends nearly one-third across the bay.

There is a rugged mount or double peak, two very high conical hills inland, called the *Mother* and *Daughter*, which from the sea appear as one. The Daughter is only seen separate when well into the depth of the bay.

The eastern side is streaked with white, by reason of its bare rocks. It lies on the S.E. side of the depth of Cayeli Bay, $4\frac{1}{2}$ miles S.E. $\frac{1}{4}$ S. from the fort, and is an excellent mark for rounding the eastern head from the S.E.; as long as its head can be seen above the trees at the eastern point, the shipping will be perfectly clear of danger. The instant it begins to *rise*, after passing the point, a course may be shaped for the North point, which apparently shows as the left of an island on the N.W. shore. When in mid-channel steer with the town off the port cathead until Mother bears S.E. by S. Then steer South for the fort; shorten sail when about 1 mile from it, and anchor at the first cast 25 fathoms, bottom mud, good holding ground.

The limit of danger, westerly, is the two eastern turrets of the fort in line. Sir Edward Belcher found soundings in every part of the bay, both going in and coming out; on the latter occasion it never exceeded 50 fathoms until he hauled up E.N.E. Entering, it ranged from 64, 42, to 60 gravel, anchored with the fort, South, Red Island, or Pulo Papeoa, East. The latter is $1\frac{1}{2}$ mile E. by N. from the fort, and behind it is a landlocked anchorage in 6 fathoms, entered between the reefs North of the island, the channel first trending S.E., then South. H.M.S. *Sulphur* was here in August and September, 1840. Sir Edward says that Bouro or Cayeli Bay possesses great advantages over Amboina as regards supplies of poultry, eggs, water, and wood. The harbour is also snug, sheltered from the monsoons, and less troubled with the diurnal rains of Amboina. Deer are plentiful in the interior. A great variety of beautiful woods, adapted for cabinet purposes, and now (1868) greatly appreciated, are also plentiful, including the most valuable ebony of these seas. The cajeput oil is principally obtained from this island and sent to Amboina. The Dutch resident was much perplexed at the frigate's visit.

It is high water, at full and change, at $1^h 32^m$; rise of tide $4\frac{1}{2}$ ft.

Amblau or Amblauw, a small island 6 miles in extent, lies 6 miles off the S.E. end of Bouro. Its East end is in lat. $3^\circ 50' S.$, long. $127^\circ 17' E.$ A reef of rocks is *reported* to lie in the strait, but its position is not known.

Manipa is a lofty island, 2,100 ft. high, midway between Bouro and the western peninsula of Ceram, its centre being in lat. $3^\circ 17' S.$, long. $127^\circ 34' E.$ The best channel is the *Manipa Passage*, between it and Bouro. It is about 16 miles wide, is without soundings, and clear of danger. It is the passage generally used in going from Bouro to Ceram or Amboina. At $1\frac{1}{2}$ mile West from the West extreme of Manipa is the small islet of Suangi, 327 ft. high, in lat. $3^\circ 16' 30'' S.$, long. $127^\circ 29' E.$ On the South side of Manipa is the Dutch fort, off which, and within a small islet, there is anchorage close to the shore. Kelang is 2,400 ft. high, and lies to the N.E. of Manipa, being separated from it by a safe channel 3 miles wide, through which the tides or currents set very strongly at times with great noise and

strong rippings. *Babi* is low, and separated by a narrow but closed passage from the N.E. Cape Kelang. To the East it is separated from the West point of Ceram, *Tanjong Hatan*, by a narrow passage called the *Nassouwsche Gat*.

AMBOINA or Amboyna, a *free port*, is, as before observed, the seat of the Dutch Government of the adjacent islands, although it is not very populous, Melvill van Carnbee giving its total inhabitants as 29,592 in 1841, of which about 9,000 live in the chief town. They are a brown complexioned race, who have lost many of the distinctive characteristics they were found to have when the island was first discovered. The Malay is now the universal language, and a large proportion of them have been well educated and cared for by the Dutch Government, so that they are allowed to be the most moral, well conducted, and peaceable people of the whole Archipelago.

The island is 29 miles long E.N.E. and W.S.W., and consists of two portions, nearly separated by a narrow and low isthmus, across which the Dutch commenced and nearly succeeded in cutting a canal. The northern and largest portion is called by the natives *Hitoe* or *Hitu*, and the southern peninsula, on which is the capital of the Moluccas, is *Leitimor*.

“Amboyna is a beautiful island, nearly divided in two by a broad sea inlet running between high hills, covered with forest or yellow grass, and along the shores are Malay villages, nearly hidden by cocoa groves. Fourteen miles up, on the South side, is the town of Amboyna, the bay continuing 6 miles farther, narrowing just above the town, and again broadening into a lake-like sheet of water, bounded by soft and lovely vegetation at the foot of low wooded hills. We anchored almost alongside of a pier crowded with Dutch soldiers and Malays, excited at our arrival. Though the town from the anchorage looked picturesque enough with trees and palms springing up above the roofs, we were rather disappointed, as it by no means looked like the large place we had heard it was; but when on shore we found it was very much larger than Banda.”—(Lord George Campbell: Log Letters from the *Challenger*.)

The island is composed of primitive and volcanic rocks, and, like many other productions, the clove cultivation is peculiarly adapted to the disintegrated soil of volcanic origin. The little energy of the inhabitants, about 30,000 in number, is almost exclusively devoted to the growth of this staple product, as the island is not much cultivated in other respects. The total produce of the clove is about 500,000 lbs. to 600,000 lbs. per annum. This industry, however, is not now so well cared for, since the soil of other lands has been found suitable for clove cultivation. Shells of rare species are also much collected and exported. The rocky and hilly portions of the island do not attain a very great elevation, Gunong *Salhoetoe*, in the N.E. part of Hitoe, being 4,010 ft., and Gunong *Latoea*, in the S.W. part, 3,363 ft. The highest points of *Leitimor* are Gunong *Nonna*, 1,972 ft., 2 miles S.S.W. of

the city, and Gunong *Horie*, 2,030 ft., 3 miles E.S.E. of the same. The southern peninsula is traversed by some good roads.

Winds, &c.—From a meteorological register kept at Amboina, extending over a period of four years ending 1874, it would appear that the N.W. monsoon commences about November and lasts till April; but only during January, February, and part of March do the winds blow steadily, and then between North and N.W. The S.E. monsoon blows from May to the beginning of September, after which it becomes variable to the end of November. In December the wind is variable from North through West to South, and in March and April from N.W. to S.W.

Rain falls in every month of the year, the driest being from October to April inclusive, with an average of 13 days rain and 8 inches fall for each of these months. The other months average 21 days rain, with a fall of 27 inches. The mean temperature for the whole year ranges from 74° to 86° Fahrenheit.

Earthquakes occur from December to June.

Tanjong Wawolle, the western extreme, is in lat. 3° 40½' S., long. 127° 54' 30" E.; off it are three islands called the *Drie Broeders* (three brothers), or *Pulo Tega*, between all of which and also between them and the point, there are safe passages. The North shore of Amboina is clear of danger throughout, and the channel between it and Ceram, 4 or 5 miles wide, is subject to strong but irregular currents. Off the N.W. point of Amboina is a small island, *Pulo Pombo*, and from this to the S.E. extreme of the northern part of the island the distance is 8 miles in a S. by W. direction. *Bagualla Bay* indents the eastern face of the island, and at its head is the low isthmus. There are numerous shoals in it, and it is entirely open to the East.

The BAY of AMBOINA, which trends to N.E. by E., enters between *Tanjong Allang* on the West and *Noesanive* on the East; they are steep-to, and bear East and West from each other 6 miles apart. About 3 cables' lengths S.S.E. from the latter point there is a narrow bank of soundings of from 15 to 50 fathoms, on which a ship might anchor during a calm. It is detached from the shore.

Inside the S.E. point is a slender bay, called formerly *Portuguese Bay*, but there are no soundings to be obtained at a cable's length from the shore on either side except in the upper part near to the narrows.

AMBOINA or Amboyna, the capital of the Moluccas, is 8 miles up the bay on its southern shore, or about 15 miles from Point Allang. The town is regularly built, clean, and neat, with wide and regular streets. It has a governor's palace and a long esplanade, planted with nutmeg trees, terminating at *Fort Victoria*, at the N.E. end of the town.

The houses are built in the Dutch style, but chiefly of one story, on account of the frequency of earthquakes. The Chinese quarter, which is extensive,

is in the western part, and has a very large and well stocked market, furnishing most of the luxuries as well as the necessaries of the climate, but the people do not seem to be so industrious as they are in other parts of the world.

“The Dutch Government have a large coal depôt here. One day we proceeded farther up the harbour for the purpose of taking in a supply, lying alongside a jetty during the operation; it was, however, a slow and tedious process, for no inducement could make the coolies get in anything like a reasonable quantity per day. It was a pretty place, and as we had the additional facilities of lying alongside a pier, many excursions were taken. On completing our coaling we returned to our first anchorage off the town. The passage down the harbour afforded one of the most astonishing and beautiful sights to behold. The bottom was absolutely hidden by a continuous series of coral sponges, actinæ, and other marine productions of varied forms and brilliant colours. The waters were clear as crystal, and the depth varying from 8 to 10 fathoms.”—(W. J. J. Spry, R.N., Cruise of H.M.S. *Challenger*.)

This citadel was built by the Portuguese, and, besides the military quarters, contains storehouses for the produce of the clove plantations. A wooden jetty extends from the wharf in front of the fort, off which is the usual anchorage. The town contains about 8,000 or 9,000 people, but seems to be declining. The summer-house on the S.W. angle of Fort Victoria, the observatory of Sir Edward Belcher, was found by him to be in lat. $3^{\circ} 41' 30''$ S., long. $128^{\circ} 10' 18''$ E. corrected), which agrees closely with the observations of Lieutenant H. A. Meijer, of the Dutch royal navy, who surveyed the bay in 1840. A survey of the island was made in 1842 by Lieutenant H. van Guffron.

The bay, as before observed, has very deep water along the middle, for at between 3 and 4 cables' lengths of the jetty there are 60 fathoms water. The bay here is about 2 miles wide. There is anchorage abreast of the fort, in case a ship is driven from the anchorage to the south-westward, off the town.

The best time for entering the bay in the *westerly monsoon* is in the morning between daybreak and 8 or 9 a.m.; and by keeping a N.E. by E. course from between the heads nearly in mid-channel, you will generally carry a breeze up to the anchorage off the town. During the night light variable airs or calms generally prevail, accompanied with an outset, which renders the progress up the bay tedious and difficult, for ships are liable to be drifted about by the eddies, or probably out of the bay after getting half-way up with a favourable breeze. There is, however, no danger to be apprehended during the night, for although a ship may seem to be drifting toward the beach when calm, yet the depth of the water allows a ship to be set parallel to the shore close to. Strong gales are often experienced in the westerly

monsoon, about full and change of the moon, which are generally preceded by a great swell tumbling into the bay.

In the *easterly monsoon*, as the current frequently sets strongly past the points of the bay to the westward, a ship coming from this direction ought to work up in the offing until Noesanive Point bears N.N.E. or N. by E. She should then steer round it pretty close, keeping along the southern shore of the bay at a moderate distance under low sail; for the sudden gusts of wind which come off the high land sometimes might endanger the masts with light sails set.

The anchorage is off the town or the fort, in about 20 fathoms, at 2 cables' lengths off shore. It is customary to run the stream cable on shore, and for this purpose heavy anchors are already laid down, to which cables can be attached at low water. The edge of the shoal off the town of Amboina is well marked by fishing stakes, which may also be seen in many parts of the bay. H.M.S. *Challenger* anchored in 24 fathoms 1 cable W. by N. from the pier.

Water, fruit, and vegetables may be got, but stock cannot be depended on at all times. The watering place is opposite to the town $1\frac{1}{2}$ mile distant, but there is another in the Inner Harbour.

"Beef is indifferent in quality and expensive, being 2s. per lb.; fowls, 1s. 6d. each; ducks, 3s. to 4s. each; eggs, 2s. 6d. per dozen. Fish is plentiful and cheap, but fruit is scarce.

"The coaling wharf is at Tanjong Mungayeu, a little more than a mile south-westward of the town pier, and there are 4 fathoms alongside it. Ships intending to coal at the wharf should steer in with their heads to the south-eastward, and at half a cable's length off the wharf end drop the port anchor in 10 fathoms, hauling alongside by means of the wooden piles placed at convenient distances along the shore. The red buoy to the north-eastward of the wharf is lightly moored, and intended only for the off-fasts of the small steamers frequenting the port. Large vessels will therefore find it necessary to have their stream anchors to windward, as the wharf is slightly built, and the N.E. wind presses them strongly against it. A large quantity of coal is stored here, principally from Newcastle-on-Tyne, the price being £3 per ton. Labour can be obtained at a Dutch rupee, of 1s. 8d. per day, but only about 60 tons a day is shipped.

"There is a monthly *mail-steamer* from Makassar or Sourabaya, which touches at Koepang and Dilli in Timor, and at the Banda Islands, on the voyage to Amboina; also at Ternate and either Kema or Menado in the Celebes, on her return.

"*Tides*.—It was found to be high water, full and change (in October) in Amboina Harbour, at 2^h 5^m, the day tide being lower than the night tide; they are, however, irregular, and influenced by the wind."—(H.M.S. *Challenger*, October, 1874.)

The Inner Harbour is entered by a narrow channel, 300 yards wide, between the sandy flat on the South side and the steeper North shore. There are 6 to 10 fathoms water in it. It is $1\frac{1}{2}$ mile above the town, and the channel, as before stated, is on the northern side; within, it widens into a large basin, 3 miles long by $1\frac{1}{2}$ broad, with tolerably even depths over it, varying from 12 to 18 fathoms. It is well sheltered from all winds, but, probably from this cause, is considered to be unhealthy for ships' crews, much sickness prevailing with the small vessels coming inside, while those in the outer harbour continue healthy. The watering river is on the North side, and may be known by a house on either side of it, at a small distance. Casks are readily filled by means of a hose, but a loaded long boat can only float out at high water. The head of the harbour, as before mentioned, is separated from Baguala Bay on the eastern end of the island by a narrow sandy isthmus. At one time the Dutch attempted to cut a canal. It has been partially filled up, still up to the present large prahus are floated up and carried across the remainder to avoid going round the whole of the island.

OMA or Haruku lies 6 miles eastward of the eastern part of Amboina. The channel is quite safe. It is about 9 miles long, and the clove is well cultivated. It has no harbour or roadstead, the chief place being *Haruku*, at its S.W. end. *Fort Zeelandia* here is in lat. $3^{\circ} 37' 45''$ S., long. $128^{\circ} 25'$ E. The North coast of the island should not be approached within 2 or 3 miles.

SAPAROEAE or Honimoa, the next island to the eastward, is larger than Oma, and, like Amboina, is of an irregular figure, two peninsulas joined by a narrow isthmus. The channel between Oma and Honimoa is only a mile wide in its narrowest part, destitute of anchorage, and subject to strong currents or tides. Should a vessel venture through, which is not to be recommended, keep on the Oma shore. Some shoals are marked on the Dutch charts as lying a mile East off the N.E. point of Oma.

Pulo Dombo or Pigeon Island, a small islet, lies off the South point, known formerly as the Dolphin's Nose. This is in lat. $3^{\circ} 39\frac{1}{2}'$ S., long. $128^{\circ} 39'$. A bay, 3 miles deep, lies to the East of it, and *Pulo Melano* or *Moelana* about 2 miles to the S.W.

Saparoea village, the chief place, lies at the head of the bay of which the Dolphin's Nose is the S.W. point. *Fort Duurstede* protects it. There is good anchorage near this fort in the westerly monsoon in about 12 fathoms. Steer in about mid-channel, between the reefs that line both sides of the bay, but no soundings are to be got until within a mile of the fort, and anchor in 10 fathoms with it bearing N.W. 450 yards distant. The fort is in lat. $3^{\circ} 35' 50''$ S., long. $128^{\circ} 38' 18''$ E. High water, full and change, at 1^h 0^m; springs rise 6 ft. The island, like the others, is well cultivated, and has several roads traversing its central portion to its North shore.

NUSA LAUT, about 800 ft. high, the easternmost of the Amboina group, or the *Clove Islands*, is separated from Honimoa by a *safe* channel, 2 miles wide. Foul ground surrounds it to the distance of a quarter of a mile. There is no shelter whatever, but anchorage may be had in favourable weather at the North side, and off the N.W. part, where there is a fort. A road goes all round the island, a circuit of 18 or 20 miles. It is believed to produce the best cloves of all the group.

The **STRAIT** which separates these islands from the South coast of Ceram is of very various width. Its northern part, along the shores of Ceram, is believed to be quite clear at a mile off the land, but a berth should be given in working through it, to the shoals which lie to the northward of Oma and off the N.W. part of Honimoa. The eastern islands are comparatively low, and, when viewed at a long distance from the southward, do not appear separated from the very much higher land of Ceram to the northward; it is not until closer up with them that they are perceived to be distinct islands.

The **BANDA ISLANDS** are the home of the nutmeg tree, as the islands just described are of the clove. It is a singular fact that these two spices of such universal use should be only produced on two such insignificant groups of islands, lying so near the equator as those in question. There has been no regular hydrographical survey of the group, but the Dutch authorities and Captain Owen Stanley have given us sufficient data to use the charts with confidence.

The islands, subject to the Dutch, by whom a Resident is appointed, have been cared for in a most expensive and exclusive manner. The nutmeg monopoly was formerly maintained by the government, by purchasing the produce at a fixed price, and supplying the proprietors of the perks (parks) with slaves at a fixed price, and rice from Java at its cost. Since the abolition of slavery, however, any one is free to clear the jungle and plant the spice-giving trees. The annual produce is about 600,000 lbs. of nutmegs and 150,000 lbs. of mace. Many obsolete obstructions to the extension of commerce have been removed, but the islands still preserve their character of *exclusively* producing the best nutmegs. The nutmeg trees are in fruit and blossom all the year round; the flower is yellow, and the fruit like a small unripe peach. When fit to gather, the outer rind splits open, disclosing the nut with its covering of mace.

The Banda Islands have been frequently described, and most recently by Mr. W. J. J. Spry and Lord George Campbell, who visited the islands on board H.M.S. *Challenger* in September, 1874. They were much struck during their three days' stay with the neatness of the town, the beauty of the scenery, and hospitality shown by the inhabitants. We take the account of a visit by Mr. A. S. Bickmore, in company with the Dutch Governor-General, Mr. Arriens, in September, 1865.

They are ten in number; the largest, Lonthoir or Lontar, or Great Banda,

is a crescent-shaped island, about 7 miles long, and a mile and a half wide in its broadest parts. Its eastern horn curves towards the North, and the other points to the West. In a prolongation of the former lie Pulo Pisang, "Banana Island," and Pulo Kapal, "Ship Island." The first is only about two-thirds of a mile long, and half as wide, and the last is merely a high rock, resembling the poop of a ship, hence its name. Within the circle of which these islands form an arc, lie three other islands. The highest and most remarkable is the Gunong Api, or "Burning Mountain," apparently attaining a very considerable elevation, because its sides rise so abruptly up from the sea. Between the Gunong Api and the northern end of Lonthoir lies Neira, about two miles long and less than a mile broad. North-east of the latter is a small rock, called Pulo Krakka, or "Women's Island." The centre of the circle of which Lonthoir is an arc, falls in Zonne Gat or Sun Strait, a narrow passage separating Gunong Api from Neira. The diameter of this circle is about six miles. Without this another concentric circle may be drawn, which will pass through Pulo Ai (Wai), "Water Island," on the West, and Rosengain on the S.W.; and outside of this a third concentric circle, which will pass through Pulo Swangi, "Sorcery," or "Spirit Island" on the N.W., Pulo Run (Rung), "Chamber Island," on the West, and the reef of Rosengain on the S.W. The total area of the whole group is only 17.6 geographical square miles.

In the five islands now named—Lonthoir, Rosengain, Ai, Run, and Neira—grow all the *good* nutmegs consumed in every part of the world. De Barros, in 1852, said that they had been frequented for ages by the Malays, in proof of which, the names of the different islands mentioned above are all of Malay or Javanese origin. The aboriginal population at that time is given at 15,000, which, if correct, would have made this group far more densely peopled than any other island or number of islands in the whole archipelago at the present day.

The climate and proximity of the great volcano render the islands very unhealthy, the annual deaths in the group amounting to 1 in 21. The frequent eruptions, always followed by famine and death, and the earthquakes, which also devastate the group, have kept down the population to a very great degree. The most fatal of these visitations occurred in 1629, 1683, 1686, 1691, 1743, 1816, and 1852. So terrible were the ravages of the eruption and earthquake of 1691, that all the more wealthy people hastily abandoned it, and it was only by the firmness of the Dutch Governor that the abandonment of the place was prevented. Some of these have commenced their destruction without an instant of warning, and the ashes and hot stones have buried the island in dust and ashes, and poisoned its water in a moment.

Winds, etc.—From inquiries amongst the natives and Dutch residents, it was gathered that the North-West Monsoon, which sets in about the middle

of November, occasionally blows with violence, but that the South-West Monsoon seldom blows so fiercely. Rain falls in both monsoons, the dry months being September and October, when light variable winds and calms prevail.

The population of the group in 1840 was only 5,081, of which Neira had 1,225, Lonthoir 372, Ai 148, and Run 42. These, amounting to 1787, were the free population; but to make up the total there were 2,183 slaves and 1,029 convicts from Java, Sumatra, and Borneo, so that the people had decreased one-fifth in the previous 115 years.

GREAT BANDA is about 7 miles long, by $1\frac{1}{2}$ broad. It is divided into three districts, *Lonthoir*, or *Lonthar*, at its West end, and the rest into the *Voorland*, or "front," on the North side, and the *Achterland*, or the "back," on the South and East.

The shore of the western horn of crescent-shaped Lonthoir is composed of a series of nearly perpendicular crags, 200 or 300 feet high; but on the North side the luxurious vegetation of these tropical islands does not allow these rocks to remain naked, and from their horizontal crevices and upper edges hang down thick wide sheets of a bright unfading verdure. The western entrance to the harbour is between the abrupt magnificent coast of Lonthoir on the right, and the high, overhanging peak of Gunong Api on the left, and, as we advance, these separate and open to our view the steep lofty wall that forms the northern shore of Lonthoir. This is completely covered with one dense mass of vegetation, out of which rise the erect columnar trunks of palms.

This western end of Lonthoir is about 400 feet high, and is composed of coral rock of very recent date. Nearly the whole island is composed of such eruptive rocks, and Lonthoir may be regarded as merely a part of one immense crater about 6 miles in diameter, if it were circular, though it may have been more nearly elliptical. Pulo Pisang and Pulo Kapal already noticed as falling in this circle, are two other fragments of the old crater walls—all the rest have disappeared beneath the sea. Here, then, is another enormous crater, greater even than that seen among the Zeugger Mountains on the eastern end of Java, whose minor and major axes severally measure three miles and a half and four miles and a half, and whose floor of naked sand is well named by the Malays "the Sandy Sea." Banda Neira represents the extinct craters rising in that Sandy Sea, and Gunong Api has a complete analogue in the still active Bromo. The enclosed bay, where vessels now anchor in 8 or 9 fathoms, is the bottom of this old crater, and, like that in the Zeugger Mountains, is composed of volcanic sand.

The radiating ridges on the outer side of Lonthoir represent the similar ridges on the sides of every volcano that is not building up its cone by frequent eruptions at its summit.

Every island in the group is now belted with a fringing reef, except at a

few places where the shore is a perpendicular precipice, and the water of great depth. The western entrance through which we came to the roads is already quite closed up by a broad reef of living, growing coral.

The Western Channel, half a mile wide, which separates it from Gunong Api, is called the *Lonthoir Channel*. It has 6 and 7 fathoms in the fairway, but from the North shore, abreast of Lonthoir village, shoal water extends for half a mile off. The channel, therefore, is under the Gunong Api shore.

GUNONG API, the "burning mountain," is simply a volcanic cone, in lat. $4^{\circ} 31' S.$, long. $129^{\circ} 54' E.$

The whole mountain is one great cone, about 2 miles in diameter, of small angular blocks of trachytic lava and black volcanic sand, the crater at its top being a conical cavity in this mass. The form of the summit is nearly elliptical; the depth of the crater is about 80 feet, its diameter being roughly estimated at from 100 to 150 yards. The area at the top is about 200 yards long, by 390 wide, composed of heaps of small lava-blocks, which are whitened on the exterior, and in many places quite encrusted with sulphur. Through these heaps of stones steam and sulphurous acid gas are continually rising.

The first European who reached the summit, so far as I am aware, was Professor Reinwardt, in 1821; the second was M. Salomon Müller, in 1828, and from that time till the 13th of September, 1865, when we ascended it, only one party had attempted this difficult undertaking, and that party was from the steamer *Etna*, whose name we had found on a large rock in the old crater. Some of the crew of H.M.S. *Challenger* ascended the mountain in 1875, and took 2 hours in reaching the summit.

The height of this volcano we found to be 707.5 metres, 2,321 feet. Its spreading base occupies less space, 2 miles square. In size, therefore, it is insignificant, compared to the gigantic mountains on Lombok, Java, and Sumatra; but, when we consider the great amount of suffering, and the immense destruction of property that have been caused by its repeated eruptions, it becomes one of the most important volcanoes in the archipelago."—*Bickmore*.

NEIRA, or **Banda Neira**, is separated from Gunong Api by a channel of irregular breadth, called *Zonnegat*, or Sun Strait. It being so contracted, and the tides within it being so rapid, it is seldom used except by small vessels. From the north-eastern part of Great Banda it is separated by the *Slaman*, or *East Gat*, a name given to it from a ruined Portuguese fort on the N.W. end of Great Banda. Neira is about $1\frac{3}{4}$ miles long from N.N.W. to S.S.E., and the capital of the group is at its South end. Its highest point is the *Papenburg*, 640 feet at its northern part. The southern part is composed of hills, which gradually slope down to the South shore, on which the town or village is built. On the S.W. point are the Pakhuizen, or Magazines, and above this point, on the summit of a hill, is Fort Belgica.

Fort Belgica is in form a regular pentagon. At the corners are bastions surmounted by small circular towers, so that the whole exactly resembles an old feudal castle. Its walls are white and almost dazzling in the bright sunlight, and beneath is a broad neatly-clipped glacis, forming a beautiful green, descending lawn. Below this defence is *Fort Nassau*, which was built by the Dutch when they first arrived in 1609, only two years before the foundations of Belgica were laid, and both fortifications have existed, much as they are now, for more than two centuries and a half. To the right and left of this fort extends the town of Banda Neira, with rows of pretty shade-trees on the bund, or front street bordering the bay. The town is prettily laid out, and contained, in 1874, 6,000 inhabitants, including 600 Europeans. At one end is the Dutch garrison, and at the other the Chinese, Arabs, &c. There are three piers running into the sea. The roads are in excellent order, being kept so by convicts; a row of green trees on each side of the road gives them a refreshing coolness. Banda is a free port.

H.M.S. *Challenger* entered the harbour northward of Great Banda, between Pisang Island and Point Burang, and anchored in 7 fathoms, with the East extreme of Banda Neira bearing N.E. $\frac{3}{4}$ N., the South extreme of Gounung Api W. $\frac{1}{4}$ N., and Fort Nassau N. $\frac{1}{2}$ W.

The edges of the shoal water on either side of the southern channel into Banda Harbour, between Gounung Api and the western end of Great Banda, are marked by *beacons*, each consisting of a pole surmounted by a triangle.

Supplies are scarce and expensive, fowls are 3s. to 4s. each, eggs 2½d. each. Beef can only be occasionally procured. Vegetables and fruit are to be had in small quantities. *Coal* is generally to be had, but the supply cannot always be depended on.

Tides.—From the Dutch observations, it is high water, full and change, at the mole head in Banda Harbour, at 12^h.; springs rise 14 ft. The tides are strong, but not regular; it is therefore proper to moor at once.

Batu Pulo Matti is the N.W. point of Neira, and off it is *Pulo Krakka*, or *Porto Krak*, an islet lying in the northern entrance to the Sun Strait.

Pulo Pisang lies half a mile northward of the N.E. point of Great Banda, and is joined by a reef to *Pulo Kapal*, the Ship Rock. Between Pisang and Great Banda the channel is very deep. *Pulo Way* or *Ai* bears West 7 miles from Gunong Api, and E. by N. $\frac{1}{2}$ N. 4 miles from *Pulo Run* or *Rung*, the passage between the latter being said to be unsafe, as a reef extends off the North side of Pulo Run. *Pulo Swangy*, the northernmost of the group, bears N. $\frac{1}{2}$ W. from Pulo Way. *Rosengain*, or *Rosengeyn*, the easternmost of the Banda Islands, lies about 4 miles eastward of Great Banda.

Rosengain Reef, which breaks, lies 5 miles S.E. by S. of the island of the same name. It is in lat. 4° 38' S., long. 130° 5' E.

The islands, generally, are subject to gusts of wind from the mountains, and the weather is hot and oppressive in the day, but the nights are cool.

In the *Westerly Monsoon*, the only practicable channel is by the Lonthoir Channel, which, as before said, has shoal water on its southern side; so that it is necessary to keep the Gunong Api shore on board. The extremity of Pulo Way kept just touching, but open with the extremity of Gunong Api, will lead a ship up to the anchorage. As this is only used for coming in in this monsoon, so it is the channel used for going out in the opposite season.

In the *Easterly Monsoon*, the broader Slaman Channel is used. Give a berth of half a mile to the shore of Great Banda and to that of Banda Neira. You may pass on either side of Pulo Pisang and Pulo Kapal, but not between them, and when to the southward of them the channel is about 2 miles wide.

The anchorage is off the Residentie House and the New Pier at Neira, in 7 or 8 fathoms, with Pulo Way just shut in with the point of Gunong Api and Fort Belgica, about N.N.W., distant one-third of a mile from the wharf. The Orpheus Bank, with only 15 ft. water over it, will be avoided in coming in by not shutting in the north-eastern point of Great Banda with the low S.E. point of Banda Neira.

THE BANDA SEA.

The space between the S.E. portion of Celebes and the islands lying off it on the one hand, and New Guinea on the other, with the islands just described, with Ceram on the North, and the chains of islands extending eastward from Timor, has been termed the Banda Sea. It is difficult to describe in geographical sequence a series of islands so widely scattered. Most of the islands are supposed to belong to the Dutch, and during the period when a strict monopoly of trade was maintained at the Spice Islands, that Government established and kept up a number of forts on the chief islands for the protection of this monopoly. Since this system has been partially abandoned, the interest in them, which must have been costly, has led in most cases to their virtual abandonment, but still the natives acknowledge the sway, now so slightly exercised over them, and they usually appear to passing ships or traders under Dutch colours.

The Banda Sea is of great depth in places, as H.M.S. *Challenger* obtained a sounding of 2,800 fathoms in lat. $5^{\circ} 24' S.$, long. $130^{\circ} 38' E.$ In the serial temperatures taken in the deep soundings, the same temperature, 37.5° , was found from a depth of 900 fathoms to the bottom, indicating that the Banda Sea is enclosed by a rim or border, with only 900 fathoms in its deepest channel.

Some of the islands are still very little known or visited, especially those in the western part; of the others which lie between the Moluccas and N.W. Australia, the charts have had many improvements from the observations and partial surveys by Captains J. Lort Stokes and Owen Stanley, R.N., and especially the remarks of Lieutenant D. H. Kolff, of the Dutch navy; but very much is required before we can give a perfect description of the region. We commence, as before, with the western portion—that next to Boeton off Celebes, is described on page 814, *ante*.

TOKEN BESSI, or **Tukan Bissi Islands**, an extensive but little known archipelago, lies to the S.E. of Boeton. They are of moderate elevation, but are quite unsurveyed. *Wangi-Wangi*, or *Wantiyi*, the north-westernmost, and perhaps the largest, is 10 miles eastward of Cape East of Boeton. Between them the depth is very great, 1,070 fathoms. The island is high, and may be seen 7 or 8 leagues off, and may be approached within 2 or 3 miles on the North and West coasts, there being no soundings nor any appearance of danger above $1\frac{1}{2}$ mile off shore. It is inhabited, and abounds with cocoa-nuts. The South side of Wangi-Wangi is bordered by three or four islands, and S.S.W. 8 miles from the western one is the N.W. end of a shoal, in lat. $5^{\circ} 24' S.$, long. $123^{\circ} 24' 30'' E.$, which thence extends to the S.E. towards the Kadupa Group. *Kadupa*, or *Combado*, another cluster, lies 13 miles S.E. from Wangi-Wangi, and the southernmost, *Binonko* or *Pinunoko*, is in about lat. $6^{\circ} 17' S.$, long. $124^{\circ} E.$

The space between the southern island and the northernmost is supposed to be foul, but is quite unknown. Some small islands, tree covered, called the Boompjes, are marked on the Dutch charts.

Hegadis, in lat. $6^{\circ} 7' S.$, long. $122^{\circ} 40' E.$, is the westernmost of the groups around the S.E. end of Boeton. It is of moderate height, and about 3 miles in diameter. Reefs extend East and West of it, and off its South end are some islets, called the *Lagu Rocks*. At 9 miles to the South of it is a *sunken rock*, of doubtful position. A *Six-Foot Bank*, of considerable extent, is shown to the eastward of it; and East of the bank, 40 miles East of Hegadis, an island, vaguely marked as *Groenwout Island*, on the old charts.

The **Boeton Passage**, mentioned on page 814, is about 20 miles wide in its narrowest part, between these islands and shoals and the South end of Boeton; and, as far as is known, is safe, with the exception of Penguin Reef, lying 5 miles off the coast of Boeton.

Some shoals are marked to the southward and south-eastward of Binonko, but nothing certain can be said of them. The *Emperor of China Rock* is said to be 33 miles S.S.E. of Binonko, and another rock, *Koko* or *Kaka*, is vaguely stated to lie at 12 miles S.E. of the same, or under the name of the *New Rock*, in lat. $6^{\circ} 39' S.$, long. $124^{\circ} 40' E.$, at 37 miles South of Velthoen Island.

Velthoen, the south-easternmost of the islands off Boeton, is in lat. $6^{\circ} S.$,

long. $124^{\circ} 46'$ E. It is low, covered with trees, and about 5 miles in extent, and should not be approached within 2 or 3 miles. When seen to the westward the coast has a white chalky appearance, probably coral, which might be mistaken for breakers.

An island of small size is marked doubtful midway between Velthoen and Binonko.

St. Matthew Islands, the north-easternmost, are two in number. They extend in a N.W. and S.E. direction for 15 miles, the centre being in lat. $5^{\circ} 24'$ S., long. $124^{\circ} 16'$ E. The southernmost is the largest, separated from the other by a space of 4 miles of breaking reefs. They are about 30 miles eastward of the northern Token Bessi. The channels between are not safe, having several reefs, and with our imperfect knowledge demanding a good look-out.

Ships bound westward in the S.E. monsoon should steer for the northern of the Token Bessi's, and round it within 3 or 4 miles, for by steering wide of these islands, you may not be able to weather or beat round the South end of Boeton against the northerly currents which prevail at times. *Wetter*, and the other islands on the South side of the Floris Sea are described on pages 782, &c.

LUCIPARA, *Lousapara*, or *Lucapin*, is a cluster of five low islands, covered with trees, the North islet in lat. $5^{\circ} 28\frac{1}{2}'$ S., long. $127^{\circ} 31'$ E., according to the Dutch frigate *Maria Reygersbergen*. They cannot be seen more than 12 miles from the deck. Within 5 miles to the E.S.E. of this are several small islets, and at about 2 miles S.W. from them is a reef called *William I. Reef*, from a steamvessel of that name, which was wrecked on it in 1837.

The **Turtle Islands** are three in number, very low and small, and dangerous to approach by night, being surrounded by coral reefs. The northernmost island is in about lat. $5^{\circ} 20'$ S., long. $127^{\circ} 48'$ E.; the other two islands lying at 3 miles to the S.W., and 5 miles to S. $\frac{1}{2}$ W. They lie 11 miles N.E. from the Lucipara Islands.

GUNONG API, before mentioned on page 792, a volcano or burning mountain, as its name indicates, is a high conical hill, visible 45 to 50 miles off. Its summit is in lat. $6^{\circ} 43'$ S., long. $126^{\circ} 43\frac{1}{2}'$ E., bearing S.W. by S. 88 miles from the Lucipara Islands. It is generally active, and the smoke issuing from its crater will indicate its proximity. It is bold-to.

The **SERWATTY ISLANDS**.—The several groups of little known or visited islands, which lie between Timor and Timor Laut, are generally known as the *Servatty Islands*. The people are of the Malay race, and are described by Mr. George Windsor Earl, who visited them, as a peaceable and industrious race, who raise vegetables, sugar, and hogs, and are divided into three castes—lords, land owners, and serfs.

ROMA, which lies 64 miles S.E. $\frac{1}{2}$ S. from Gunong Api, is a hilly island, about 12 miles in circumference. There is said to be good anchorage in a

bay on the N.W. side, but this part of the island has but a scanty population. On the S.W. side lies a fine and fertile valley, through which runs a small river. In the West monsoon there is good anchorage for a vessel opposite to the mouth of this river, from which abundance of timber, firewood, and good water may be obtained. On the other sides of the island the shores are steep and rocky, which renders even boat landing very difficult. The chief village lies on the side of a hill about 400 ft. above the sea, and is very picturesque. The population, who are chiefly Christians, are very industrious, and collect large quantities of wax, besides cultivating the soil, so that provisions may probably be obtained. The anchorage of *Serussa* is on the S.E. side of the island, northward of the small island *Nussa Medta*, which lies within $1\frac{1}{2}$ mile of the shore. The South shore of Roma is dangerous to a mile off. Its West point is in lat. $7^{\circ} 38' S.$, long. $127^{\circ} 20' E.$

A *doubtful island*, with a rock off its North end, is marked at 8 miles North of the West end of Roma, and several uncertain islands within 20 miles to the eastward of it.

Medta is a small island, placed on the chart about 3 miles S.W. of the South end of Roma. The island is covered with trees, but without fresh water. Abundance of turtle are caught around this and the other islands. A rock is marked near its N.W. side.

LETTI, or LETTE, is about 23 miles E.N.E. of the East Cape of Timor, and to the S.S.E. of Roma. It is about 8 miles in extent. A high ridge of hills extends along the centre of the island from East to West, the sides of which, sloping towards the sea, are covered with trees, and the whole island presents an appearance of great fertility, but it suffers much sometimes from drought. It was surveyed by Captain Owen Stanley. As above said, it is generally hilly, but low near the shore, where the chief part of the inhabitants reside in villages on the more elevated and projecting points. Reefs line the island on the North and N.W. sides through an opening, which is the entrance to the anchorage off the village of *Tombra*, which appears to be the chief place. This inlet or basin is from 400 to 500 ft. wide, with 6 to 9 fathoms, sandy bottom. It is bounded on either side by reefs, visible at low water. In the westerly monsoon the best anchorage is off the village of *Batu Meau*, on the East side of the island, opposite Moa. The people are not so civilized as those of Roma, neither are they so prosperous.

Moa lies next eastward of Letti, and is about 18 miles long East by South and West by North. The S.W. point of the island is surrounded by reefs, but on every part of the East side of the island there is good and convenient anchorage during the appropriate monsoon.

The S.W. point of the island has reefs steep-to, so that there is a very heavy surf, especially in the rainy monsoon. The people, who profess much

attachment to the Dutch Government, turn their chief attention to breeding cattle, and grow only a small quantity of vegetables and Indian corn. On the N.E. point of the island is a solitary high mountain, called *Korbou*, or *Buffalo Peak*, 4,100 ft. high, in lat. $8^{\circ} 12' S.$, long. $128^{\circ} 2' 30'' E.$, resembling in appearance, though so much lower, the Peak of Tenerife. The rest of the island is generally flat and coralline; on the South and south-eastern sides there is very little cultivation. The buffaloes are the best that can be procured among these islands.

Lakor is separated from Moa by a strait, in which is good anchorage. The island bears a perfect resemblance to a dry coral bank, raised about 20 ft. above the sea, so that there is but little scope for cultivation. The sandy spots are planted with cocoa-nut trees; most of the necessaries of life are imported from the other islands, so that the population is small and poor. The *Dourga* anchored off the western village, on the North shore, in 7 fathoms, with a warp on to the shore reef. At 8 miles eastward of Lakor is a small cluster of islets, called *Okenao*.

Luan, about 32 miles E.N.E. from Lakor, is a group about 14 miles in circumference, and, being high, is visible at a considerable distance. An extensive reef, studded with islets, surrounds it, within which there is a depth of 2 fathoms, affording sufficient anchorage to small traders. The islets to the N.E. of Luan are not inhabited, and are about 4 miles distant from the the main island. Close outside these the reef is steep-to, and may be safely approached. The people, forming 200 or 300 families, nominally Christians, are tolerably civilized. The chief product of the islands is tortoise-shell, of good quality. Trepang is also one of the chief articles of trade, as well as edible birds' nests. Louan is the chief island. *Matumara*, a small islet, lies 2 miles South of it; and *Klapa*, the second largest islet, is 3 miles eastward of Louan.

Sermatta, or *Sermattan*, next eastward of Luan, is about 15 miles long, and composed of a high ridge of hills, extending East and West, the sides of which run steeply down to the sea. As the island is thinly inhabited, and affords no shelter to shipping, it is unimportant to strangers. The inhabitants are subject to the people of Luan. East end lat. $8^{\circ} 16' S.$, long. $129^{\circ} 0' E.$

DAMMA lies 65 miles N.N.W. of Sermatta. It is high and hilly, and on its N.E. extremity is a volcanic peak, from the crater of which smoke issues almost without interruption. At the foot of this mountain, near a cave, in the Bay of Kulewatta, are some warm sulphureous springs, useful as a bath in rheumatic cases. The island is about 15 miles long from N.W. to S.E., and on its East side is *Kulewattu Bay*, before mentioned, extending about 4 miles inland, and in many parts quite unfathomable, with precipitous shores. *Wilhelmus Bay*, on the North side of the island, was formerly the seat of the Dutch residency. It is much exposed, and a heavy swell tumbles home

in it in all seasons, but there is secure anchorage near the mouth of a small fresh-water river. Several islands are marked to the southward and two to the westward of it, but we have no particulars of them.

Teon, or *Tauw*, is 37 miles E.N.E. of Damma, is hilly, and of moderate height. It is uninhabited. *Nila*, which is much larger, is about 18 miles N.E. of Teon, the water between being dangerous. It consists of a high, round hill, with anchorage for small vessels on its North side. It is visible 6 leagues off. In the channel between it and Teon there are numerous reefs, so that it is quite unsafe. It is inhabited by a few heathens. Tortoise-shell is procured in great abundance on all these islands. Two shoals are shown on the old charts to the northward of Nila, and the captain of the Dutch brig *Doesborgh* reported, in 1870, a shoal N.W., distant $5\frac{1}{2}$ miles; particulars not stated; and Captain Griffin, in 1874, reports a danger with the peak of Nila bearing W.S.W. $\frac{1}{2}$ S., and Seroea N.E. $\frac{1}{4}$ N.

Serua, or *Seroea*, in lat. $6^{\circ} 17' S.$, long. $130^{\circ} 0' E.$, is 32 miles N.E. of Nila, and is said to have anchorage on the North side; but most of these islands are steep-to, and generally have a rocky bottom in those few places where they have been sounded.

MANO or **Bird Island**.—This island, lying N.N.W. and S.S.E., is about 1 mile long and half a mile wide; it is prism-shaped, its sides sloping from the sea at an angle of about 30° to the summit, which is 980 ft. high. The eastern slope and the northern part of the summit are wooded, the western slope and southern part of the summit are bare. Smoke was seen rising from the West side by H.M.S. *Challenger*. The South point of the island is in lat. $5^{\circ} 34' S.$, long. $130^{\circ} 19' E.$ At 22 miles E.N.E. $\frac{1}{2}$ N. from it, H.M.S. *Challenger* found a depth of 2,800 fathoms.

BABA is 43 miles E.N.E. of Sermatta. It is hilly and tolerably high, and surrounded by several smaller islets, the most important of which are *Wetang* to the West, *Daai* to the North, *Maselar* to the S.E., and *Davelaar* to the East. The best anchorage near Baba during the East monsoon is on the West side of the island off the village of *Tepa*; and, in steering towards this, the *Dourga* ran close along the North shore of *Wetang*, and then stood over to Baba, when she worked up close under the land to the anchorage, bringing up in 15 fathoms, good holding ground. Care is necessary in working up to the anchorage during this monsoon, as heavy squalls sometimes come off the land. When easterly winds prevail, it is said that the most secure roads are under the coast of *Wetang*. There is a bank of $5\frac{1}{2}$ to 10 fathoms between them, on which a vessel will be sheltered from all winds. There is also anchorage at the East end of Baba, with the N.E. point of the island bearing about North, and the South point S. by W., and the entrance of a fresh-water river S.W.; but the bottom is generally foul about this island. The western side of Baba is so precipitous and overgrown with

forest, that there is but little cultivation. *Matang* is more fertile, and is well cultivated.

The people are divided into two portions, one to N.W., the other to S.E., the centre of the island being uninhabited. They are a barbarous people, who have forgotten nearly all the old Dutch influences for good, and, like those of Timor Laut, are not to be trusted.

The TENIMBER ISLANDS.—This group is the easternmost of those which extend from Timor towards the Ki and Arru Islands. It consists of numerous islands, of which Timor Laut, or "Timor of the Sea," is the principal. They are almost all low and coralline, with the exception of Serra and Vordate, which have some hills. The inhabitants are of the Malayan race, and are good looking when young. They are very particular with their persons, and have great cleanliness in their dwellings, &c., a rare virtue. They are industrious, and raise much vegetables, farinaceous roots, cocoa-nuts, hogs, goats, and poultry; but they are not to be trusted. Capt. Owen Stanley has given a vivid picture of his visit to a village in the S.E. part of Timor Laut.

TIMOR LAUT, according to the charts, is 95 miles long from S.W. to N.E. Its eastern coast is formed of a range of hills, wooded to the very summit, and indented by deep bays, which would afford anchorage during the N.W. monsoon, were it not for a coral reef that appears to extend along the coast at the distance of 2 or 3 miles from the shore.

The *South Point*, or S.W. point, is rather low, in lat. $8^{\circ} 19' S.$, long. $130^{\circ} 43'$, and is fronted by a dangerous reef, projecting from it 2 miles, requiring great caution when in its proximity during the night, particularly as the currents are variable and strong at times. The land about the point is covered with trees, and the shore to about a mile eastward presents a rocky face, the East end of which has the appearance of the entrance of a river, and is remarkable by a large detached fragment of rock resembling the hull of a ship. From the South point the coast extends in a N.E. by E. direction 12 or 13 miles, and afterwards more northward, the whole extent to the North end being above 100 miles. A wooded islet lies 2 miles West of the South Point.

Oliliet, on the East coast of Timor Laut, was visited by Captain Owen Stanley, R.N., in H.M.S. *Britomart*. He places it in $7^{\circ} 55' S.$, long. $131^{\circ} 23' E.$ It is built on a hill, 413 ft. high, about the middle of the East coast. The hill is nearly perpendicular, and only capable of being ascended by ladders. The houses are all built on piles, and are thatched and surmounted at the gables by richly carved large wooden horns. It does not appear to be a place from which any quantity of sea stock can be procured, for although there were many pigs seen, they did not seem inclined to part with them. Water may be got on the beach, but a merchant vessel should be very cautious in sending her boats for it to guard against treachery. To the N.E. of

Oliliet there are six other villages perched on cliffs overhanging the sea, and most difficult to approach.

Of this coast, beyond what has been stated, nothing more is known, and the whole of the western shore appears to be a complete terra incognitá.

Laarat or Laroc Island, off its N.E. point, is nearly 20 miles long; its eastern shore is surrounded by a reef, but off which there is anchorage in the westerly monsoon.

Vordate Island, which is higher than the rest, is separated from Laarat by a safe channel, 2 miles wide. The island is well cultivated; the anchorage off its South end is not very good, owing to the great unevenness of the bottom. H.M.S. *Britomart* came here in 1839 and anchored. They found that the natives were very well off, had many European goods, but were not to be trusted. Like the adjacent islands, the people acknowledge some sort of sovereignty in the Dutch. Many of them profess Christianity, especially the chiefs. They have been converted for many years by the Dutch from Amboina.

Of the other islands which lie to the northward of Timor Laut, *Maru* and *Mulu*, we know nothing; the northernmost is represented in lat. $6^{\circ} 35'$ S., long. $131^{\circ} 40'$ E. The same may be said of the islet and reefs which extend for many miles off its N.W. side, and having *Serra*, a high land to the S.W., the S.W. point of which is in lat. $7^{\circ} 38'$ S., long. $130^{\circ} 44'$ E., and is quite bold-to. The strait between this and Baba, 60 miles to W.S.W., is deep and clear.

The ARRU ISLANDS, which lie 130 miles E.N.E. from Timor Laut, are an extensive group or archipelago extending 110 miles from North to South, and with a breadth of from 40 to 50 miles. They were visited by H.M.S. *Britomart* in 1839-41, and from the descriptions by her commander Owen Stanley and other officers, and especially from the notices given by Mr. Geo. Windsor Earl at the same period, we owe nearly all that can be said of them. H.M.S. *Challenger* anchored off Dobbo for a week in September, 1875, when some interesting additions to the natural history collection were made, including some fine specimens of the king bird of paradise. The name is properly *Pulo Arau*, "islands of the casuarina trees."

The Arru Islands are under Dutch authority, being visited periodically by the officials from Banda. They are inhabited by a negro race, bearing more resemblance to the northern tribes of Australia than to the Papuans of New Guinea, but they seem to have acquired more civilization than is usual with this race. Many strangers, Malays, Javanese and others from Celebes and the Moluccas are settled among them. They are vigorous traders, mother-o'-pearl shells, trepang, birds' nests, and tortoise-shell being the chief articles. The islands are of limestone formation, and the land rises from an elevation scarcely above the sea-level to the eastern side. The shores abound in

caverns, the resort of the swallow which builds the esculent nest. They are covered with tall trees, the casuarina being prominent among them.

The land is only a few feet higher than the level of the sea, except in spots where patches of limestone rock rise to the height of about 20 ft. ; but the immense trees which cover the face of the country give it the appearance of being much more elevated. Most of the islands consist of fresh-water swamps, and the jungle is so thick that it is seldom penetrated by the natives ; the communication between the different villages, all of which are erected on the sea-shore, being carried on by means of boats.

The produce of the Arru Islands consists chiefly of pearls, mother-o'-pearl, tortoise-shell, birds of paradise, and trepang ; but the trade of *Dobbo* on the N.W. side does not entirely depend upon the produce of the Arru Islands alone. The Bugis prahus import large quantities of British calicoes, iron hardware, muskets, gunpowder, &c., from Singapore ; to obtain which, Dobbo is visited by natives of Ceram, Buru, New Guinea, and all the adjacent islands, it being the only spot in this part of the world where British manufactures can be procured. The tortoise and mother-o'-pearl shells, ambergris, birds of paradise, ebony, cloves, massay-bark, rosamald, an odoriferous wood, and kaya buku, a wood much prized in Europe for cabinet work are obtained here. British calicoes and iron are the only articles taken in exchange for these by the prahus of New Guinea.

Of the timber of the Arru Islands there are several varieties highly spoken of by the Bugis, who build and repair prahus here, for its durability and ease with which it is worked. Although of immense size, the trees are almost invariably sound, and as they can be felled within a few yards of the beach, it is not impossible that timber may at some future time form a valuable article of export.

The western islands of this group are thinly inhabited. The eastern islands are said to be more thickly inhabited ; the natives appear to be a harmless race, and although their country in produce is so rich, the greater portion are in a state of poverty. This is to be attributed to the inconsiderate use of spirituous liquors, large quantities of which are brought by the traders from Java and Makassar ; indeed, with rice, it forms the bulk of their cargoes.

Weather.—From native report, the S.E. monsoon commences at the Arru Islands about the beginning of May, and lasts until the end of August or middle of September ; light winds then prevail to the middle or end of November, when the N.W. monsoon sets in. The rainy season is during the N.W. monsoon, but there is rain on every day of the S.E. monsoon. The finest months are September and October, when but little rain falls. This account of the weather agrees with that given by the missionaries of Redscar Bay, New Guinea.

Ngor Island is the southernmost of the group, its South extreme being in

lat. $7^{\circ} 10'$ S., long. $134^{\circ} 23'$ E. The North part of this island was the first land sighted by H.M.S. *Challenger* in approaching from the southward. *Batu Goyang* and *Krei Islands* to the N.W. of Ngor, between it and White Rock, could not be seen in their assigned positions.

Trangan Island, forming the S.W. land of the group, is low and flat; the only elevations on its western side are a small wooded, flat-topped hill (S.W. hill) conspicuous from the southward, in lat. $6^{\circ} 49'$ S., long. $134^{\circ} 8\frac{1}{2}'$ E.; and a low summit (North Hill) but slightly higher than the surrounding land, and conspicuous only from the westward. It is in lat. $6^{\circ} 40'$ S., long. $134^{\circ} 6'$ E.

Close off the South point of the island are two small islets, the southern one, *White Rock*, in lat. $6^{\circ} 58'$ S., long. $134^{\circ} 13'$ E., is bare, about 20 feet high, and shows white when seen against the green background. The other islet has a few scattered trees upon it.

The South point of Trangan Island is not remarkable, but just East of it are some very conspicuous red cliffs. From the South point the western coast of the island trends N.W. for 2 or 3 miles to a bare point, where, turning northward, it forms a bay. Upon the western bluff point (Red Patch Point) of this bay is a red patch, by which it is easily distinguished. Its extremity is in lat. $6^{\circ} 51\frac{1}{2}'$ S., long. $134^{\circ} 4\frac{1}{2}'$ E., and it was seen from the north-westward at a distance of 18 miles.

The coast northward of Red Patch Point is low and flat, as far as the N.W. point of the island next South of Maika Island, which seemed to end abruptly with the trees growing to its outer extremity, and it is easily recognized. About 5 miles southward of this point, is an apparent bluff that stands out from the dead level of the trees, and is the only prominent object northward of North Hill.

Maika and Babi Islands are both flat and thickly wooded; they were seen at a distance of about 15 miles.

Blackburne Shoal, lying W.S.W. 8 miles from Red Patch Point, is about 1 mile in extent, and upon it there appeared to be as little water as 6 ft., with shallow water to the north-eastward. The outer part of the shoal is in lat. $6^{\circ} 54\frac{1}{2}'$ S., long. $133^{\circ} 57'$ E.

From 10 miles S.W. of the South point of Ngor Island to the Blackburne Shoal, the soundings varied from 19 to 12 fathoms; northward of the shoal the depths were from 7 fathoms to 13 fathoms W.N.W. 13 miles from North Hill, after which the water deepened to 35 fathoms. Off the N.W. point of the island next South of Maika Island, 10 fathoms were found N.W. $4\frac{1}{2}$ miles from the point, when the depth rapidly increased to 40 fathoms, and 45 fathoms 8 miles West of Maika Island. Ten miles W.S.W. of Babi Island no bottom was found at 150 fathoms, and there are 58 fathoms 3 miles W.S.W. of the N.W. point of Wama Island. Westward of Dobbo

Harbour the water deepens rapidly, when Babi Island opens of Wama Island.

Kobroor Island, the central one, is the largest, and is 55 miles long. Off its N.W. end is *Wokan* or *Wokam*, off the S.W. side of which is *Wama* on the North shore of which is Dobbo, the chief trading port.

Dobbo Harbour is formed by the channel between *Wckan* and *Wama*. The village is in lat. $5^{\circ} 47'$ S., long. $134^{\circ} 14'$ E. Mr. Hill, R.N., of H.M.S. *Britomart*, gives the following.

The native traders found at Dobbo from the northward, generally prefer making the small island of *Babi*, lat. $5^{\circ} 52'$ S., long. $134^{\circ} 10'$, after getting hold of which a N.N.E. course is steered for the N.W. point of *Wama*, distant $6\frac{1}{2}$ miles, and may be known by a native village and a small Dutch fort.

Vessels bound to Dobbo from the southward, when in the parallel of $6^{\circ} 8'$ South, and long. $134^{\circ} 4'$ East, with 11 or 12 fathoms of water, will find a deep opening to the eastward, and a little more to the northward will be seen the island of *Babi*, which is low. Having reached the N.W. end of *Babi*, and being 4 or 5 miles to the westward of it, steer N.E. or more easterly, until you see the village and fort of *Waula*, on the N.W. point of *Wama*.

Water may be procured at the point, by sinking a cask a few feet deep, but it is not very good from the stream. The native chiefs of the islands of *Wama* and *Wokan*, who have both gold-headed sticks with the Dutch arms on them (as a symbol of authority), expect a trifling present of arrack and tobacco from vessels visiting the harbour.

The following is by Commander Tizard, who was here in H.M.S. *Challenger* in September, 1874. Steering into Dobbo Harbour with the end of the spit upon which the village is situated, bearing E.S.E., a depth of $5\frac{1}{2}$ fathoms was obtained when the rock off the N.W. point of *Wama* Island bore S. by W.; and $3\frac{1}{2}$ fathoms, with the spit end bearing E.S.E. and the rock bearing W. $\frac{1}{2}$ S.; from which it was inferred that the 3-fathom line extends farther from the shore than has been hitherto supposed.

The *Challenger* anchored in 16 fathoms, with the rock off the N.W. point of *Wama* Island bearing West, the western point of *Wokan* Island N.W. $\frac{1}{2}$ N., and the end of Dobbo Spit S.S.E. $\frac{3}{4}$ E. Fishing stakes were seen in various parts of the harbour, stretching from the shore nearly to the edge of the reef.

The native estimate of the number of inhabitants in the village of Dobbo was 300, in September, 1874, principally Bugis from the southern part of Celebes; but during March the number is said to be increased to as many as 1,500, by the crews of large trading proas from the Makassar coasts, which carry from 30 to 40 men each.

Supplies are scarce, and consist of a few fowls, eggs, and fish. Upon the

islands of Ougia and Wassia there are deer, a pair having been originally placed upon each island by the Dutch.

Alligators are said to abound on the islands, particularly in the swamp at the back of Dobbo.

The principal exports are trepang, pearl-shell, birds' nests, tortoise-shell, and birds of paradise. The price of pearl-shell is 2s. per lb., tortoise-shell 15s. per lb., and birds of paradise are sold to the Chinese traders by the natives for 2 dollars each. The coin used is the Dutch dollar at 4s. 2d., and the rupee at 1s. 8d. Gold, particularly sovereigns, is eagerly accepted.

Tides.—From observations obtained at Dobbo (in September, 1874) it would appear to be high water, full and change, at about 2^h 30^m. Springs rise 6 ft., but the time of high water is uncertain. The flood stream in Dobbo Harbour comes in from the eastward, and the ebb stream from the westward. In the S.E. monsoon the flood is weak, but the ebb runs from 1 to 1½ knot an hour.

Having to run in or out, great attention should be paid to the tides. If turning in with the flood, and standing towards the southern shoal, you should tack the first shoal cast, as the tide sets strong over that bank; in turning out with the ebb, the same attention should be paid to the northern shoal, as the ebb sets strong over that bank. The people of Wama profess to be pilots, but those seen by the *Britomart* did not appear to be the least trustworthy or of any use.

Coal Store.—A Dutch coal store on the East end of Wama Island was visited. The coals, estimated at 300 or 350 tons, were in a shed 90 ft. long by 30 ft. wide, and 20 ft. high, and close to the beach, which appeared steep-to. Boats can probably load at any time of tide, and a vessel approach within a half or 1 mile of the beach upon which the shed stands.

A passage or strait about one-quarter of a mile wide, was found running in an easterly and westerly direction through the islands, winding slightly. From its western entrance, which may be distinguished by a small rocky islet on the southern side, the North point of Maika Island bore W. ¼ S., the right extreme of Babi Island N.W. ¾ W., the left extreme of Wama Island N.N.W. ¾ W., and the right extreme of Wama Island N. by W. ¼ W. In the centre of the passage were found depths of 4 and 5 fathoms.

The island North of this strait is named by the natives Wokan, who stated that it was part of the island forming the North side of Dobbo Harbour.

The island South of the strait (Kobroor) was called Wanembai. The inhabitants were numerous and friendly, and cultivate plantains, cocoa-nuts, sugar-canes, pine-apples, &c., in patches of partially cleared ground enclosed by rough rail fences. The land is greatly diversified by hill and dale, although from the sea it appears perfectly flat, but it seldom rises to more than 100 ft. in height.

Each house contains 10 or 12 families, the space being partitioned off by

boards a foot high into divisions about 6 ft. square, each portion being the residence of a family.

It was also said that at an island named Gomo Gomo, at the back of Koproor, and two days journey from Dobbo, goats and an abundance of poultry might be procured.

The high mountains of Great Ki, which rise to a height of about 3,000 ft., are visible before Dobbo Harbour is lost sight of.

The northernmost point of the Arru Islands is in *about* lat. $5^{\circ} 20'$ S., long. $134^{\circ} 40'$ E. 60 miles distant from the coast of New Guinea.

The **KI** or **KEI ISLANDS** are 70 miles westward from Dobbo, in the Arru Islands. The name, which has been variously spelt as above, or *Key*, *Kii*, or *Ky*, perhaps means island or the tribes which inhabit them, as it is prefixed to most of the places on them. The Ki group consists of two large islands, called the *Great* and *Lesser Ki*, and a number of smaller ones lying to the N.W. of the latter. The Great Ki is about 40 miles long, high and mountainous; but the Lesser Ki is nowhere more than 50 ft. above the level of the sea. The natives of the islands differ very considerably, both in personal appearance and in language, from those of the Arru Islands, and are evidently the same race with that inhabiting the Serwatty and Timor Laut. During the stay of the *Britomart* at Ki the inhabitants maintained the high character they have acquired for industry and hospitality to strangers. The population is between 8,000 and 10,000.

H.M.S. *Challenger* left Dobbo on the 23rd of September, 1874, and reached Little Ki Island the following evening, having obtained two soundings between the groups of islands in 800 and 580 fathoms, green mud. As the largest island of the group was approached, several boats full of natives boarded the ship, but as they were all more or less afflicted with skin disease, they were soon cleared out. On anchoring at Ki Doulan this malady was found not to be so prevalent. The Rajah and numbers of natives visited the ship. The chief trade of the place is boat-building, for which they are locally famous. The natives are an active race, as they proved by running over the rigging like cats, in a manner that could scarcely be imitated by the seamen themselves. None of the women were to be seen; being Mohammedans, they are naturally and religiously jealous of them, and kept them out of sight. Some fine pigeons, weighing two pounds each, were taken.

Great Ki, as before said, is about 40 miles long from N.N.E. to S.S.W., and is not more than 6 miles across where broadest. Its South point is in lat. $5^{\circ} 56'$ S., long. $132^{\circ} 53'$ E. At 8 miles from this, on the East side, is a small harbour, *Hier*.

The North point of Great Ki Island is bluff and readily distinguished; its extreme was found to be in lat. $5^{\circ} 16' 45''$ S., long. $133^{\circ} 10' 45''$ E. On the East and West sides of the point are small bays, in which huts were seen, and probably anchorage may be found in them,

The N.E. point, lying S.E. $\frac{1}{2}$ E. 2 miles from the North point, is low and sandy, with casuarina trees growing upon it. Off the point are two small islets, the outer being about 40 ft. high. From the N.E. point, the eastern coast of the island runs to the southward for 3 miles, and then, receding to the westward, forms a small bay, on the South point of which is the village of Ali Bandang; whence the land extends about S. by W. $\frac{1}{2}$ W. to a conspicuous point in lat. $5^{\circ} 34' S.$, long. $133^{\circ} 8' E.$

The N.W. point is W. by S. $\frac{1}{2}$ S. 2 miles from the North point, and off it there is a detached rock 30 or 40 ft. high. The western side of the island is nearly straight in a S.S.W. direction for a considerable distance, without any conspicuous object on its shores.

The whole of the island is mountainous, the range traversing its centre and sloping down on either side, the peak at the North end being 2,200 ft. high.

Little Ki Island in reality consists of three low wooded separate islands, each about 10 or 12 miles long North and South, and 5 to 8 miles wide; the two eastern of these are separated from the southern part of the Great Ki Island by a strait varying in breadth from 6 miles at its southern entrance to 12 miles in its northern. In the South part of this strait, 10 miles North from the South end of Great Ki Island, and 5 miles off one of its projecting points, is an extensive shoal. *Hogian* is the southern of the Little Ki group, and is separated from Ki Doulan to the northward by a narrow strait. To the westward of Ki Doulan and *Hogian*, and separated from them by a narrow strait, is Letman Island, on which is a hill 200 ft. high at its N.E. end. Between the North side of Letman and the West side of Ki Doulan are three large and numerous smaller islands and rocks.

Ki Doulan Harbour.—N.W., 8 miles from the North point of Ki Doulan Island, is *Ramadan Island*, $1\frac{1}{2}$ mile in diameter, and midway between is another small island, which forms the West side of entrance to Ki Doulan Harbour, the North point of Ki Doulan forming the eastern side of the entrance. Doulan Laut Island, with a shoal off its eastern point, is about 2 miles in diameter, and shelters Ki Doulan Harbour on its western side. Commander Tizard, who visited the harbour in H.M.S. *Challenger*, in Sept., 1874, gives the following information:—

Ki Doulan Harbour was not readily distinguished from the north-eastward, from the similarity of the two outer islands, Pulo Ramadan and Pulo Bandang, each having a small islet off its S.E. side.

There is a small summit about 200 ft. high upon the South point of Pulo Oboor, called Buket Krain, and another, Buket Kalamit, of about 250 ft., upon the main shore of Little Ki, S.S.W. $3\frac{1}{2}$ miles from Buket Krain.

The first anchorage of the *Challenger* was off the village of Tamandam on the North point of the harbour, with Tranjong Serbat bearing E. $\frac{3}{4}$ S., Buket Krain S.S.W. $\frac{3}{4}$ W., and the East extreme of Pulo Bandang N.N.W. The

second anchorage was in 19 fathoms, off Ki Doulan village, a quarter of a mile from the shore, and about a cable from the edge of the shoal water, with the mosque at Ki Doulan bearing East, Loobi Rock S.W. by S., and the left extreme of Doulan Laut W. $\frac{1}{2}$ S.

From the village of Ki Doulan a wharf or jetty, built of loose coral stones, extends off to the edge of the shoal water. A few fowls and eggs, cocoa nuts, and a small quantity of pumpkins and plantains were procured. Some fine pigeons weighing about 2 lbs. each were also shot. Sago palms grow upon the island, and supply the staple food of the natives.

One day's observations (September 25th), at full moon, gave the time of high water, full and change, at Ki Doulan Harbour, at 1^h 26^m. Springs rise 7 ft. The same report as to the winds and weather was given at Ki Doulan as at the Arrou Islands.

Southern Channel.—A deep channel, was found from the harbour westward, South of Doulan Laut Island, by which the *Challenger* proceeded to sea. Between the reef off Doulan Laut Island and the reef westward of Pulo Oot 9 and 10 fathoms were obtained upon what seemed to be a ledge joining the two reefs; westward of this the water deepened rapidly, and 90 fathoms was obtained between the N.W. point of Little Ki Island and the islet of Pulo Gadang.

Margaretha Harbour.—According to Count Lovera di Maria, commanding the Italian vessel of war *Vettor Pisani*, 1872, is situated about 5 miles to the southward of Ki Doulan Village, on the West side of Ki Doulan Island, is a capacious and well-sheltered harbour formed by Ki Doulan, Letman, and Oboor Islands; the best anchorage is off Tuallah Village, in 7 to 11 fathoms good holding ground.

The passage leading from Margaretha Harbour to the southward, between Letman and Ki Doulan, is about 1 $\frac{1}{2}$ miles in length, and from 1 to 3 cables wide, with depths of 2 $\frac{1}{4}$ to 2 $\frac{3}{4}$ fathoms.

Vessels entering Margaretha Harbour from the northward should steer in with Buket Kalamit (197 ft. high), in line with Buket Krain, bearing S.W. $\frac{3}{4}$ S., until Loobi Rock bears East, whence a S. by W. course for 3 $\frac{1}{2}$ miles will lead to the anchorage off Tuallah.

The **ARAFURA SEA** is the area southward of the foregoing islands, between them and the North coast of Australia. There is nothing to describe in it, more than information given by the charts. The only dangers or shoals in the open sea are the *Victoria Shoal*, lat. 9° 13' S., long. 131° 22' E., a doubtful position, and the *Lynedoch Bank*, discovered in the ship of that name, Captain W. Stead, October 26th, 1838, in 9° 55' S., long. 130° 40' E. The latter had 13 to 7 fathoms least water when found, three-quarters of a mile long, and composed of *coral*, which may have grown up to a less depth than the above.

The *Money Shoal*, 27 feet, is another small detached spot, lying 62 miles

N.E. from the entrance of Port Essington, lat. $10^{\circ} 19' S.$, long. $132^{\circ} 47' E.$ These appear to be all the shoal spots which have been found.

The depth of the Arafura Sea increases from 20 to 30 fathoms, on the meridian of Cape Valsche and Cape Wessel to 450 fathoms off the South end of Timor Laut. From Melville Island, in Australia, to the latter, the depths also appear to gradually increase.

One feature of this sea, which has been frequently noticed, is the quantity of fish spawn, or of microscopic animalculæ, which discolour its waters. It being the highway to India from New South Wales, viâ Torres Strait, it has become of more importance since that important channel has been well surveyed, and thus opened to commerce. Captain Henry Toynbee passed through it in his well known ship the *Gloriana*, in September and October, 1855. He notices the discolouration of the water from animal life.

September 27, 1855.—At noon this day the sea was all shades of yellow, blue, and green, caused by what I suppose to be fish spawn; it had a fishy smell, and its shape, when seen through a small microscope, was like that of grass seed.

29th.—Much fish spawn was seen again to-day; in some parts it was quite dark enough to be mistaken for a sand-bank; it floated in lines pointing in the direction of the wind.

In conclusion he says—I have little to say on our passage through the Arafura Sea. Most of the reported dangers are under water, and we found none of them. We had soundings of 15 fathoms about 50 miles to the westward of Booby Island; 27 fathoms forty miles further to the West; and 38 fathoms seventy-five miles further; then the depth decreased to 29 fathoms at the spot where we passed the line between Wessel Island and Frederick Henry Island. From this point it gradually increased again, so that it is probable that a line of less soundings connects these islands. We averaged 109 miles per diem through this sea, which quite equalled my expectations, and were in $11^{\circ} S.$, on the meridian of Cape Leeuwin on our thirty-third day from Sydney. Thence we gradually increased our southing until we were in lat. $13^{\circ} 51' S.$, where we had a good S.E. trade. On the 18th of October we were in $10^{\circ} S.$ lat. and $90^{\circ} E.$ long; and between the 25th and 26th we crossed the line, in $87^{\circ} E.$ On the 5th of November we anchored at the Sandheads.

To the westward of Little Ki Island are several clusters of small islands. H.M.S. *Challenger*, in September, 1874, passed among these islands in proceeding towards Banda from the Ki Islands, and found the charts most inaccurate. Many islands were not marked at all. We give below the information gained.

In about $6^{\circ} S.$ and $132^{\circ} 30' E.$, or 15 miles S.W. by W. from the S.W.

end of Hagian Island of the Little Ki group, is an island, and several lie northward of it, at 8 or 10 miles westward of Little Ki.

The Tionfolokker Group consists of three large and four small islands with a few outlying rocks. They lie in a N.E. by N. and S.W. by S. direction, and extend over about 20 miles in length, and about 8 miles in width. The south-westernmost island is 550 feet high and round-backed; its southern point is in lat. $5^{\circ} 47' S.$, long. $132^{\circ} 9' E.$

The other islands are low and flat, but covered with trees, and they can be seen at a distance of from 12 to 15 miles.

A reef extends for 3 miles southward from the two islands lying north-east of the high south-western island of the group; on the edge of this reef are some rocks which are always above water. No other dangers were seen, but vessels should not venture amongst the islands.

Three Brothers Islands.—This group of three islands occupies a triangular space, the apex of the triangle being to the southward, and its sides are from 6 to 7 miles in length.

Ta Island, the southernmost, is round shaped, about one mile in diameter, and 390 ft. high; its South point is in lat. $5^{\circ} 42' S.$, long. $131^{\circ} 54' E.$ The island appeared to be inhabited.

Dol Island, the north-eastern and largest, is low; it is $1\frac{1}{2}$ mile long in a N. by W. and S. by E. direction, and nearly one mile in width; its southern point in lat. $5^{\circ} 37\frac{1}{2}' S.$, long. $131^{\circ} 58\frac{1}{2}' E.$, is N.E. $\frac{1}{2}$ N. 6 miles from Ta Island.

Onelin Island, the north-western of the group, is also low, but covered with trees; it is round and about half a mile in diameter, and is in lat. $5^{\circ} 36\frac{1}{2}' S.$, long. $131^{\circ} 53\frac{1}{2}' E.$

Each island is fringed with a coral reef which did not appear to extend far from the shore; and the passages between the islands seemed free from danger.

Nusa Tello Islands lie to the North of the Three Brothers. The southernmost of them is *Kanalur Island*, 5 miles long, in a N.E. and S.W. direction. No dangers were observed eastward of the Three Brothers Islands, or between that group and Kanalur Island. It has an islet off its N.E. extreme, and rises to the summit in a succession of beach-like terraces. The peak, which is 1,600 ft. high, is in lat. $5^{\circ} 20\frac{1}{2}' S.$, long. $131^{\circ} 57' E.$, and it was seen from the southern entrance of Ki Doulan Harbour. The island is probably inhabited as smoke and cocoa-nut trees were seen upon it.

At 8 miles northward of Kanalur is *Kandar*, a smaller island; and 5 miles northward of this is *Boen*, with two small islets within 2 miles N.E. of it. *Toppers Hoedje* is marked P.D., at 10 miles N.E. by E. of Boen, as is also *Little Fortune Island*, 9 miles N.N.E. of Boen.

Toa or *Tehor Island* is 6 miles long North and South, and 3 miles wide at

its North end. Its South extreme is in lat. $4^{\circ} 50' S.$, long. $131^{\circ} 46' E.$ At 6 miles E. by N. of this point is a small islet.

Matabella Islands.—The group is hilly and rocky, and the South extreme of the Matabellas is a small table hill. *Kassuwi* or *Corsair* is the central and largest of the Matabellas; it is 6 miles long N.W. and S.E.—its South extreme being in $4^{\circ} 30' S.$, $131^{\circ} 40' E.$ At 5 and 7 miles S.E. by S. from this point are two small islets, called the *Bare Islets*. *Kukar*, another small islet, lies 6 miles East of them. Separated from the North extreme of *Kassuwi* by a strait $1\frac{1}{2}$ mile wide are *Watubella* and *Ingar Islets*, joined by a bank, and extending 6 miles in a N.W. and S.E. direction.

GORAM ISLES are three in number, and are separated from the Ceram Laut group to the N.W. by a narrow channel. They are distinguished by the natives as Goram, Manovolko and Salawatta or Soeroeaki, or Salavako. They are rather high, and very fertile. Rice is only grown on the main island, as that is considered to be an hereditary right.

Goram is the easternmost; its S.E. point is in lat. $4^{\circ} 3' S.$, long. $131^{\circ} 28' E.$, and it is about 9 miles long. It has the largest population, and most trade of the group. The people resemble those of Ceram, and being well acquainted with the neighbouring coasts, willingly go on board foreign trading vessels as pilots. Coin is unknown, cotton twist being the best object to barter. There is a small harbour, called *Onдор*, in the reef on the N.W. side of Goram, which is the chief trading place. Between the two coral reefs which form it there are 16 and 18 fathoms. Going northward by keeping the Matabellas their own breadth open of the West entrance of Goram, will lead outside of them. A N.E. by E. course leads in, and the channel can be seen, but a gun fired will bring a pilot off. When you have entered, bear more to the northward, and come to off a stone pier in 10 fathoms. Fowls, fruit, and sago can be procured. There is a clear passage between the two western islands, and also between the N.W. island and Ceram Laut. There is another harbour, open to the East, near the S.E. point, called *Kailakat*.

CERAM LAUT, "Ceram to sea," lies off the S.E. end of Great Ceram, and is a cluster of islets lying on one coral reef, 15 or 18 miles long, which, as usual, is very shoal on its edges, and drops at once into deep water. The western island, which is the largest, is high and hilly, and, according to Captain Kolff, has an exceedingly high tree on it, under which the chiefs of *Kilwari* are interred, and which forms a good land mark for seamen. Lat. $3^{\circ} 50' S.$, long. $131^{\circ} 0' E.$

Kilwari, or *Kaliwaru*, is a small sandy island overspread with houses, on the N.W. side of Ceram Laut, to which it is joined by a sand-bank. The two villages are under the native rajah to the East, and the other a small portion to the West under a Dutch commander, and are separated from each other by a stone wall, 6 feet high and 2 feet thick, a similar defence surrounding

the island. Coral reefs extend for a considerable distance from the island, but boat landing may be effected in a bay on the North side. The people are of the Malay race, and are chiefly fishermen, and take considerable quantities of tortoise-shell and trepang, which with other articles are largely collected and bartered here.

Ghissa or *Gesir* is a low, sandy, uninhabited island, surrounded by a reef off Kilwari, the channel between being narrow, but said to be safe.

The **Keffing Isles**, two in number, lie close to the S.E. extreme of Ceram, and are connected with it by sunken reefs. *Little Keffing* is well peopled, each village being governed by a separate rajah. The East point is in lat. $3^{\circ} 52' S.$, long. $130^{\circ} 53' E.$ The island is low, and the groups of huts among the cocoa-nut trees have a very picturesque appearance. To the East of these islands and the reef which surrounds them, there is a small island, with a deep channel between.

CERAM, one of the largest islands of the Malay Archipelago, is 162 miles long East and West, and about 40 miles across where broadest. A chain of mountains runs through its eastern length, so that it may be said to consist of one cordillera, some of the peaks of which rise to the height of 6,000 to 8,000 ft., and one of them, *Nusa Heli*, to 9,250 ft. It has no active volcano or extinct crater, as far as is known, and has no good harbour on either shore, except that of *Amahai*, North of the Amboina group. The whole island is covered with one stupendous forest, but generally of useless timber. The coasts are occupied with an enterprising race of Malay fishermen, who vigorously collect tortoise-shell and trepang from as far as New Guinea and Australia. But they are a wild and untractable people, who, though they may be hospitable to Europeans who visit them to their profit, are inveterate head-hunters, and live in constant feuds. They should not, therefore, be trusted. The island, as a whole, is very thinly inhabited. A small portion of its East end, *Tobo*, is under, nominally at least, the Dutch Residentie of Banda; the rest belongs to the Residentie of Amboina.

On the North coast of Ceram, during the East monsoon, the weather is fine with regular land and sea breezes. The West monsoon is the wet and squally season, although it brings fine weather at Amboina, a very singular exception; but at Ceram the West monsoon is the rainy and squally season, in conformity with its general character everywhere else in these seas from December until April. The wind is frequently fresh from West and W.N.W. during the day, dying away towards night, and veering to the W.S.W. with a light breeze in the morning.

Waru Bay, on the eastern coast of Ceram, has anchorage off the village, which is in its southern part, in lat. $3^{\circ} 26' S.$, long. $130^{\circ} 45' E.$ It affords good anchorage, where water and other refreshments may be procured. For 5 miles eastward of this village the water is foul from the coast, and there is also a small shoal 5 miles W.N.W. of it, the anchorage lying between these

reefs. N.N.E. 10 miles from Waru is Parang Island, dangerous to approach, and having a reef 2 miles off its West end. *Semgum*, or *Lengowa Point*, is 22 miles northward of Waru; and at 10 miles N.W. from Semgum Point is Lama Point, at 22 miles westward from which is the anchorage in Kobie Bay, a small bay, sheltered by the land from winds between S.E. and West. Leuwarden Reef, the West end of which is 7 miles E. by N. from Lama Point, is 2 or 3 miles in extent, and *very dangerous*, the West side being a white sand-bank, and the eastern side a ledge of rocks, some above water. There are no soundings near it, nor in the channel inside it, which is considered to be safe.

Wahaay Bay.—The fort at the head of this bay, according to the Dutch charts, is in lat. $2^{\circ} 45' 30''$ S., long. $129^{\circ} 30'$ E.

It was visited by Captain R. L. Hunter, in the *Marshall Bennett*, in 1840. He says it is something to the westward of the situation assigned to Flat Point of the charts. Wahaay, however, is at no point, nor is the land near it at all remarkable for flatness; in fact, the houses are on the rise of a hill of some height. It presents from the offing a straight coast, therefore it is necessary in running for it to keep within 4 or 5 miles of the shore, that the houses may be seen; the adjoining land also appears more cleared here than elsewhere.

Wood here is plentiful of all kinds, large or small, for spars, plank or any purpose, and excellent water near the ship, and very convenient.

For refreshments a tolerable supply of fowls can be procured, and we obtained sweet yams enough to supply all hands daily during our stay. Pine apples and plantains are plentiful. Fish frequently are in abundance, and sometimes wild deer. Pigs, goats, sheep, and ducks, are scarce and expensive.

Close to it on the western side is a similar but larger opening in the reefs; at the head of the bay, which it leads to, is a village called *New Hatiling*. There is a shoal in the middle of the bay; the anchorage is inside this.

It is high water on full and change days at 6 p.m., only one tide in 24 hours, and the rise 8 ft.

Sawaai Bay is in lat. $2^{\circ} 51'$ S., long. $129^{\circ} 9'$ E. *Tanjong Para* forms its western point; it is low, and has several small islands surrounded by shoals, the outer one named *Pulo Basar*, lying 2 or 3 miles off. There are also some islands and shoals in the S.E. part of the bay. The channel into the harbour or road is to the westward of the latter, by steering South for a mount called the Friar's Hood, at the bottom of the bay, near the village *Selema*; and having rounded the reef and islands fronting the road, haul along shore to the eastward, and anchor near it, with *Pulo Atui*, the westernmost island, bearing North. The water is deep, 40 to 25 fathoms, but it is good anchorage, in the S.E. monsoon, bottom mud.

Ella Island and shoals, 5 miles in extent, lie off the western entrance of Pha Point.

Cape Talanuru is the N.W. extremity of Ceram, and is in lat. $2^{\circ} 52' S.$, long. $128^{\circ} 11' E.$ From this the western part of Ceram trends off to the S.W. and South for 45 miles in a long irregular peninsula, in a similar manner to Amboina, Saparua, and other volcanic islands in the neighbourhood, and as is seen on a much larger scale in the singular forms of Celebes and Halmaheira.

Bonoa, an island of about 12 miles long, with a reef off its northern end, lies off this N.W. part of Ceram, forming *Bonoa Strait*, 5 miles wide in its narrowest and S.W. part. It is quite clear on the North side, but the Ceram coast is skirted by a series of islets and rocks, which require care. *Ada Reef* lies 3 miles West of the West extreme of the North coast of Bonoa.

The islands which lie between this and Bouro, forming the East side of the Bouro or Manipa Strait, have been mentioned on pages 823-4, *ante*.

The South Coast of Ceram has but few particulars to interest the seaman. It is deeply indented by the different bays at its western end. *Seal Point*, its S.W. extreme, is the end of the long peninsula above mentioned, and 4 miles North of the *Three Brothers*, which lie off the N.W. end of Amboina. *Piero Bay*, 28 miles wide, penetrates the S.W. part of Ceram, opposite to Amboina, and thus forms a wide portion of the strait limited to the South by Amboina and the islands East of it.

Amahai Bay, East point, is 30 miles N.E. by E. from the N.E. point of Saparua. The bay extends in an E.N.E. direction for 23 miles, and on the North side of its eastern point is a secure anchorage called *Amahai Roads*. It was surveyed in 1862 by Lieut. Koning. The outer bay is named by the natives *Elpapoetie Bay*, and in the centre of it there are no soundings, and the shores are very steep-to.

The Inner Bay is limited by *Tanjong Koeakho* on the West, of moderate height, and on the East by *Tanjong Mapoei*, higher, and covered with trees. At the head of the bay is the small village of *Amahai*, where there is a small Dutch fort and garrison, the flagstaff of which is in lat. $3^{\circ} 19' 30'' S.$, long. $128^{\circ} 56' 7'' E.$ It is high water at noon, and the rise is 3 ft. In coming in, you may pass round Point Koeakho within a ship's length, and avoid the reef which projects from the eastern side nearly two-thirds over, and may be seen by the colour of the water. There are some bamboo stalks on it, and there is sometimes a bathing-house. Anchor with Point Koeakho bearing N.W. by W., and Point Mapoe N.N.E., the cupola on the reef N. $\frac{3}{4}$ E., and the flagstaff of the controller's house E.S.E. $\frac{3}{4}$ E. in 8 fathoms with 40 fathoms of cable.

WESTERN PART OF THE ISLAND OF NEW GUINEA.

The COAST of NEW GUINEA, which fronts the Molucca Islands, is chiefly known to us from the voyage of Lieut. Kolff, in 1826. We take the following from the extracts made from his work by Mr. George Windsor Earl. It is very much out of the way of the ordinary track of ships, and is never visited by European vessels for trade, and will therefore need but few remarks. Should the Dutch Government act on the knowledge recently acquired of this fine island (the greatest area of the world now entirely unknown, with the exception of a portion of Africa) there may be a necessity for further nautical information on it. The eastern part of the island, including the discoveries of Captain Moresby, in H.M.S. *Basilisk*, during the years 1873-4, are described in the South Pacific Directory, chapter xix.

FREDERIK HENDRIK ISLAND, on the S.W. coast, is about 100 miles long, separated from the mainland by *Prinses Marianne* or *Dourga Strait*, first determined to be a channel in 1835. The island is everywhere low, apparently marshy, and covered with a dense forest. The entire South coast is fronted by a mud-bank, extending about 8 miles out to sea, having 3 fathoms on its verge, from which the depth rapidly increases to 9, 14, and 27 fathoms. About 50 miles to the N.E. of Cape Valsche the mud-bank begins to decrease in breadth, so that vessels are enabled to approach the shore.

Cape Valsche, or False Cape, according to Lieut Kolff, is in lat. $8^{\circ} 22' S.$, long. $137^{\circ} 40' E.$ The northern part of Dourga or Prinses Marianne Strait is about 15 miles wide, the eastern part being in lat. $7^{\circ} 23' S.$, long. $138^{\circ} 54' E.$, and there was no danger discovered by the Dutch ships in beating through. On the North side of the strait, about 5 miles within the entrance, is a creek, within which the water is fresh at three-quarters ebb, but difficult to be got on account of the hostility of the natives, who should be avoided on all occasions.

The coast from the entrance to the strait extends in a N.N.W. direction to the *False Utanata River*. The land is low and covered with forest, and a mud-bank, which lines the shore, prevents approach within from 4 to 8 miles. The coast is thickly peopled by inhospitable natives.

The *Triton Sandbank*, the South side of which is in lat. $6^{\circ} 0' N.$, long. $138^{\circ} 4' E.$, lies 23 miles off shore, and has 10 fathoms, mud, immediately to the southward. *Providential Bank*, lat. $5^{\circ} 38' S.$, long. $137^{\circ} 52' E.$, has 4, 6, and 7 fathoms immediately to the South of it. It lies 18 miles from the main.

False Utanata River, in lat. $4^{\circ} 46' S.$, long. $136^{\circ} 57' E.$, is of considerable size, but a bar of sand extends across its mouth, on which, during the S.E. monsoon, there is a heavy surf. A vessel may anchor in 13 fathoms to the westward of the bar; but a strong swell from the southward, and the reefs which lie to the N.W., render this anchorage unsafe in the S.E. monsoon.

False Wakia River, 7 or 8 miles to the northward, is of a similar description. The shores of these rivers are thickly peopled, but no intercourse with them was obtained. The coast to the northward of this forms a deep bight, terminating in *Cape Steenboom*, lat. $4^{\circ} 44' S.$, long. $136^{\circ} 23' E.$, across which, in a line between the cape and the river, lie several shoals, the outermost of which lies 9 miles S.E. from Cape Steenboom.

Utanata River, in lat. $4^{\circ} 40' S.$, long. $136^{\circ} 15' E.$, is about 2 miles wide at its mouth, and is fronted by a bar, on which there is above 6 ft. at low water. The natives here were more friendly, perhaps arising from more frequent intercourse with the Ceramese and Makassar traders. To the N.W. of the Utanata lies the *Wamuka River*, lat. $4^{\circ} 39' S.$, long. $139^{\circ} 11' E.$ It is rather smaller than the former, and, like it, is covered by a bar.

Cape Buru, or *Boeroe*, lat. $4^{\circ} 28' S.$, long. $135^{\circ} 10' E.$, is a steep promontory, visible at a distance of 30 miles, with no soundings 4 miles outside. At 25 miles N.W. by W. from it is *Mount Lakahia*, near the coast, 4,526 ft. high. This is the western of a chain of mountains which thence extends inland to the eastward, and is known as the *Charles Louis Range*. At 40 miles North of False Utanata River the elevation is 11,500 ft., and at 56 miles N.E. of the same river the elevation is 14,000 ft.

Cape Perier is N.W. by W. $\frac{3}{4}$ W., 42 miles from Cape Buru, the coast between having a few small indentations. Between Cape Perier and *Cape Baudin*, 10 miles N.W. from it, is the entrance to *Etna Bay*, which is 20 or 25 miles deep. Between Etna Bay and Triton Bay, 30 miles to the westward, the coast is fronted by several islands having narrow straits between. The easternmost of these islands, named *Chausot*, is 1,600 ft. high, and lies 5 miles westward of Cape Baudin. The westernmost is named *Aidumea*; it is 10 miles long, N.W. and S.E., and forms the eastern side of the entrance to Triton Bay.

Triton Bay is an inlet extending 6 miles to the N.E. into the mainland. A chain of five small islands stretches 4 miles W.S.W. from the West point of *Aidumea*, and the fair channel lies between the outermost of these and *Semieuw*. *Fort Du Bus*, a Dutch establishment, is at the head of a small cove on the North side of Triton Bay, lat. $3^{\circ} 46' S.$, long. $134^{\circ} 3' E.$ The cove is 2 miles deep and a mile wide, having at the entrance a depth of 32 fathoms, which decreases to 5 fathoms, mud, at its head, where a vessel may moor a cable's length from the shore. The channel into the cove is close to the S.W. side, as a mud bank, nearly dry at low water, extends from the N.E. side, three-fourths of the width of the cove. High water, full and change, $1^h 8^m$; rise and fall 7 ft. Water and refreshments may be obtained here through the Dutch commandant. *Iris Strait*, the channel by which the *Triton* entered the bay, is formed by *Aidumea Island* to the South and by *Dramaai Island* and the mainland to the North. Its South entrance is 2 miles

wide, in lat. $4^{\circ} 2' S.$, long. $134^{\circ} 6' E.$, from which it stretches N.W. by W. about 6 miles. At 45 miles W.N.W. of the entrance to Triton Bay is the N.W. corner of *Arguna Bay*, which is little known.

Pulo Adi, or *Wessel Island*, which extends W.N.W. and E.S.E. about 25 miles, lies 33 miles to the S.W. of the entrance to Triton Bay. The S.E. point of the island is in lat. $4^{\circ} 16' S.$, long. $133^{\circ} 34' E.$, and W.S.W. of this point at 9 miles distant is *Vogel* or *Bird Island*, surrounded by a reef.

The *Nautilus Strait* separates Adi from the southern shore of the *Orange Nassau* peninsula, on the South side of which is *Speelman Bay*, before which lie some islets named *Buloffs* and *Karawari*. In *Nautilus Strait* the western end of *Wessels Island* should not be approached within a mile. Sunken rocks also lie at 3 miles W.N.W. and 5 miles N. by E. of this point. There is anchorage North of the N.W. point of *Wessels Island*, southward of some islands. *Plana Islands*, two in number, are 5 and 8 miles northward of the centre of *Wessels Island*. The district here is under the control in some measure of the *Mysolè* chiefs. The S.W. part of this portion of the western peninsula of New Guinea is not known beyond the coasts, which are tolerably well defined on the chart.

Cape Kaffoera, lat. $4^{\circ} 5' S.$, long. $132^{\circ} 47' E.$, is 23 miles West of *Nautilus Strait*, and here the coast is high and bold, and trends to *Cape Sapey*, 28 miles to the N.N.W. Near the shore, along the stretch of coast, the land reaches an elevation of over 3,000 ft., and no bottom was found with 100 fathoms of line at 4 miles westward of it. *Cape Kaloeman* or *Kalomuns* is in $4^{\circ} S.$, and has several islands northward of it.

Between *Cape Sapey* and *Dree Cap Peninsula*, 60 miles to the N.W. $\frac{1}{2}$ N. from it the district is known as *Charles Albert Archipelago*. *Gudin Island*, 6 miles long N.W. and S.E., is 1,200 ft. high, and has a hill at each of its extremities. *Cape Foullyoy*, 10 miles northward of it, is in lat. $3^{\circ} 17' S.$, long. $132^{\circ} 32' E.$ It is high, and has a 3-fathom patch $1\frac{1}{2}$ mile West of it. At 10 miles N.N.W. of it is *Jacobs Island*. *Gide Isles* lie to 7 or 8 miles off the S.W. part of *Dree Cap Peninsula*, and eastward of them, at 10 and 15 miles distance, are *Roze Island* and *Coster Island*.

Mc Cluer Gulf, or *Telok Berow*, is an extensive inlet, which reaches within 5 miles of the shores of the Great Geelvink Bay, almost insulating the N.W. part of New Guinea. This part is under the influence of the *Salawatti* chiefs, and, like the rest of the vicinity, is very little known. From the N.W. point of *Mc Cluer Gulf*, thus named from Lieut. *Mc Cluer*, who sailed up it in 1791, to the western extreme of New Guinea, there are several bays, but we have no hydrographical particulars of them. The natives are stated to be numerous, treacherous, and hostile.

Patippi Bay is 7 miles deep, and has its entrance in lat. $2^{\circ} 41' S.$, long. $132^{\circ} 10' E.$, facing the West. It is on the North side of *Drei Cap Peninsula*.

Wass Island, 6 miles westward of the entrance to Patippi Bay, is a small islet close to the land, and protecting an anchorage eastward of it. At 16 miles eastward of the entrance to Patippi Bay is *Segaar Bay*, with numerous islets and rocks lying N.W., North, and East of its entrance. It is high water in Segaar Bay at 6^h 30^m. Springs rise 4 to 6 ft.

The channel between this portion of New Guinea and the East end of Ceram, and the islands which trend south-eastward from it, and to northward of the Ki and Arru Islands, is apparently clear, and from 65 to 90 miles in breadth. The first island in proceeding north-westward through it is *Sabuda* or *Wonie Melat*, off the entrance of McCluer Gulf, the South point in lat. 2° 40' S., long. 131° 37' E. To the S.E. of it is a group of islets called *Pisangs*.

MYSOLE or **Misool**, a large island 45 miles long and 15 to 20 broad, is but little known, though of such considerable extent. The interior is said to be inhabited by Arafura negroes, and the coast by a mixture of the negro and Malay races. It is generally level land, and of moderate height, and the shores are lined almost all around it by a range of small islands, the outermost of which to the N.W. and E.S.E. lie many miles off. On the South side is *Efbe*, which forms a harbour, visited by Capt. Forrest in 1775, where he was well received by the inhabitants at a small village. Numerous other islets lie off the South side of Mysole to a distance of nearly 10 miles in the eastern half of the island. *Efbe*, the largest island, is in lat. 2° 5' S., long. 130° 11' E.

To the eastward of the S.E. point of Mysole a range of islets and scattered rocks extend for 14 leagues, terminating to the East in *False Pisang*—"banana-island," a common Malay term in these seas.

Off the North coast of Mysole are numerous islets and several sandbanks, only to be understood by the chart, which extend more than halfway across the channel between the island and Popa, leaving, however, a clear route 15 miles in width, and leading towards Pitt Strait.

The Kanari or *Canary Islands* lie to the N.W. of Mysole, and are an extensive chain of flat, wooded, uninhabited islands, leaving a narrow passage between some of the groups which lie close to Mysole. *Great Canary* is the westernmost and largest, in lat. 1° 49' S., long. 129° 35' E.

On this island Captain Forrest, on his voyage to New Guinea in 1775, in search of the nutmeg tree, found good water, in a pond situated on the South end. He anchored in Round Harbour, so called by him, lying between two small islands, which are at a small distance on the East side.

To the southward of those islands which front the South shore of Mysole and the North coast of Ceram the passage, which is 50 miles wide, is safe, and was partially examined by Lieutenant Brütel de la Rivière, D.R.N., in 1850.

Between Mysole and Popa are the groups, little known, called the *Vienna Isles*, and *Nosela Islands*.

FitzMaurice Shoal, of 2 fathoms, is marked in two positions northward of the Canary Islands. *Pigeon Island* is in lat. $1^{\circ} 42' S.$, long. $129^{\circ} 45' E.$, and the shoal is marked 5 miles N. $\frac{1}{2}$ W. from it, and at 10 miles N.W. from it.

In the strait between Mysole and Salwatti are several islands and dangers. *Pinon* or *West Brother Island* lies in the centre of the East part of the strait northward of the False Pisangs. There is a sand-bank N.W. 7 miles from it. *Efmatal Island*, 10 miles off the New Guinea coast, is 20 miles to the E.N.E., and N.W. 10 miles from Efmatal is an extensive sand-bank with a depth of 2 fathoms water near the New Guinea coast. *Orse Islets*, in lat. $1^{\circ} 33' S.$, long. $130^{\circ} 51' E.$, are 2 miles off the coast of New Guinea, and 10 miles eastward of the southern entrance to Galewo Strait. Vessels should not pass inside of them, as some banks lie to the East and West. *Vettor Pisani Isles*, two small islets near together, the southern, being in lat. $1^{\circ} 40' S.$, long. $130^{\circ} 29' E.$, lie in the middle of the strait midway between the North point of Mysole and the Orse Islets. A $2\frac{3}{4}$ fathom bank, *Hesketh Shoal*, was reported in 1876 as lying about $1\frac{1}{2}$ mile northward of these islets and between them and the Schilpad Isles. From it Schilpad North Island, the largest and highest of the group of that name, bore from it N. by E. $\frac{1}{2}$ E., distant 5 or 6 miles, in latitude $1^{\circ} 38' S.$, long. $130^{\circ} 28' E.$, 12 miles from the nearest part of Mysole Island. A sandbank lies 5 miles off the North shore of Mysole, W.S.W. of Vettor Pisani Isles. *Schilpad* group, six or seven small islands, lies about 5 miles northward of Vettor Pisani Isles, and a chain of islets extends N.W. from them for a distance of 10 or 12 miles. A sunken rock lies N. by W. 10 miles from the Schilpad group, and another at 15 miles N. $\frac{1}{2}$ W. from it.

POPA, *Popo*, or *Poppo*, 42 miles North of the West end of Mysole, is inhabited. Its East point is in lat. $1^{\circ} 8' S.$, long. $129^{\circ} 53' E.$ Including the adjacent islands which surround its S.W. and West sides, it is 18 miles from East to West, and 9 miles in breadth. It has two remarkable hills on its West part, which may be seen at a great distance, the one of a semi-circular form, like a beehive; the other of an oblong shape; the rest of the island being entirely flat. The group of islets off its S.W. part are sometimes called the *Tatas*. At its N.W. end is a considerable island, called *Calap* or *Kalap*. *Deception Island*, of the old charts, to the N.E. of Calap, adjoining the N.W. part of Popa, appears like four separate islands in passing along the North side of it, having four separate points, each resembling an island until they are closely approached. Close to, and among these isles which surround the western part of Pulo Popa, there are soundings, but none at 2 or 3 miles distance.

Grosvenor Bank, 5 miles in extent, with 3 fathoms least water, lies 15 miles W.S.W. of the *Tatas*, in lat. $1^{\circ} 19' S.$, long. $129^{\circ} 23' E.$

SALAWATI or *Salwatti*, a large island adjacent to the West end of New Guinea, is lofty, and inhabited by above 4,000 *Arafura* negroes. The charts will give all particulars known.

Galewo Strait, which lies between *Salawati* and *New Guinea* is only known from the examination made of it by Lieut. McCluer, who went through it in the *Panther* and *Endeavour*. It was called *Revenge* or *Watson Strait*, Captain *Watson* of the *Revenge* being the first person who went through it in 1764. It is much embarrassed by numerous small islands and shoals, and being out of the direct track of ships it is seldom or never used. At the North part of it a chain of islands stretches across from the N.E. point of *Salawati* to *Cape Spencer* on *New Guinea*. It has been called *Foul Point* by the Dutch, and reefs project from it to the N.W., and from the adjoining islands to the distance of $1\frac{1}{2}$ or 2 miles. There are soundings and various depths throughout *Galewo Strait*, and there is anchorage in many places, but at its N.W. part the water is deep very near to the shore.

The *North Coast* of *New Guinea* eastward of *Cape Spencer* is generally high, but in some places is low near the coast. A short distance inland a chain of mountains covered with trees, and from 4,000 to 5,000 feet high, extends parallel with the coast as far as the N.W. point of the *Great Geelvink Bay*.

BATANTA or *Battanta*, another considerable and lofty island, is also little known. It lies North of *Salawati*, and is separated from it by *Pitt Strait*. The island is about 30 miles long E. by N. and W. by S. *Cape Mabo*, its West extremity, is in lat. $0^{\circ} 56' S.$, long. $130^{\circ} 24' E.$, bearing N.E. by E. $\frac{1}{2}$ E. from the East end of *Pulo Popa*, 34 miles distant. Off this cape is a small but high island, *Fisher Island*, bearing from it W. $\frac{1}{2}$ N. 2 miles. *Batanta* and *Salawati* to the South of it are lofty, and may be seen after a ship has passed *Pulo Popa*.

PITT STRAIT was thus named by Capt. *Jas. Dewar*, who went through it in the ship *Warwick* in 1760. The shores of *Batanta* and *Salawati*, which form this strait, are both lofty and steep, and the tides are remarkably rapid, attended with strong eddies, which render the passage at all times dangerous, especially if it should happen to fall calm.

There are no soundings going through the strait, except near *Salawati*, on the East side of *Roggewyn Island*, which is a small island at the West entrance of the strait, and must be passed on the North side in going through; and also at a small distance from a shoal or reef of rocks, the *Batanta Reef*, 9 miles E. by N., from the East end of *Batanta*. You must be careful not to approach them, as the want of anchorage may expose you to danger;

for these reasons Pitt Strait is seldom frequented, and Dampier Strait is preferred, being shorter and wider, with anchoring ground in the narrowest part.

After a ship is in Pitt Strait, in case of night coming on, without moon-light, she may haul in for the Salawati shore, where she may anchor, should occasion require, but it is improper to anchor if it can be avoided. Some ships have been thrown by the eddies against the North shore of Salawati, their yards touching the trees, and apprehending great danger. Steer right through this strait, keeping as near the middle as you can, till near the East end of Batanta; then haul over to the southward toward Jackson's Island, to give a berth to the reef off the East end of Batanta. It runs a considerable distance from that end of the island, having $3\frac{1}{2}$ and 4 fathoms on some parts of it, but there is a greater depth on the West and South sides of it, where a ship may anchor, if the tide is carrying her towards the shoal part of the reef. *Jackson's Island* is high, and lies off the N.E. end of Salawati.

When past the reef you may steer for *Point Pigot*, which is the S.E. point of the Island Waigiou; and when to the eastward of it you are in the Pacific Ocean, taking care to avoid the *Buccleugh Shoal* at 12 miles N.E. by E. from Point Pigot; and another shoal, 3 miles South of the western of two islets, which lie off Point Pigot to the southward.

WAIGIOU is a considerable island, 64 miles long, to the northward of Batanta. Its North shore is just South of the equator. It is generally hilly in the interior, the highest peak, *Cone de Beuffle* or *Buffalo's Horn*, was estimated by the officers of the French surveying ship, *La Coquille*, under D'Urville, at 1,516 ft. The climate is moist and hot, and the people on the coast, which in some places is low, are said to be a cross between the Malay and the Papuan negro. Sago is their chief food; rice is unknown.

Captain Forrest explored the northern coast of Waigiou in January and February, 1775. The coast is described as generally bold, but reefs extend from some of the points and small isles near the shore. Within the harbours fresh water may be obtained.

Piapis is situated about 3 leagues from the S.W. end of the island. Rocks, on which the sea generally breaks, project to the W.N.W., about a quarter of a mile from the western point of the entrance. They may be avoided by steering in about S.E., and keeping towards the West point. Off the latter is a haycock rock, about 15 ft. high, and standing in 10 fathoms of water.

The entrance, rather more than a quarter of a mile in breadth, has from 30 to 20 fathoms water. The depth thence decreases. A ship may haul round the haycock rock, and anchor to the S.W. of it, in 15 or 20 fathoms, muddy bottom. Fresh water may be procured at a pool on the island within, which has a hill on it. Between this island and the western shore there are rocks, leaving a passage of 8 fathoms close to the island, and of 6 fathoms

close to the shore in a cove at the S.W. side, where a ship may be careened. At the bottom of the eastern branch there is good timber for masts, and a small brook of water may be found near two peaked hills. On the small but high island *Sipsipa*, which forms the eastern point of the entrance, there is a pool of fresh water.

Nearly midway between the harbours of Piapis and Offak, there is a small island called the *Shoe*; thus named from its appearance. Three remarkable peaks will be seen in sailing along the coast; of these the first or western peak is represented at 2 miles to the eastward of Piapis; the second or middle peak to the S.S.E. of the Shoe; and the third or East peak to the southward of Offak. The latter, from its peculiar figure called the *Buffalo's Horn*, is mostly covered with trees, and very steep.

Offak Harbour is 31 miles to the eastward of Piapis. Being surrounded by high land, it is not readily discernible at a distance. At the entrance, on the eastern side, is a sugar-loaf hill, about 500 feet in height, and the Buffalo's Horn above mentioned standing inland will be seen. The latter in a line with the Sugar-loaf bears S.S.W.

The breadth and depths of the entrance are nearly the same as those of Piapis. The course in is about S. by W., keeping some rocky islets, like haystacks, which lie near the eastern point, on the port side. Within, the harbour extends considerably; on one side to the eastward, on the other to the S.W.

To the southward, fronting the entrance, are two islands connected by a reef; the outer one has a pool of fresh water on it, and a reef extends from its western end. On the South side of the isle and reef are from 12 to 6 fathoms, over a muddy bottom; but there are from 26 to 20 fathoms midway between it and the entrance. A little way within the eastern point is a small sandy cove with 10 fathoms, and a stream of fresh water.

Pulo Manouaran, at a league from the coast, lies $3\frac{1}{2}$ leagues from the entrance of Offak Harbour, in the direction of N.W. by W. The isle is of moderate height, and has a pool of fresh water on it, and an islet close to its N.W. point. There are soundings from it to the East and West, and a safe channel within, varying in depth from 10 to 20 fathoms.

Rawak.—This harbour is situated at about 5 leagues from Offak. It is formed by the isle called *Pulo Rawak*, which is separated from the island of Waigiou by a narrow channel. The larger entrance, about half a mile wide, is from the eastward, with depth decreasing from 17 to 10 fathoms. A ship may be sheltered here from all winds, excepting those from between East and N.E. Water may be obtained from two streams on the Waigiou shore, which is inhabited.

At 3 miles E.N.E. of Rawak Island is a shoal, and in the same direction 6 miles from it a $4\frac{1}{2}$ fathom bank.

Boni Harbour, 6 miles eastward of Rawak, has its entrance filled with shoals.

DAMPIER STRAIT, or Gemen, or Gamien, is formed by Batauta Island

to the South and Waigiou to the North. It is named from the great English navigator who first explored it. It is 70 miles long from Cape Mabo, the West point of Batanta, to Cape Pigot, the S.E. point of Waigiou. But the narrower and difficult part of the strait is only 30 miles long, and is northward of Batanta. *Gamen* is the largest of several islands on the North side of the strait, and appears as part of the South coast of Waigiou, being separated from it only by narrow channels leading into an extensive inlet.

Chabrol Bay is to the eastward of this inlet. It extends in a W.N.W. direction across the island to within $1\frac{1}{2}$ or 2 miles of the western arm of Offak Harbour, and within $2\frac{1}{4}$ miles of *Ports Duperrey* and *D'Urville*, nearly cutting through the island. On the western side of Chabrol Bay two other bays branch from it; and at its northern extremity is a safe harbour named *Port Blossenville* by the officer of *La Coquille*, lat. $0^{\circ} 5' S.$, long. $130^{\circ} 40' E.$

King William Island, to the southward of *Gamen*, and on the North side of the strait, is high, with a white patch on its eastern extremity; it may be seen 12 or 13 leagues off, and when first discerned in coming from the eastward, three hills on it appear like separate islands. Contiguous to the East end of King William Island, is *Hump Island*, with a round rocky islet a short distance outside of it, and two shoals N.W. from it. Several small islets lie near the Waigiou shores.

Augusta and *Pigeon Islands* are very low, and lie in the middle of the strait to the southward of the West end of King William's Island; the westernmost is *Augusta*, and the easternmost *Pigeon Island*. *Foul Island* lies between the East end of King William's Island, and the North shore of Batanta, but nearest to the latter. It is a small, level island, and the channel is between it and King William Island. Due East of Foul Island is a small white sandbank, part of which is covered with tall trees, and is called *Mansfield Island*. This island is on the South side of the strait. There are several others between it and Batanta, but scarcely to be distinguished from Batanta, being very near that island. The passage between King William Island and Waigiou is unsafe.

Woodford Shoals are two 4-fathom patches, which lie respectively at 7 and 10 miles S.W. from *Augusta Island*, and are described presently.

On leaving *Pulo Popa*, if the wind should be northerly, haul up N.E. or N.E. by N., so as to be able to lie round the N.W. end of Batanta, observing not to approach near the *Tameay Isles*, a chain of islands lying to the westward of Batanta, 8 or 9 leagues from Cape Mabo; these islands are not well known, therefore it is proper to give them a good berth, by borrowing on Batanta, the West end of which is perfectly clear of danger; and when 3 or 4 leagues to the N.E. of Fisher's Island, there are soundings as far as Foul Island. Being to the northward of Fisher's Island, a ship should not exceed 3 or 4 leagues distance from Batanta, as to the westward of *Augusta Island* there are some coral patches, called the *Woodford Shoals*, not perfectly

known. There is a spot on which the *Augusta* had only 3 or 4 fathoms, which bears W. by S. 2 leagues from Augusta Island; another spot, on which the *Mansfield* had 6 fathoms, bears about W.S.W. 4 miles from Augusta Island; and it is probable there may be less water on some of these patches. The soundings in these straits are in general irregular, the bottom gravel, with coral and shells in some places; you have from 30 to 60 fathoms, until 2 or 3 miles to the eastward of Pigeon Island. There is a bank extending eastward from this island 4 or 5 miles, with moderate depths on it for anchorage, the bottom mostly sand and gravel. There is $5\frac{1}{2}$ fathoms coral rock, with Pigeon Island W. by S. $1\frac{1}{2}$ mile; but deepens to 10 and 12 fathoms, sand, when 3 or 4 miles eastward from this island. To the northward the water deepens fast towards the East end of King William's Island, there being no ground at 1 mile distant from it, with 90 fathoms of line. It also gets deeper in standing towards the shoal which surrounds Foul Island; this is called *Vansittart's Shoal*, extending 3 miles to the N.W. of Foul Island, and then trenches directly to the southward, till it reaches Batanta; from its N.W. extreme the North verge of it extends in a line directly East, towards the East end of Batanta, Mansfield Island lying on the northern edge of it. When you have passed at the distance mentioned from the Batanta shore, and Augusta Island bears N.E. by E., you should then edge over towards it and Pigeon Island, to keep at a proper distance from the N.W. part of the Vansittart's Shoal, by not coming nearer Foul Island than 5 or 6 miles, when it bears East, nor within 4 miles when it bears to the southward. Augusta and Pigeon Islands may be approached on the South side to a small distance if necessary, as the coral flat does not extend far out to the southward from them. There is a channel between these two islands, but it is narrow and intricate. Augusta Island is the easiest for landing on, to cut wood; but on the ebb tide care is requisite, to prevent boats from receiving injury on the sharp coral rocks. If you see Mansfield Island, it is a good guide for the shoal spots which the *Augusta* and *Mansfield* were upon. Keep it on with the South part of Foul Island, and you will go clear to the southward of them both; and when within 3 miles of that island, pass on the South side of them, at any convenient distance. When to the eastward of Pigeon Island, and you have it bearing West from 3 to 5 miles, you shoal to 10 or 12 fathoms, but borrow over toward Foul Island, you will deepen, there being 60 fathoms irregular, close to the North and N.W. verge of the Vansittart's Shoal, the verge of which is thought to be steep and dangerous. When Foul Island bears S. by E. or South, there are no more soundings, and you are clear of danger; only do not near Batanta so as to be in a line with Foul and Mansfield Islands, as that line borders on Vansittart's Shoal.

When past Foul Island steer for *Point Pigot*; along the Waigiou shore you will see several small islands lying close to that point, which appear like

inlets of a river. If the wind be from the northward, keep near Point Pigot, so as to be able to keep at a tolerable distance from New Guinea, when clear of the strait. *Point Pigot* is the S.E. end of Waigiou; it is moderately high, and two small islands, with a sandbank 3 miles S.S.W. of the westernmost, lie at a very little distance from it; its latitude is $0^{\circ} 19' S.$, long. $131^{\circ} 11' E.$ The N.W. point of New Guinea is low, but after you have got a few leagues to the eastward of Point Pigot, all the North coast is very high and mountainous. Between Point Pigot and New Guinea the passage is about 8 leagues wide; when outside, a ship should make to the eastward till she gets sufficient easting to pass to the eastward of the Pelew Islands, giving a reasonable distance to the North coast of New Guinea.

Bucclough Bank is 8 miles eastward of the eastern side of Waigiou Island. It is 5 miles in diameter, the shallowest part, of 2 and 3 fathoms, lying on its western side, N.E. by E. 10 miles from Point Pigot, and the same distance S.E. from Cape Lamarche, the N.E. point of Waigiou.

In Dampier's Strait the tide seems very irregular, and very strong at times; between Pulo Popa and Batanta, in the S.E. monsoon, there is often a current setting to the northward, but at times there is no current. In the N.W. monsoon, from September to April, the prevailing current is southerly; although, at times, it may be liable to deviations.

Between Point Pigot and New Guinea the tide appears to run sometimes 12 hours in and out; but the tide setting to the eastward is generally the strongest in this part in both monsoons.

In the narrow part of Dampier's Strait, between Foul Island and Augusta and Pigeon Islands, the tide to the S.W. appears to be the strongest, in the southerly monsoon, and continues to run longer than the tide out of the strait.

In July and August, at anchor, about 4 miles eastward of Pigeon Island, the tide to the eastward has been observed seldom to run longer than 5 hours; often weak, with a long interval of slack water; but, at other times, its velocity, for a short time, when strongest, has been from $4\frac{1}{2}$ to 5 miles an hour.

At the same times and places it has been observed that the tide to the westward frequently runs 10 and 11 hours, gradually augmenting in strength in the first part, setting about W.S.W.,—from thence S.W. by S., when strongest about 5 miles an hour, or a little more on high spring tides, and about 4 miles on the neaps. After running strong S.W. by S. to S.W. for a few hours, it abates gradually, until it changes and runs to the eastward.

PITT'S PASSAGE, the great channel North of Boeru and Ceram is sometimes called by the Dutch the *Ceramese Sea* (*Ceramsche Zee*). It is quite free from danger, as far as is known, and the charts will show all its hydrographical features.

OBI MAJOR or Ombirah, "great gain Island," lies on the North side of Pitt's Passage. It is about 30 miles long East and West, and 15 miles wide. It is lofty, the highest part being about 5,000 ft. high. Over the N.W. point of Obi Major is a remarkable bluff, with a knob-like summit, higher than the surrounding forest, which is probably a clump of trees; the knob is in lat. $1^{\circ} 24' S.$, long. $127^{\circ} 24' E.$ Five miles southward of this bluff is a projecting point which looks like an island. It is surrounded by several smaller islands, of which *Gomona*, on the South side, is most conspicuous from this passage. It is 850 ft. high, round-backed, and its centre is in lat. $1^{\circ} 50' S.$, long. $127^{\circ} 38' E.$, bearing from the East point of Lisa Matula of the Xulla Islands, East 55 miles.

Sophia Reef lies midway between the North point of Gomona and Rocky Point, the West point of Obie Major, which should not be approached within 2 miles.

Obie Latta is 6 miles in diameter, and attains an elevation of about 2,400 feet; upon it are three or four sharp, well-defined peaks, of nearly equal height, the highest point being in lat. $1^{\circ} 25' S.$, long. $127^{\circ} 18' E.$ Its centre is 8 miles N.N.W. of Rocky Point.

Typha Island, off the N.W. point of Obie Major, is 10 miles long E.S.E. and W.N.W., is about 1,000 ft. high, and rises in a single round-backed hill, its summit being in lat. $1^{\circ} 12' S.$, long. $127^{\circ} 23' E.$

Numerous tide rips were passed through westward of the Obie Islands by H.M.S. *Challenger*.

The **Bahia Reef** lies 25 miles N.W. by W. from Obie Latta, and 30 miles S.W. from Mandolie. It is a *dangerous* coral reef, announced in December, 1858, as having been discovered by the ship *Bahia*, striking and dragging heavily on it, lat. $1^{\circ} 10' S.$, long. $126^{\circ} 50' E.$

Lukisong or **Loyang**, "Landscape Island," lies off the East end of Obi Major. It is sometimes called in the old charts *Great Pulo Gasses*. Its South end is in lat. $1^{\circ} 43' S.$, long. $128^{\circ} 2'.$ It is 9 miles long N.N.E. and S.S.W., and of moderate height, well wooded, stretching with a remarkably even slope that forms its northern extremity. The channel inside it is very narrow, and subject to calms, owing to the adjacent high land, and is therefore not recommended for ships. A small island, *Long Island*, lies off the North end of Lukisong or Lookisong.

Pulo Gasses is 7 or 8 miles eastward of Lukisong, and nearly of the same height, a flat table-land for about three-fourths of its extent, sloping down to each end with a spit of rocks, stretching about a cable's length from the S.E. end, which is in lat. $1^{\circ} 38' S.$, long. $128^{\circ} 14' E.$ The island has a sandy beach, but no soundings at 1 or 2 miles off. The channels on either side are safe; that to the westward may be used with a westerly wind, but that to the eastward is wider, and seems better with a working wind.

The *Courier Rock*, a five-foot shoal, seen in 1845, bears N.W. $\frac{1}{2}$ N., about 26 miles from Gasses, and 8 miles North of the N.E. point of Obi Major.

Talbot Shoal was reported in 1873, by the master of the vessel of that name, in lat. $1^{\circ} 51' 30''$ S., long. $128^{\circ} 8'$ E., with the East side of Gasses bearing N.N.E., and High Peak on Gomona W.N.W.; where the latest charts mark no bottom at 70 fathoms. The sea was nearly smooth, and ship sailing from 5 to 6 knots per hour, steering S.S.W. She grated over for about three times her own length. The extent of the shoal S.S.W. and N.N.E. would be about 500 ft. Before we had time to pass the lead we were in deep water. This shoal lies directly in the fairway between Manipa Straits and the entrance to Gillolo Passage. The bottom must be of dark-coloured rocks, as there was not the slightest discolouration of water, or any appearance whatever to indicate danger. Time of accident, 3.30 p.m. Tide, half-ebb.

Kekik, a high island, bears N.E. by E. $\frac{3}{4}$ E. 20 miles from Gasses, in lat. $1^{\circ} 30'$ S., long. $128^{\circ} 35'$ E. *Laun*, about 6 miles eastward of Kekik, is also a high island, with an islet off each side of it, and another in the form of a button, between it and Kekik.

Pisang, the highest of these islets, forms two hills resembling each other, and may be seen 30 or 35 miles off; in lat. $1^{\circ} 23'$ S., long. $128^{\circ} 49'$ E. The *Nabob Shoal*, of $3\frac{1}{2}$ fathoms, lies 16 miles North of Pisang.

The **Boe or Bu Islands** lie 24 miles E.N.E. of Pisang. They form a group of ten or twelve small, low islands, 15 or 16 miles West from the West end of *Popa* (page 859), the channel between being safe. These islands are inhabited, and produce cocoa-nuts. A few goats and some dried fish *perhaps* may be procured.

Captain Jacob B. Brown, of the American barque *Agate*, writes to the "Shipping and Mercantile Gazette" as follows:—"On a voyage from New York for Shanghai, January 25, 1877, the barque *Agate* struck upon reefs off Boe Islands, which, in the latest charts, are laid down as deep water. These islands are laid down in $1^{\circ} 10'$ S., and $129^{\circ} 20'$ E. There are various reefs making off from Boe Islands, extending, by good observation, to $1^{\circ} 14\frac{1}{2}'$ S.; depth of water, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, and 3 fathoms. Most of the islands appear to be connected by coral reefs. This group of islands lies in the direction of E.S.E. and W.N.W. A rock appears from the mast-head between the Boe Islands and *Popa*, about 4 miles from the former. I should recommend extreme caution in navigating about these islands. There is a safe anchorage between the two westward of the reefs in 12 fathoms of water."

The *McCleure Bank*, a dangerous coral shoal, 19 ft., has been said to lie in the channel to the westward, 2 miles in extent, and bearing W. by S. 20 miles from the Boe Islands, and E.N.E. from Pisang.

The **GILOLO PASSAGE** or Strait, between Halmaheira on the West, and the islands of Mysole, Waigiou, &c., on the East, may be said to commence

to the northward of the islands just described, and is preferred by some to the narrower Dampier Strait, to the eastward, for passing into the Pacific Ocean from Pitt's Passage. Having avoided the neighbourhood of Talbot Shoal above described, enter it between Gasses and Kekik, haul close around the South end of the former, to prevent being carried past the channel by the current, which frequently sets to the eastward. After rounding Gasses, the loftier parts of the Dammer Islands, off the South end of Halmaheira, will rise in sight from the deck. They first appear in form of a saddle, the southernmost being in lat. $1^{\circ} 11' S.$, bearing N.N.E. 26 or 27 miles from the North end of Lukisong. They will be described presently, the islands and shoals which lie in the passage will follow.

Black Rocks or *Fairway Ledge*, bears about E.N.E., 6 miles from the southernmost of the Dammer Islands. They are a low ridge of rocks, about 2 miles in extent E.N.E. and W.S.W., a part of which, near the East end, is about the size of a small ship's hull above water. The breakers continue toward Dammer beyond the rocks. They, therefore, should be carefully avoided in the night, by giving a wide berth to them, for there are no soundings to guide.

Anchorage.—Captain Collins, of the American vessel *Brewster*, reports as follows:—

At the southern entrance of Gillolo Passage, 5 miles South of the 'Black Rocks,' I was becalmed, and experienced a three-knot current, setting about S.S.E., which drifted the ship towards Toppershead or Button Island. When within 4 miles of it, saw bottom plainly; let go my kedge anchor in 14 fathoms—Toppershead Island bearing S. by E., distant $3\frac{1}{2}$ to 4 miles.

This bank extends East and West, how far I was not able to ascertain, but another vessel anchored about 3 miles East of me, on the same bank, therefore I think it extends as far as from Lawn Island to Kekik Island. Found 50 fathoms between the bank and the islands, and 15 fathoms within a cable's length of Toppershead Island.

There were nine other vessels in company, and had they known of this anchorage they could all have availed themselves of its convenience, and thus escaped the anxiety and trouble incidental to being drifted about at the mercy of the tides and currents. In my own case, I think I should have lost the ship on Toppershead Island, had it not been for the anchorage on the bank.

I am sorry that I cannot give you a more accurate description of it. I lay at anchor 24 hours (2nd of December, 1868), after which the current changed, setting strong to the N.W., enabling me to proceed on my passage. The vessel anchored with me had 12 fathoms; it may possibly be much shoaler in some parts.

The Wida or Weedah Islands form two compact groups of low wooded islands, the southernmost bearing N. $\frac{1}{2}$ W. from Kekik, and N.N.E. from

the South point of Halmaheira, 10 or 12 miles, in lat. $0^{\circ} 40' S$. The northern group is 8 or 9 miles W.N.W. of the other. They lie on the western side of the passage, and seem to be safe to approach, though very steep-to.

Veldman Roek is 6 miles northward of the eastern group, in lat. $0^{\circ} 27' S$., long. $128^{\circ} 24' E$.

To the northward of Popa there is a line of islands, of which we have no account. On the Dutch charts they are named *Vlaming*, the south-westernmost *Schooteroog*, *Klaarbeck*, and *Kommerust* the north-easternmost, which lies 12 miles W.S.W. of the western island of the Tameay group.

GEBI or Gebeh, a large island, on the N.E. part of Gilolo Strait, is long and narrow, about 21 miles long E.S.E. and W.N.W. It is hilly, but not exceeding 500 ft. high; the formation is probably sandstone, not volcanic. The aborigines are Papuans, but there are settlers from the Moluccas, who own the sovereignty of the Sultan of Tidore. Their chief employment is fishing for trepang and pearl oysters. The north-western part is rather low, but the other end is high, and terminates in a bluff point. The N.W. point is very nearly, or quite, *on the Equator*, Capt. Duperrey placing it in lat. $0^{\circ} 2' N$., long. $129^{\circ} 19'$, while Lieut. McCleure gives it as $0^{\circ} 0'$. It bears from Moar off Cape Tabo, on Halmaheira, E. by S. $\frac{1}{2}$ S. 21 miles, and this forms the narrowest part of the Gilolo Passage.

Fow Island lies off its S.W. side. It has a peaked hill on its South point, and is separated from the southern shore of Gebi by a narrow channel, about a quarter of a mile wide, which forms a *safe harbour*, much frequented by the whalers, with depths of from 10 to 15 fathoms. There is a passage into it on either side of Fow Island, by passing close to the latter, for a shoal lies in mid-channel in the West entrance, with good depths around. In the South entrance there are two small shoals close to each other, the best channel being between them and the East side of Fow. In the bay to the eastward of these shoals there is anchorage in 15 to 20 fathoms, near the Gebi shore, the chief village, *Ketchepee*, being about 2 miles distant, on the East side of the island.

At 1 mile off the Gebi shore to the S.E. in the bottom of the bay, distant $1\frac{3}{4}$ to 2 miles, is a fresh-water stream or creek with excellent water, into which our boats went at half-flood and filled the casks from alongside, but at low water as there is a bar, your boats must anchor outside, land the casks and roll them a short distance up the hill, in which case you have to raft them off, which may be done with ease and expedition, as the water is perfectly smooth, and must be so during the whole of the N.W. monsoon. A ship tolerably well manned would have no difficulty in filling twenty or thirty tons in the course of the day. From the mouth of the creek the South point of Fow Island bears by compass W. $\frac{1}{2}$ N., and may also be known by a bluff cliff or headland, the only one in the bay, rising in a gentle slope of table-land from the top of the cliff towards the hills to the S.E.

Spars fit for yards and masts abound on either shore; vegetables, fruits, and fish are also procurable in abundance from the natives, who are very friendly and kind, many of them speaking English, Fow Harbour being much frequented by whalers.

On the N.E. side of Fow a narrow channel fronting Gebi Harbour stretches into the island close to the peaked hill, and forms an excellent port or basin, with 4 or 5 fathoms in the narrow entrance, and from 10 to 16 fathoms within. The fresh water rivulet is on the Gebi shore opposite the North point of Fow. Tide rises 5 ft. at springs.

The N.E. side of Gebi is steep-to without anchorage, and the islands *Yoe* and *Utū* or *Oetoe*, about 3 miles northward of the East point, are small and low.

Gagy is of considerable extent, being about 22 miles S.E. by E. from the S.E. end of Gebi, North end, lat. $0^{\circ} 20' S.$, long. $129^{\circ} 55' E.$ It is moderately elevated, formed of uneven hummocks, having some small islets S.W. of it, called *Doif* (or Dove), and a large group called the *Bangapally Islands*, to the eastward, off the S.W. end of Waigiou. Between these and *Gagy* there is a passage, and the channel between *Gagy* and Gebi is very safe, having an islet near the South end of the latter. This channel is sometimes taken by ships going outward, and may probably be advantageous to those coming towards Pitt's Passage during the S.E. monsoon.

Syang, in lat. $0^{\circ} 20' N.$, long. $129^{\circ} 52' E.$, is 40 miles N.E. by E. $\frac{1}{2}$ E. from the N.W. end of Gebi. It is a low, flat island, about 3 miles in extent, with fresh water at a rocky point near its N.W. end, from whence a reef projects three-quarters of a mile. *Eye Island*, off the North end of *Syang*, is small and low, and covered with trees. There is said to be a bank, having 10 or 11 fathoms over it about 5 or 6 miles East of *Syang*.

Wyang or *Vayag*, 9 miles S.E. from *Syang*, is the northernmost of a range extending off the N.W. end of Waigiou. *Yen* is the easternmost. *Ruib*, the largest and highest, lat. $0^{\circ} 2' S.$, is the southernmost, and is surrounded by rocks which contract the passage between it and Waigiou. This has been called the *Bougainville* or *French Passage*, as it was explored by the French expedition under Bougainville.

The channels among these islands are probably safe in many parts, but require care, as the French corvette *Uranie* found a coral bank of 6 fathoms, 5 miles N.W. by N. from the North end of *Ruib*.

Ormsbee Shoal, least water 15 fathoms, bearing N. $\frac{1}{2}$ W. from *Wyang*, in lat. $0^{\circ} 42' N.$, long. $130^{\circ} 0' E.$, that island and *Syang* being visible from the masthead. Nearer to Halmahera there are several shoals, which will be described with that island.

Captain J. W. Roy, of the *Chusan*, writes as follows to Lloyd's agent at Iloilo:—"As some doubt appears to exist as to the extent of the Ormsbee Shoal, North of the entrance of Gillolo Passage, I beg to hand to you a few

remarks made while passing the South end of the above shoal on my passage from London to Shanghai.

“On the 30th of December, 1872, at 8.30 a.m., centre of Syang Island bore due South; steered due East $7\frac{1}{2}$ miles by patent log; the centre of the island then bore S.S.W. These angles place the ship at the last bearing N.N.E. 17 miles from Syang Island. At the same time saw rocks under the ship's bottom; sounded immediately; had 7 and 9 fathoms; then no ground.

“This appears to be the southern extremity of the shoal, lat. $0^{\circ} 38' N.$, long. $129^{\circ} 58' E.$; the bank to the North of the ship at that time appeared to have much less water, and very smooth. I am sorry that I cannot give you a more accurate description, as I had to take advantage of the light breeze then blowing.”

DIRECTIONS.—Having entered the Gilolo Passage by the strait on either side of Gasses, as mentioned previously, if passing to the eastward of that island, steer about N.N.E. $\frac{1}{2}$ E., or if by the western entrance, about N. by E., so as to pass between Point Tabo of Halmaheira and Gebi. In the night, be careful to give a berth to the Tramway Ledge and to the Wida Islands; but it is advisable to keep on the western side of the passage when the winds are light, as the current sometimes sets to the N.E. or eastward. If the wind be at N.N.W., so as to occasion delay in working to the westward of Gebi, pass to leeward between it and Gagy, and then out into the Pacific through any of the channels near Syang. But the western channel, and between the Catharina Isles and Syang should be followed if possible, so as to weather the Aiu and Asia Islands.

HALMAHEIRA or **GILOLO** is one of the most singularly formed islands in the world, being a representation of Celebes on a small scale—a junction of four peninsulas jutting to the eastward and also to the North and South; but it is not more than one-tenth of the area of the larger island, and about half the size of Timor.

The name has been very variously designated. The Dutch, who claim the sovereignty, now term it *Halmaheira*, otherwise *Almahera*, as above, which probably means “mainland,” in distinction from the range of the true Moluccas on the western side. The name by which it has been generally placed in geographical works is *Gilolo* or *Jillolo*, by the Dutch *Djailolo*, which was applied by the early Portuguese to the whole island, from the name of a kingdom, and now of a town on the S.W. side of the northern peninsula, near to Ternate.

Its surface is broken, mountainous, and volcanic, the highest point being 6,500 ft. high. From its physical character, and the depth of the surrounding ocean, the fertilizing powers of the climate run away into deep water, and thus the island from this cause and the absence of irrigation is not productive. It is covered with a tall forest, among which it is singular that the

clove tree is not found, though its native place is in the islands adjacent to it on the West. The absence of this and of other articles of commercial production, have left the natives (a rude and inoffensive people) in a comparatively uncivilized state. The original natives are a brown complexioned race, speaking peculiar languages, but the coast is usually occupied by Malays, who, like the rest of their race, are much addicted to a seafaring life.

The island is subject to the Dutch nation, and is divided between the governments of the Sultan of Ternate, who has the northern and half the southern peninsula, and that of the Sultan of the next island, Tidore, who holds the central portion of the island. Its three bays on the eastern side are open, and have no good harbours, but this is of less importance in a sea never troubled by storms. Our hydrographical knowledge of this and its adjacent islands is most imperfect, and what will be said here is little more than an enumeration of the points.

Dammer Island, before mentioned, lies off the South point, and to the southward of it there are numerous islets and rocks, extending to a considerable distance to the South and S.W.

Tanjong Libobo or *Cocoa-nut Point*, lat. $0^{\circ} 51' S.$, long. $128^{\circ} 23' E.$, is the southern point of Halmaheira. There is a knob on it, but the land near it is rather low and uneven. *Pulo Babi* (or *Ordal*), which lies off this point, is small, and lies in the entrance of the strait between Dammer and Halmaheira, which is too narrow for ships. The Wida Isles, which lie to the N.N.E. of Libobo Point, have been before mentioned.

Wida or Weedah Bay, as the south-easternmost bay of Halmaheira is called, takes its name from a village lying on its western side near the head. It is 63 miles wide in the entrance, and about the same depth. We have no useful particulars concerning it.

Cape Tabo, in lat. $0^{\circ} 10' N.$, long. $128^{\circ} 51' E.$, is the north-easternmost point of this bay. It has a gradual slope, ending in a bluff to seaward, and, when bearing N.W. by N., some white cliffs are seen near it. The land about it is lofty, and over the point there rises a quoin-shaped hill, the highest point to the westward. *Pulo Moar*, off the extremity of Cape Tabo, is low, flat, and woody, and connected with the cape by rocks and breakers. Close to the East point of those there is a small islet, in lat. $0^{\circ} 9' N.$, long. $128^{\circ} 56' E.$ There are several villages near this part of Halmaheira.

The Shanpee Islands, a group three or four in number, lie 15 miles North from Cape Tabo. They extend 3 or 4 leagues North and South, and are mostly level, of considerable size, with a small elevation between the central part and northernmost island. The *Recovery Rock*, a round islet or rock, about half a mile in circuit, with a few shrubs on it, lies about 10 miles S.W. by W. from the next group, the *Catherine Islands*. These are three small low islands near each other, forming the western side of the North

entrance to the Gilolo Passage. They are about $1\frac{1}{2}$ mile long, lying W. by N. and E. by S., low, and steep-to on the southern side, which appears to be steep as a wall, except near the East end, where there is a small sandy cove. The *Canton Packet Shoal* consists apparently of white sand and black rocks, very near the surface, about mid-channel between the Shanpee and Catherine Islands, lat. $0^{\circ} 40' N.$, long. $129^{\circ} 4' E.$ The *Ardassier Rock* is N.W. of the Catherine Islands, in lat. $0^{\circ} 45' N.$, long. $129^{\circ} E.$ The *Aurora Bank* is the easternmost of these, and is of small extent. Although 8 fathoms was the least depth found on it on its discovery, yet a whaler has stated that there is only 5 ft. in some parts, which must very much diminish the safety of the Gilolo Passage in rough weather.

Bitjoli or Bitzoli Bay is the eastern or central inlet of Halmaheira, separating its N.E. from the S.E. peninsulas. It has numerous islets and rocks scattered over it. It takes its name from a village on its South shore, where there is a Dutch sub-resident. *Chiawo Bay* is the north-easternmost of the inlets, which give Halmaheira its bizarre configuration. We have no account of it. On the north-eastern side of the northern peninsula is *Gunong Karakan*, the highest point of the island.

Tanjong Batu Bessao is in lat. $2^{\circ} 14' N.$, long. $127^{\circ} 33' E.$ This part of Halmaheira is high, bold land, with three high, remarkable peaks. There are several islands, called collectively the *Talenading Islands*, to the N.W. of the point, the northern of which, *Dili*, is in $2^{\circ} 17' N.$, $127^{\circ} 33' E.$ They are of moderate height.

MORTI, or **Morotai**, or **Morty**, is the northernmost of the Molucca group. It is about 58 miles long North and South, and 10 to 12 miles broad. The North cape is in lat. $2^{\circ} 44' N.$, long. $128^{\circ} 21' E.$ It slopes down from the high table land into a point which forms this cape. The northern end is skirted by a reef which extends 1 or 2 miles off, having no soundings close-to, with some small islands adjoining.

Riao or *Riow Island* lies off the western side of Morti, separated by a small strait. In the bay between the N.E. part of Riao and Morti there is said to be anchorage, with fresh water, abundance of wild hogs, deer, pigeons, &c., on the islands contiguous.

The Western Coast of Halmaheira trends to S.S.W. for about 63 miles, to the point which forms the north-western extremity of the bay, in which lies the village of *Gilolo* or *Djailolo*, which, as has been before mentioned, gave its name to the island. After the terrible earthquake of 1840, which devastated the adjacent and chief island Ternate, this place was proposed as a fitting one to remove the seat of government to, but nothing was carried into effect.

The point of Gilolo nearest to Hieri Island lies from Hieri Peak N.E. $\frac{3}{4}$ N. 8 miles. Over this point is a hill, 1,050 ft. high; 3 miles north-eastward of

the hill there is a remarkable sharp peak of 3,450 ft.; and about 8 miles still farther northward a flat-topped hill with four peaks on it will be seen.

Dodingo Bay, to the eastward of Ternate and Tidore, has the village of *Sedangoli* on its North side, and that of Dodingo at its head—places of some importance among others which are quite insignificant. From this bay the western coast of Halmaheira trends to S.S.E. for about 110 miles to the South point, before alluded to. There is nothing particularized concerning it.

The **MOLUCCA ISLANDS** properly consist of the five islands next enumerated, which lie against the West coast of Halmaheira. The name is unknown among the native languages, though applied by the early Portuguese discoverers. The term has had a much more widely-spread significance by including the islands East and N.E. of Celebes, but originally it was restricted, as above said, to the five islands in question. They were formerly considered the principal of the Spice Islands, but had ceased to be so from the destruction of the trees by the Dutch. They are, however, regaining their reputation for spice-bearing and nutmegs; cinnamon is also grown to a great extent; pepper is largely cultivated, as also are coffee and cocoa; the sago-bearing palm flourishes in every part of the island. They also now produce what the others do not, and which is more thought of by the passing seamen, viz., a tolerably good supply of provisions, in sheep, fowls, vegetables, and a greater variety of fruit; pine-apples, oranges, lemons, bananas, &c., being plentiful in their seasons.

TERNATE ISLAND lies between the parallels of $0^{\circ} 45' N.$ and $0^{\circ} 52' N.$, and the meridians of $127^{\circ} 16\frac{1}{2}' E.$ and $127^{\circ} 22' E.$ The peak is 5,600 ft. high, and in lat. $0^{\circ} 48\frac{1}{2}' N.$, long. $127^{\circ} 19' E.$ Its shores appeared steep-to, and with no dangers beyond a few reefs extending off from one quarter to half a mile.

In the Ternate Channel the flood stream, coming from the north-eastward, formed numerous tide-rips and eddies, which gave the appearance of broken water over a sunken reef.

Ternate is the northernmost and principal of the group, the head quarters of the Dutch government of its region, and the seat of the Sultan, who claims sovereignty over a large part of Halmaheira. It is of very small extent, being, in fact, the mere pedestal on which stands the lofty volcano of the same name. This volcano produced no fewer than fourteen eruptions, between 1608 and 1840, and at times has nearly caused the total abandonment of the island. The peak was ascended without much difficulty by a party from H.M.S. *Challenger*. The clove, for which this island was celebrated, and which was apparently its native seat, has long been almost extirpated from its soil.

Ternate is a free port, and is visited regularly by the Netherlands India Steam Navigation Company's boats, the town being on the East side of the

island. *Fort Oranje*, which protects it, is in lat. $0^{\circ} 47' N.$, long. $127^{\circ} 21' E.$ The anchorage is abreast the town. The *Scaleby Castle* anchored in November in 22 fathoms, coarse sand and gravel, with the flagstaff of the fort bearing N.W. by N. Water was only procurable in small quantities at this time. It was during this night that one of the most violent of the explosions before alluded to occurred at the volcano. The town is built along the shore, half hidden among fruit trees and cocoa-palms. As usual, there are the Dutch, Chinese, and Malay quarters. Behind the town lies a considerable extent of level ground, before the wooded slope of the mountain commences, and a great portion of this is occupied by plantations growing every spice, fruit, and palm, under the tropical sun; cloves, pepper, cinnamon, nutmeg, coffee, cocoa, pine-apples, durians, oranges, limes, citrons, bananas, bread-fruit, and endless others, with palms of every kind, are here planted on a green sward, level as a billiard-table."—*Lord George Campbell*

The *Challenger* was here in October, 1874, and made purchases of a fine collection of parrots and other natural history objects. The crew received much hospitality at the hands of the inhabitants. As on the other islands visited in this region, the beautiful tropical vegetation was highly appreciated by those who went into the interior of the island.

The anchorage chosen by H.M.S. *Challenger* in Ternate Road was in 13 fathoms, with the extreme of the North pier extending from the Resident's house, N. $\frac{1}{2}$ W.; the extreme of the middle pier, N.N.W. $\frac{1}{4}$ W.; the extreme of the South or coaling pier, N.W. by W. $\frac{1}{2}$ W.; and Maytara Island S.S.W. Vessels making more than a temporary stay should moor, as the holding-ground is bad, and the tide streams strong.

Three piers extend from the island to the edge of the reef, which is composed of sand and coral. The northern pier is used as a landing place, the middle pier is for the shipment of merchandise, and the southern is the coaling pier. These piers are lightly built, and would be easily destroyed by a ship pressing against them.

Two large *coal* sheds stand upon the shore abreast the coal wharf; they are capable of holding 1,000 or 1,500 tons, but at the time of the *Challenger's* visit a small quantity only was in stock.

There is a depth of 5 fathoms at the outer end of the pier; and small anchors are buried on the land to which hawsers may be secured, but, from the frailty of the pier, anchors off the bow and quarter are necessary.

Supplies are plentiful and moderate in price (October, 1874). Beef, 1s. per lb.; fowls, 8s. per dozen; ducks, 2s. 9d. to 3s. each; geese, 6s. to 7s. each; sweet potatoes, 5s. per picul of 133 lbs.; potatoes (imported), 25s. per picul. Fruit in its season is abundant; the durien, mangostein, mangoe, pine-apple, orange, lemon, banana, jack-fruit, and pomegranate grow luxuriantly. The coffee and cocoa beans are cultivated, also the arica and sago palms, the latter supplying the principal food of the inhabitants.

Birds of paradise skins can be procured in considerable numbers at the rate of 6s. or 7s. each. As a spice island, Ternate is growing in importance, and produces nutmegs, pepper, cinnamon, and cloves.

The Dutch dollar and rupee are the coins in general circulation. An English shilling is only accepted as half a rupee. Gold in small quantities can be changed at its full value.

Magnetic sand.—The whole of the sand upon the island proved to be of such a highly magnetic character that no compass observations could be made.

Tides.—It is high water, full and change, at Ternate, deduced from one day's observations, at 5^h 10^m; springs rise about 4 ft.

The flood stream comes from the northward, and the ebb stream from the southward, and they run for two hours after high and low water by the shore.

Winds, &c.—From a register, kept by the surgeon of the Dutch settlement at Ternate, extending over a period of 8 years, from 1860 to 1867 inclusive, it was deduced that the N.E. monsoon blows through January, February, and March, the wind varying from N.E. to N.W. After a month of variable winds, the S.W. monsoon commences in May and ends in October, its direction being from S.E. to S.W. During November and December the winds are again variable.

Rain fell on 216 days of each year, or 18 days per month; the average fall during the N.E. monsoon being rather less than during the S.W. monsoon.

The mean temperature for each of the above 8 years was 80.7°.

On comparing the records of the weather at Ternate with those at Amboina and stations eastward, it would appear that during the periods of their greatest strength, the N.E. monsoon passing through the Molucca Passage turns eastward and becomes the N.W. monsoon in the Banda and Arafura Seas; and that the S.E. monsoon blowing through the Arafura and Banda Seas, bends into the Molucca Passage, and joins the S.W. monsoon in the Pacific.

These changes in the direction of the winds in this locality will be seen to be a corroboration of those shown on the Admiralty Wind Charts.

Hieri Island, lying to the northward of Ternate, is circular in shape, and about $1\frac{3}{4}$ mile in diameter; the peak, which is in lat. 0° 54' N., long. 127° 18' E., is 2,200 ft. high. Off the North point of Hieri Island is a rock, and north-westward of the island is a small islet, both close to the shore.

TIDORE or **Tidor** is the next southward of Ternate, and is separated from it by a safe channel. It is larger than Ternate, and, like that island, is entirely of volcanic formation. The mountain, of which it is chiefly composed, is 6,000 feet high, and its extinct crater is in lat. 0° 39' N., long. 127° 22' 30" E.

The capital of the island, *Soa Sia*, is on the East side. The Sultan is tributary to the Dutch, but at one period held great sway over a large portion of central Halmaheira, which is still subject to his influence. The people of Tidore, about 6,000 in number, are Mohamedans, having been so from early ages. The town is walled, and contains, besides the Sultan's walled residence, a large mosque, &c. The anchorage is off the town in 30 fathoms, sandy bottom, but in several places the ground is foul, with deep water close to the shore.

Mareh or *Potbakker Island*, 1,160 ft. high, is the next in succession to Tidore, the passage between them being safe and the island bold-to. Two small sandbanks, dry at low water, lie almost 5 miles East from the middle of this passage. These banks may be readily seen by their white colour during the sunshine or daylight, and they are the only known danger in the passage. They may easily be avoided by keeping on the Halmaheira side in coming up.

Motir, or **Mortier**, or *Moone*, is the next southward, and is about 4 miles in diameter, the passage northward of it being about 3 miles wide. It is 2,800 feet high, the highest point being in lat. $0^{\circ} 28' N.$, long. $127^{\circ} 23' E.$

Makkian is a larger island than the last, and is also bold-to. Its peak is in lat. $0^{\circ} 19' S.$, long. $127^{\circ} 23' E.$ On its South shore is the village of *Mofagila*, where there is a Dutch resident. The *Scaleby Castle* anchored here with the fort bearing S.W. off shore a quarter of a mile in 35 fathoms, sand and shells. *Miskien* is the next island southward, and *Kayo* or *Kiow* succeeds it southward. They are together about 11 miles from North to South. To the westward of them is a cluster of islets, called the *Guaricha* or *Latta Islands*. By daylight they are not dangerous, as most of them are visible.

At Makian, in 1846, a tremendous volcanic eruption took place, splitting the peak in two, destroying villages and their inhabitants by thousands. The island again repopled, once more in 1862 the volcano burst out, killed some 6,000 people, leaving scarce one to tell the tale; and the ashes discharged so covered Ternate, 40 miles distant, that nearly all vegetation there was destroyed.—*Lord George Campbell.*

At 6 miles S.W. from the S.W. end of Makkian is a 5-fathom bank, and 11 miles in the same direction from it is Laigoma, the easternmost of a cluster of islets and rocks which extend for 20 miles to the West and W. by S. The western part of the group should on no account be approached, as several *sunken rocks* lie around it.

The **Wolf Rock** lies about 28 miles W. $\frac{1}{2}$ S. from the South end of Makkian, lat. $0^{\circ} 20' N.$, long. $127^{\circ} 9' E.$ It is nearly level with the surface, the sea breaking over it, when it is visible in the hollow of the swell. It is thus a *very dangerous* neighbour. From it the Peak of Ternate bears N.E. $\frac{3}{4}$ N. 43 miles. One of the Guaricha isles bears S.E. by E. 12 miles, and a

small island off the North part of this group bears E. by S. about the same distance.

BATCHIAN or **Batjan**, one of the five original Molucca or Clove Islands, is by much the largest of them, and is the southernmost. Like the others, it is of volcanic formation. It is said that fossil coal of good quality has been found on it. The island is of irregular figure, about 52 miles long from N.W. to S.E., and has numerous islands off its West end. The Sultan of Batjan is the third prince in rank subject to the Netherlands in these seas, but he has very little power over his subjects, and piracy under his flag used to be common under the protection and seclusion of the bays and harbours formed by the islands around it. The population of Batjan is about 3,000. The chief town, *Batjan*, is at the head of a bay on the S.W. side, and here the Dutch have a post, called *Fort Barneveld*. *Mount Laburs*, upon Batchian Island, is a remarkable flat-topped mountain, 7,150 ft. high, in lat. $0^{\circ} 44' S.$, long. $127^{\circ} 32' E.$

“On the 14th of October, 1874, we passed the islands of Batchian and Tawali, which are great volcanic masses heaped up into ridges, about 1,000 feet in height, and separated by a long, narrow strait, abounding in the grandest scenery. Here on Batchian the clove tree grows wild. North of this island is Makian, an old volcano; in fact, we were just now surrounded with extinct craters.”—*W. J. J. Spry, R.N., Cruize of H.M.S. Challenger.*

The **Strait of Batchian** is formed by the islands of *Bottan Lumang* and *Mandolie* or *Marigorang*, the latter of which is flat-topped and about 1,000 ft. high. The southern part of it is broad, and there is good anchorage in most places, with sheltered anchorage on the adjacent shores, but the tide runs very strongly through the narrows in the North part of the strait. The strait may be said to continue past the N.W. part of Batchian, between that coast and the island of *Great Tawali* or *Kasiruta*. This channel could only be used with the greatest caution. Great Tawali has several islets off its S.E. end, of which the Sow Islets, low and not remarkable, are the southernmost. A sunken rock lies just South of the southern Sow. Great Tawali is 20 miles long N.N.E. and S.S.W., and 10 miles broad at its middle. It is high, and also flat-topped, with a peak rising above the surrounding hills to a height of 2,650 ft.; the peak is in lat. $0^{\circ} 20' S.$, long. $127^{\circ} 5' E.$

Tappi and *Latta Latta Islands* are separated by a strait 5 miles wide and 10 miles long from the N.W. side of Great Tawali Island. Tappi Island is generally high; the highest peak, of 1,300 ft., is in lat. $0^{\circ} 15' S.$, long. $127^{\circ} 4' E.$ Off the South and West extremes of Tappi are two small islets, about 200 ft. high; and 3 miles northward of its North point are three small rocks close together, 130 ft. high, and in lat. $0^{\circ} 11' S.$, long. $127^{\circ} 1' E.$ From a position 10 miles West of the Peak of Tappi, the islands of Ternate, Tidore, and Mortier were seen, and also one of the islands, probably Guari-cha, northward of Little Tawali.

Strong streams of flood and ebb were experienced by H.M.S. *Challenger* westward of the Batchian Islands, the flood coming from the northward and the ebb from the southward.

The tide sets through among these islands to the northward and southward about 6 hours each way, but not always regular, and it rises about 6 ft.

The **STRAIT of PATIENTIE**, between Batchian and the southern peninsula of Halmaheira, is about 50 miles long, and of very various breadths. It is a useful passage for vessels sailing between Ternate and Amboina in the S.E. monsoon, although there is no good anchorage in it, as there is in that of Batchian to the westward.

The northern entrance is between a projecting point of Halmaheira and *Batu Sombo Island*, close to the Batchian shore, an opening 7 miles wide. Between the S.E. point of the island and *Bristly Point* on Batchian, lie two islands near the shore, and to the southward of the point and southernmost of these islands there is a large bay, with good anchorage and plenty of wood and water. Further in the strait is *Lary Island*, long, low, and flat. It is covered with trees, and is close to the Halmaheira shore, on which, opposite to its N.E. point, there is a fresh water river, where plenty of wood and water may be obtained. The passage between the island and the Halmaheira shore is very narrow and shallow, and the tide is sometimes exceedingly rapid. Farther South is *Helang*, or *Amsterdam Island*, in the middle of the Narrows. After passing these islands, going southward, stand over to the eastern side of the strait, and keep along that coast, on account of a shoal said to lie nearly in mid-channel between the East point of Batchian and Halmaheira. The East point above mentioned is in lat. $0^{\circ} 48' S.$, long. $127^{\circ} 53' E.$, and has deep water close-to in some parts, but some islets and projecting spits should have a proper berth.

The **MOLUCCA PASSAGE**, or **Molucca Sea**, the wide space between the islands just described and the eastern side of Celebes, described on page 812, requires but little description. The islands to the South of it, the Xulla Group, are described on page 821, and Obi Major on p. 866. Between the N.E. part of Celebes and the N.W. shore of Halmaheira, the breadth of the narrowest part of the strait is 120 miles.

Mayor or Meyo Island, in the middle of the passage between Ternate and Menado on Celebes, is about $3\frac{1}{2}$ miles long East and West, and rises gradually from the shore to a round-backed summit, 1,280 ft. high, in lat. $1^{\circ} 20\frac{1}{2}' N.$, long. $126^{\circ} 22\frac{1}{2}' E.$ There is said to be anchorage on both the North and South sides, sheltered from the monsoons.

Tifore, or *Tyfore*, 17 miles S.W. of Mayor, is about 2 miles long in an East and West direction, and $1\frac{1}{2}$ mile broad. On its N.W. end is a saddle peak 530 ft. high, the eastern and highest summit being in lat. $1^{\circ} 1' N.$, long. $126^{\circ} 8' E.$ About one cable's length off the N.W. point of the island is a small islet. On the eastern side of the island there is a bay in which,

according to the statement of the Malays at Ternate, whose proas frequently take shelter in it, there is a depth of 20 or 30 fathoms, with a ridge of coral across its entrance, upon which there are from 1 to 3 fathoms. There are no soundings to be got in the strait between Tifore and Meyo, and no danger was observed by H.M.S. *Challenger*. The current sets to the N.E. during the greater part of the year.

The islands to the North of the N.E. extremity of Celebes, and those South of Mindanao, will be described in the succeeding chapter.

DIRECTIONS for the **Eastern Passages**, or those eastward of Borneo, to the description of which the latter pages of this work have been devoted, have been given in pages 67—102. The choice of the most advantageous straits or channels in the different monsoons is there indicated, and as will be understood, this choice must depend very greatly upon the consideration of the sailing powers of the ship, combined with the direction and strength of the winds encountered. To follow the directions given in the remarks referred to will not be difficult in combination with the hydrographical descriptions in this chapter, as the latter follow in regular geographical order, and are thus readily followed in any voyage, whether going northward or southward. The illustrative chart facing page 42 will also aid in facilitating the application of those general directions with the subsequent descriptions.

CHAPTER XIX.

IN the foregoing pages the various islands and channels which form the southern part of the chain of the Eastern Passages, or those between Borneo and New Guinea, have been described. What follows in the present chapter will be descriptions and brief remarks on the islands North of the Moluccas, of which the Sulu Archipelago and the important Philippine Islands, are the principal. The information is derived from a variety of sources, and considerable improvement in our knowledge of the Sulu Archipelago was gained by an examination made by H.M.S. *Nassau*, in 1872. It may, however, be observed, generally, that the hydrographical knowledge of the islands described in this chapter is not as perfect as could be desired. We commence with the southward and proceed northward towards the northern portion of the Philippine Archipelago.

ISLANDS NORTH OF THE MOLUCCAS.

Bejaren is about 26 miles N.E. from the East end of Banka Island, lying against the north-eastern extremity of Celebes, and described on page 812. The channel southward of it is quite safe, and is much used. When seen from an eastern or western direction it is wedge-shaped, with the cliff to the southward; but seen from the southward it rises to a single sharp hill with a thumb-like summit projecting nearly 500 ft. above the main portion of the hill. The peak is 1,240 ft. high, and in lat. $2^{\circ} 6\frac{1}{2}'$ N., long. $125^{\circ} 21\frac{1}{2}'$ E. A fire was seen on the N.W. side of the island by H.M.S. *Challenger*.

Tagulanda is about 10 miles N. by E. from Bejaren, the channel between being clear of danger. The island is about 7 miles long, and has two summits which show from East and West; the eastern summit is round-backed and 2,550 ft. high; the western peak, 2 miles West of the eastern, is more abrupt, and 2,450 ft. in height. To the S.W. of it, in lat. $2^{\circ} 20'$ N., long. $125^{\circ} 21'$ E., and connected by a reef, is the islet *Duang* or *Roang*, which shows from the East and West as two sharp volcanic peaks, but from the southward

as three peaks; the eastern, of 2,450 ft., is the highest. Smoke was seen rising from the middle summit, and the island to within 300 or 400 ft. of the sea is covered with lava and scoriæ, the lower part being wooded. At 5 miles N.W. of Roang is *Passigi*, small, flat, and covered with trees, the tops being about 100 ft. high.

Siao or *Seauw* is larger than *Tagulanda*, and is made very conspicuous by a high conical volcanic peak, lat. $2^{\circ} 44'$ N., long. $125^{\circ} 22'$ E. There is a village, named *Undung*, about the middle of the western side of the island, off which to the W.S.W. is a sunken rock. *Makaléhé*, a small island, round-backed, with palm trees (probably cocoa-nut) growing on its highest ridge, lies 8 miles West of *Siao*. This island was seen 25 miles off by H.M.S. *Challenger*, but *Maquiliere* Island was not visible at the same distance. *Mandang*, with other islets, lie on the eastern side of *Siao*. Some rocks project from the S.W. side of *Mandang*, between which and *Siao* there is an opening a mile wide. The channel between *Siao* and *Tagulanda* is about 12 miles wide, and quite safe.

A group of small islands lies between *Sangir* and *Siao*. They are sometimes called the *Karakitang*, or *Passage Islands*. The westernmost of the northern cluster is *Karakitang*, and is high; the easternmost is *Pala*, and projects into a low point to the eastward. The channel to the southward of them, between this and *Siao*, is considered to be dangerous, as there is a cluster of four rocky islets nearly midway between the two islands; one of these is called the *Quoin*. If this channel is taken, the North end of *Siao* should be passed close-to, to avoid them; but it is better to pass southward of that island. The easternmost of these islands is called the *Rabbit*, which is 18 miles S.E. of the South end of *Sangir*. There are two other small islets or rocks to the East of the *Rabbit*, and others to the westward; several of them are small spiral rocks, and some appear like haycocks.

SANGIR or *Sanguir* is 24 miles long N.W. and S.E., and is of volcanic formation, a link in that great chain which passing through *Java* continues northward through the *Philippine Islands*. It contains many extinct craters, and several active volcanoes. The northern part consists of high mountains. The chief peak is *Mount Abu*, at the N.W. end. The people are somewhat civilized, simple, and inoffensive, speaking a peculiar language. The South point, *Cape Palumbatu*, is in lat. $3^{\circ} 21'$ N., long. $125^{\circ} 39'$ E. The island is surrounded by numerous smaller islets, of which we have no account. The western side is indented by several small bays, with soundings of from 40 to 60 fathoms at from 1 to 2 miles off shore. It is clear of danger, but the bottom is mostly coral. There is an anchorage off a small river or watering place in a bay, in lat. $3^{\circ} 29'$ N., long. $125^{\circ} 28'$ E., with the village bearing E.N.E., the piece of land like an island, but joined to the main island N.E., distant $1\frac{1}{2}$ mile, the point of *Pulo Keama*, off the South end of *Sangir*, S. 36° E. The watering river is there a little to the southward of the land

resembling an island. The tides run to the northward and southward about 2 miles an hour, and rise 6 or 7 ft. The water should be filled before high water, as the ebb soon runs out dry. Poultry and vegetables may be got. There is also said to be a harbour on the East of Sangir, formed by the adjoining small islands, several of which are at a considerable distance.

There are some small islands which lie scattered in the space between Sangir and the South point of Mindanao, but they have safe channels among them. The southernmost is called *Louisa Island*, 13 miles N. by W. from Sangir. The *Louisa Shoal* is N.W. 4 miles distant. There is a good channel outside the isles off the N.E. part of Sangir, but great caution is requisite in the bight. To the northward of the last-mentioned island is a group called the *Carcara-long Islands*, six in number, extending from lat. $4^{\circ} 15' N.$ to $4^{\circ} 46' N.$ They are named respectively the *Haycock*, *Armadores*, *Anda*, the two *Saddle Islands*, and *Ariaga*, the northernmost. *Haycock Rock*, in lat. $4^{\circ} 11' N.$, long. $125^{\circ} 5' E.$, lies N.W. by W., 24 miles from Louisa Island, and W. by S. $\frac{3}{4}$ S., 12 miles from Haycock Island. There is also a dangerous patch of rocks, seen by the *Iphigenia*, two above water a mile apart, and a third under water a mile to the southward of the southernmost, in lat. $4^{\circ} 11' N.$, long. $126^{\circ} 8' E.$

The **TULUR ISLANDS** are the last of the Dutch possessions that have to be noticed. They lie 65 miles north-eastward of the Sangir group, are not much known, but are also called the Talaut or Salibabo Islands, the latter being the name of the principal island. They are inhabited by a partially civilized and simple race, who raise yams, cocoa-nuts, hogs, goats, and poultry.

The southernmost island is *Kaboroan* (Kabroang), and has a peaked summit on its eastern end. At its S.E. point is Kaman Village, in lat. $3^{\circ} 49' N.$, long. $127^{\circ} 2' E.$ *Satibabo* or *Lirong* is to the W.N.W. of Kaboroan. On its N.W. end is a table hill, and the principal village is in a small harbour at the bottom of Salibabo Bay, at its S.E. end. Sailing in for the road by the South channel, between Kaboroan and the S.E. point of Salibabo, a berth must be given to a spit that projects rather more than half a mile from the shore, about halfway between the point and the harbour. The harbour is readily known by the houses and cocoa-nut trees, but is not adapted apparently for large vessels. There is a safe channel between this island and the others to the N.E., but the S.E. end of Karekelang should be approached with caution.

The *Northumberland Reef* lies about 12 miles S.E. from the peak of Kaboroan. It is about 2 miles in extent, and has a patch of sand above water.

Karakelang is the largest and northernmost of the Talout Islands, and is 24 miles long N.E. and S.W. The northern part is lined with a dangerous reef, which projects 3 or 4 miles from the North point.

The *Meangis Islands*, 36 miles N.E. of Karekelang, consist of five islands,

of moderate height, with some smaller ones adjoining. The southernmost, Kakarutan Island, is in lat. $4^{\circ} 39' N.$, long. $127^{\circ} 7' E.$ At 2 miles eastward of it are some small islets, and 5 miles N.N.E. of it a sunken rock, which also lies S. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles from Central Island. *Namusa*, the largest island, 3 miles long North and South, and 670 ft. high, has its North point in lat. $4^{\circ} 48' N.$, long. $127^{\circ} 6' E.$ At 5 miles W.N.W. from this point is North Island. Karatin Island lies 5 miles South from North Island, and has a sunken rock off its N.W. end. These islands are but little known, and a good look-out is required when near them. H.M.S. *Challenger* passed within 5 miles of them in February, 1875, and exchanged some tobacco for lories brought off by the natives in their canoes. A S.E. current had drifted the ship further South than was intended.

The CELEBES SEA is the area between these last described islands, the Sulu Islands, the coast of Borneo, and the North coast of Celebes. Its shores have been described, but the following may be interesting as relating to its depth, &c.

“Proceeding through the passage between Banka Island, off the North coast of Celebes, and Bejaren Island, the positions of those and the neighbouring islands were fixed, and a sounding obtained in 2,150 fathoms, red clay, when only 23 miles West of Maquiliere Island. The serial temperature proved that the water in the Celebes Sea is cut off from communication with the surrounding seas below 700 fathoms, the temperature of the water below that depth being uniform at $38^{\circ} 6'$, this agreeing with the observations of Commander Chimmo. On the 22nd of October another sounding was obtained in 2,600 fathoms, when about 40 miles from the land of Point Pola, South coast of Mindanao, with the same result as to temperature.”—Voyage of H.M.S. *Challenger*, Geographical Magazine, November, 1875.

THE SULU ARCHIPELAGO.

This labyrinth of islands between Borneo and the Philippine Islands is variously termed the Sulu, Sooloo, Soolo, Soeloe (Dutch), Jolo (Spanish), Suluk (Malay). An examination of the group was made in 1872 by Commander Chimmo, R.N., in H.M.S. *Nassau*. Previous to this our knowledge was very scanty, and chiefly derived from the visit of the United States' Exploring Expedition, in 1842.

The Archipelago consists of nearly 150 islands, many of them mere rocks, clustered around the three larger islands, which alone are of any importance. Basilan to the E.N.E., Sulu in the central part, and Tawi-Tawi in the W.S.W. part. Although the islands are supposed to be under the rule of the Spaniards, the Sultan and his subjects are in constant rebellion, and a

blockade of the ports was going on at the time of the visit of H.M.S. *Challenger* to Samboangan in 1875. Previous to holding communication with these people it is necessary to hoist a flag of truce.

The commerce, chiefly with Manila, is mostly in tortoise-shell, pearl oyster, pearls, sharks' fins, trepang, and swallows' nests. The people profess the Mohammedan religion, and the only people who can reside among them as traders are the Chinese, who pay a large tribute in their shipping transactions.

Tapul Group.—*Siassi Island*, the peak of which is in lat. $5^{\circ} 32'$ N., long. $120^{\circ} 52'$ E., and 1,714 ft. above the sea, is the highest island between Sulu and Tawi-Tawi. There are several large villages built on the reefs that fringe the S. W. and East coasts, the inhabitants of which carry on the pearl fishery. *Tara Island* lies on the reef to the North of Siassi, and $1\frac{1}{2}$ mile North of this is a solitary rock, 8 ft. above high water mark.

Tapul and *Bulipongpong*, two fertile and well cultivated islands, lie to the northward of Siassi; the former is 1,657 ft., and the latter 984 ft. high. They are apparently clear to the westward, but reefs extend to the southward and eastward of both.

A 3-fathom patch, a mile in extent, lies 2 miles northward of Siassi, with the East extreme of Manubol Island bearing S. $\frac{3}{4}$ W., and the North extreme of Tara Island E. by S. $\frac{1}{2}$ S. Another patch, about 3 cables in extent, awash at half tide, with deep water around it, lies $1\frac{1}{4}$ mile S. $\frac{3}{4}$ E. from Tara Island; and a third patch, of 3 fathoms, lies $1\frac{3}{4}$ mile E.S.E. from it.

Lapac, three-quarters of a mile to the westward of Siassi, in the distance on a S.E. bearing looks like two islands. The reef from this island nearly joins that of Siassi. The Imperial German ship *Elisabeth*, Captain Von Wiekede, obtained good anchorage in 11 fathoms, in the channel between Siassi and Lapac Islands, abreast a house almost hidden by trees, on Siassi Island. The southern portion of this channel, which lies between the coral reefs extending from these islands, is 1 cable wide, with depths of 6 to 9 ft. on the bar at the South entrance, where it is only half a cable wide; but from an examination by Captain Schick, in the German schooner *Minna*, 1876, there appears to be $6\frac{1}{2}$ fathoms in the southern entrance of the channel.

One-third of a mile from the S.W. point of Lapac is a dangerous patch of rock, with 8 fathoms between it and the shore. The island of *Manubol*, on the South part of the Lapac Reef, has a large fishing village on the north-eastern side. Good anchorage was found by H.M.S. *Frolic*, in 1874, off the West side of Lapac Island; and immediately off the northern entrance of the passage, between Lapac and Siassi Islands, good shelter is said to be found by vessels, in the S.W. monsoon. There is also good anchorage in from 7 to 12 fathoms, sand and coral, to the southward and westward of the small island West of Lapac, and immediately off the village. Supplies may

be obtained at Lapac, such as bullocks, goats, and fowls, at a moderate rate, but vegetables are scarce, as is also water.

Selun, a small island $2\frac{2}{3}$ miles N.W. of Lapac, is about a quarter of a mile long, 153 ft. high, covered with trees, and steep-to, with a clear channel between it and Lapac. *Tapaam*, a low island, lies S.W. of Lapac. The channel between is about $1\frac{1}{2}$ mile wide, and navigable.

Tapaam Passage, which is formed by Tapaam and Lapac to the eastward, and Bubuan and Maniacolat to the westward, is about $6\frac{1}{2}$ miles wide at its narrowest part, viz., between Maglumba, a small island, 123 ft. high, off Maniacolat, and the N.W. side of Tapaam. This passage is clear for a steamer, and would be convenient for a sailing ship, as the tides make fairly through it, and in calms or light winds a vessel could always anchor to await the change of tide. *Crest of Wave Shoal* is in the fairway of the Tapaam Passage, and the shoalest part of $4\frac{1}{2}$ fathoms lies about N.E. $\frac{1}{2}$ E., $4\frac{3}{4}$ miles from the little conical island of Parangaan, on the S.W. side of the passage. As a rule, it is easily discerned by discolouration, or by the tide rippings. *Tapaam Shoal* is a small patch of $6\frac{1}{4}$ fathoms, coral and sand, nearly midway between Tapaam and Bubuan.

Tagao Island lies 7 miles southward of Bubuan. It is a small island, with a sunken rock one-third of a mile S.E. of it. *Magpeo*, another small island, surrounded by shallow water, lies 2 miles northward of Tagao. *Keenapoussan Group*, 10 miles to the southward of Babuan Island, consists of three low, densely wooded, coral islands of Tabawan, Bintoulan, and Keenapoussan, between the two former of which there is a narrow 5 fathom channel. As the reefs to the southward of these islands are steep-to, and the lead consequently gives no warning, care should be taken when navigating in this vicinity. The tides here are also strong. The best anchorage is with the West extreme of the village on the North side of Tabawan about S.S.E., three-quarters of a mile off shore. The tides are regular here, and not very strong.

The **TAWI-TAWI**, or **Tau-i-Tau-i**, or *Tawee-Tawee* Group, are those nearest to Cape Unsang. The principal island of the cluster is Tawi-Tawi, 35 miles long, and its northern side, according to the Spanish charts, appears nearly clear of danger.

Bongalao Island is the most western of the Tawi-Tawi Group. It is about $2\frac{3}{4}$ miles long by $1\frac{1}{2}$ mile broad, and the highest peak is 1,151 ft. above the sea, but other peaks attain nearly the same altitude. *Observation Islet*, immediately South of Bongalao, is in lat. $5^{\circ} 0' 33''$ N., long. $119^{\circ} 44' 20''$ E. *Sanga Sanga Island* is about 6 miles long in a N.E. and S.W. direction, and $3\frac{1}{2}$ miles across at the widest part; it lies immediately to the northward of Bongalao, between it and Tawi-Tawi Island, and separated from each by a very narrow boat passage. Unlike Bongalao, this island is not high, has no conspicuous hill on it, and is covered with trees. There are a few small

patches of cultivation on the S.E. side over Pandan Bay, where there is a Panglema or chief, but there is none in any other part of the island. *Pandan Bay* is a snug anchorage, well sheltered from all winds, with good holding ground, taking care if going close in to avoid the rock awash and the 6-foot coral patch in the middle of the entrance. The best anchorage is, however, outside the bay, in from 11 to 13 fathoms, mud, with the Panglema's House (on the East side of the bay) N.N.W. $\frac{1}{2}$ W., and South point of Sanga Sanga W.S.W. There are no supplies to be obtained. Care should be taken in approaching Pandan Bay, to avoid some dangers on the South coast of Tawi-Tawi.

Papabag Island lies on the South side of the entrance to Pandan Bay, and East of Bongalao Island. There are said to be numerous wild cattle here, but none were seen during the *Nassau's* visit in February, 1872.

Balambing, a town on the South coast of Tawi-Tawi, was destroyed by the Spanish squadron in 1871, since when, on the smoke of a steamer being seen, the inhabitants take to their boats. They are pirates when opportunity offers, and build boats at a place called Lupa Buan, about 10 miles to the N.E.

Bilitan is an island about $3\frac{1}{2}$ miles long, the North extreme being about $6\frac{1}{2}$ miles S.S.E. of Balambing; there appeared to be some large villages in the interior of this island, and judging by the number of boats passing between it and Tawi-Tawi and the islands to the S.W., there is great traffic carried on between them. The reef, with a few narrow, tortuous channels through it, joins Bilitan to the S.E. end of Tawi-Tawi, and from the S.W. end of Bilitan a dangerous coral reef, with sand cays, extends for 9 miles to the S.W. *Simonor Island* is about 5 miles in diameter from N.W. to S.E., and its N.E. end lies W.S.W. 9 miles from the S.W. end of Bilitan. It is thickly inhabited, but has no anchorage near, as the fringe of coral reef surrounding it is steep-to. At 2 miles N.E. of its N.E. end is *Laa*, a small island, surrounded by a reef, which thence extends for 5 miles to the W.N.W., having $2\frac{1}{2}$ fathoms on its western extremity, and a second island 2 miles W.N.W. from the first. This reef with the S.W. extremity of that extending from Bilitan forms a channel on the East and North sides of Simonor. *Manuc Manca* is separated from Simonor by a deep channel 2 miles wide. It is thickly inhabited, and the reef surrounding it steep-to.

There is good anchorage anywhere along the South coast of Tawi-Tawi from Bongalao to Balambing in about 13 fathoms, sand and coral, muddy bottom being sometimes obtained, but there are several dangers, as before mentioned, which require caution. When anchored North of Laa Island in H.M.S. *Nassau*, the natives came off from Simonor in large numbers with fowls, goats, cocoa-nuts, sweet potatoes, and fish.

Sibutu Island, the North end of which is in lat. $4^{\circ} 54' 40''$ N., long. $119^{\circ} 27' E.$, lies W. by S. $\frac{3}{4}$ S. about 18 miles distant from the Observation

Islet South of Bongalao; it runs nearly North and South, and is about 14 miles long, with an average breadth of 2 miles. With the exception of the single peak on the East coast, which has an altitude of 524 ft., and is a perfect cone, the island is flat and densely wooded. A reef, steep-to, fringes the coast, and then runs nearly 8 miles South of its southern point, some small islands covered with trees, lying near its S.W. extreme.

From 2 to $2\frac{1}{2}$ miles West of Sibutu a chain of islets and reefs runs to the southward and parallel to it, of which *Omapui* and *Tumindao Islands* are the principal. There is a deep channel between Sibutu and these islands, but it has not been examined. From the N.E. point of Omapui the reef trends to the N.W. for about $2\frac{1}{4}$ miles, and then to the S.W. These islands are frequented for the beche-de-mer. The natives report that wild cattle are very numerous in Sibutu, and that Omapui abounds with wild pigs.

Unsang Anchorage, off the extreme East point of Borneo, affords good shelter in the S.W. monsoon, the bottom in the bay being moderately even, and holding ground of sand and mud, remarkably good. The N.E. extreme of the island South of the anchorage is in lat. $5^{\circ} 14' 54''$ N., long. $119^{\circ} 15' 11''$ E., and lies N.W. by W. $\frac{3}{4}$ W. from the Observation Islet, South of Bongalao, distant 32 miles.

Two and a half miles N. by E. $\frac{1}{2}$ E. from the observation point is *Rocky Bank*, two rocks on a 3-fathom bank. Three-quarters of a mile to the westward of Rocky Bank is *Sandy Bank*, half a mile in extent, composed of sand and mud, its western edge being within $1\frac{1}{2}$ cables of the shore.

No fresh water was found at any time of tide. Fish are plentiful. There were no traces of natives during the stay of the *Nassau*. Casuarina trees for steaming purposes may be cut in any quantity close to the beach.

René Bank, of 4 fathoms, lies in lat. $5^{\circ} 31' N.$, long. $119^{\circ} 9' E.$, N.E. by E., 5 miles from Tambisan Island, on the East side of Tanguusu Bay. Discolored water was seen at 6 miles N.E. of it in lat. $5^{\circ} 37' N.$, long. $119^{\circ} 15' E.$, approx.

Nymphe Bank was discovered by a Prussian corvette of that name in 1873. It is described as half a mile in extent, and breaking heavily. Lat. $5^{\circ} 43' N.$, long. $118^{\circ} 41' E.$

Peri Bank, of $5\frac{1}{2}$ fathoms, is in lat. $5^{\circ} 47' N.$, long. $118^{\circ} 57' E.$

Sunday Bank lies N. by W., distant 32 miles from Hog Point, which is visible from it. The shoalest water on this bank (10 fathoms, sand and coral) is in lat. $5^{\circ} 50' 35'' N.$, long. $119^{\circ} 9' 30'' E.$

Talantam Bank is composed of sand and coral, the shoalest part of 5 fathoms being in lat. $5^{\circ} 42' N.$, long. $119^{\circ} 26' 30'' E.$ It is about 3 miles long N.W., and S.E. $1\frac{1}{2}$ mile wide, with an average depth of 8 fathoms. With wind against the tide there are heavy overfalls round this bank.

The Pearl Bank, on which are Taja and Zan Islands, is a formation of coral and sand, lying about E. by N. and W. by S., 15 miles long, with an

average width of 6 miles, and very steep-to. The opening leading into the lagoon formed by the coral reef on Pearl Bank, has a bar extending across it with 9 to 13 ft. water. This reef has several small islands, the highest (50 ft.) being near the S.E. extreme. There is fair anchorage on the bank either to the N.E. or S.W., in the S.W. and N.E. monsoons respectively, but tides are very strong, running with a velocity of from 3 to 5 knots an hour.

Doc-Can lies E. $\frac{3}{4}$ N. about 12 miles from the eastern islet on the Pearl Bank. In the centre of this island is a large lagoon, with several islets in it. A bank with from 5 to 8 fathoms extends about 2 miles to the N.W. of Doc-Can Island. *The tides* here are very strong, the flood running N.N.W., ebb S.W., 3 to 5.5 miles an hour. There is anchorage South and West of Doc-Can, but none North of it; outside the 20-fathom limit the bank is steep-to; on the southern side of the island, a ship should anchor directly 9 or 10 fathoms is obtained, as deeper water will be found between those soundings and the edge of the reef.

Laparan Island is situated to the eastward of Doc-Can, with a channel a quarter of a mile wide dividing them; it runs North and South, is 5 miles long, and from 2 to 3 miles broad, and covered with trees. To the westward it is fronted by a coral reef, with several small islets on it, the reef being steep-to. There is no anchorage to the westward of Laparan.

Cap Island lies 9 miles E.N.E. from Laparan. It has sunken rocks extending 3 miles westward from its northern end, and a 2 $\frac{1}{2}$ -fathom patch at 3 miles eastward of the same point. *Deoto Bato*, 2 $\frac{1}{2}$ miles long in a N.N.W. and S.S.E. direction, lies in the southern part of the strait which separates Laparan and Cap Islands. Numerous small islands lie to the south-eastward between these islands and the Tapul Group, which will be best understood from the chart.

SULU is about 30 miles long, and 8 or 10 miles broad. The officers of the U.S. Expedition came to the conclusion that they had seen nothing in their circumnavigation to be compared to this enchanting spot. It appeared to be well cultivated, with gentle slopes rising here and there into eminences from one to two thousand feet in height. Although under cultivation, it had the freshness of a forest region. The effect of this was destroyed in part by the knowledge that this beautiful archipelago was the abode of a cruel and barbarous race of pirates.

Sulu or Soung, at the N.W. end of the island, is or was the residence of the Sultan or Rajah, and the emporium of the archipelago. H.M.S. *Egeria* visited the place in 1876, and found that the town had been destroyed. According to Sir Edward Belcher, it is built on piles, like Bruni on the N.W. coast of Borneo, running in three lines out to sea, the outer houses being in 4 fathoms, the intervals allowing the *Samarang* to lie in the main street.

The chiefs, however, reside on terra firma. There are or were two batteries, one on each side of this main water communication. It is in lat. $6^{\circ} 2' N.$, long. $121^{\circ} E.$

The anchorage in the road is in 18 or 20 fathoms, on a loose sandy bottom, with the Sultan's house bearing S. $26^{\circ} E.$, Mount Temontangis S. $26^{\circ} W.$, Tulian Rock S. $67^{\circ} W.$, and the S.W. point of Paliangan, the largest and westernmost island in the offing N. $60^{\circ} W.$ The bottom being insufficient holding ground, ships are liable to drive in N.W. squalls. Bullocks, poultry, and live stock of all kinds, with abundance of vegetables and fruits, may be procured; also wood and water. But in any communications here, the utmost caution should be used, as before urged. Water may be procured in abundance in *Talian Bay* at the N.E. end of the island.

In coming to Sulu Road from the N.E. care should be taken to avoid the *Takut Pabunuan Shoal*, with 3 and $3\frac{1}{2}$ fathoms or less water, and extending N.E. and S.W. for 6 or 7 miles. The southern part is in lat. $6^{\circ} 14' N.$, long. $121^{\circ} 16' E.$, about 18 miles N. by W. from the East end of Sulu, and 16 miles westward of the *Duo Bolod*, two rocks 700 feet in height, nearly midway between Sulu and Basilan. They are quite bold-to. *Leaving* Sulu Road, the best route to the S.E. is round the West end of the island, leaving the high island of Tapul before mentioned, and the low islands of Taluk and Kabinguan to the southward, and the islands nearer to Sulu to the northward. One of the detached coral patches mentioned before, however, lies near this track. It has $8\frac{1}{2}$ fathoms, and bears from the westernmost high land of Sulu S.S.E. and West from the South point of Pata Island, which is high. The tides set fair through this channel, and sometimes very strong. Off the West end of Sulu, in December, they have been found to set N.W. and S.E. at 4 miles an hour. During the N.N. monsoon there is generally a N.W. or westerly current in the neaps between Sulu and Basilan. In March the current generally sets to the eastward.

Dalrymple Harbour, on the N.E. side of the island of Sulu, is formed by the island of Tulyan on the North and the coast of Sulu to the South, and, being the only well-protected harbour in this fertile island, may at some future day be a place of importance. Good anchorage will be found during the N.E. monsoon under the lee of Tulyan Island; the natives report that during the N.E. monsoon the wind seldom blows home.

Tulyan Island, about 1 mile in length from S.S.W. to N.N.E., and 8 cables in an East and West direction, is steep on the West side, running up to a height of 513 ft., the summit being clothed with long grass. The Spaniards had a guard of soldiers on this island for some time, but the natives from the mainland made such frequent excursions, spearing the sentries and cattle, that they found it advisable to remove the settlement, since which time it has not been inhabited.

Buol was the largest town in this part of the island of Sulu, but was partially destroyed by the Spaniards in 1872.

A large ship visiting Dalrymple Harbour should round Tulyan Island to the northward, and approach the anchorage by the eastern passage, avoiding the $4\frac{1}{2}$ -fathom patch $3\frac{1}{2}$ cables S.W. of Martin Bluff, having passed on the island side of which, a course about S.W. $\frac{1}{2}$ W. until the southern point bears West, leads up to the anchorage in 8 or 9 fathoms. The extreme eastern point of the island should then bear about N.N.E. $\frac{3}{4}$ E. Supplies are not to be obtained.

Maimbun Bay, on the S.W. side of Sulu Island, is much used as an anchorage during the N.E. monsoons; the bottom, however, appears to be studded with loose coral. The rock charted 2 miles South from Point Cabalian (the West entrance point of Maimbun Bay), is said not to exist. A shoal (Batolaqui Shoal), awash at high water, was seen from the *Swinger*, at half a mile E.S.E. from Point Cabalian.

The Pangutaran Group, to the N.W. of Sulu, consists of several islands, of which that which give the name is the largest and westernmost. There is a village on the coast at 5 miles S.W. of Sulu, and near the shore, N.E. of this village, is a sunken rock. W.N.W. 3 miles from the point on which the village stands is an islet, with a sunken rock $1\frac{1}{2}$ mile westward from it. *Marongos*, a small island, lies N.W. 6 miles from Sulu, and in a N.E. direction from it lie three other islands, within a distance of 8 miles. A bank lies a little to the S.E. of the centre one of the three. *Palliangan*, 5 miles long N.E. and S.W., has its South extreme at 3 miles W. by N. from Marongos. Off its S.W. extreme are some dangers, and at 4 miles W.S.W. from this point is a 3-fathom patch. There is a clear channel between the Pangutaran Group and *Ubian*, and this is the proper course in the S.W. monsoon, as the currents run strongly to the northward along the West sides of the islands. To the northward of Pangutaran the springs sometimes run 6 knots, and if hosed to the eastward of the island, there will be some difficulty in getting to the S.E., as the two adjacent islands, *Kulassein* and *Panducan*, are connected by reefs, and the strait between is very narrow.

Ubian is inhabited, the largest town Suang-bunah being on the S.W. side, well protected by a coral reef. From *Ubian* a shallow bank, with from 7 to 11 fathoms over it, runs in a W.S.W. direction for nearly 19 miles to Cap Island. This bank affords a good stopping place for a ship taking the Pangutaran passage; its northern edge is very steep, and the lead should be kept going when approaching from this direction. There is anchorage between *Ubian* and *Malicut*, a small island $3\frac{1}{2}$ miles S.W. of it, in from 5 to 10 fathoms, but the bottom is hard and even. There is also anchorage about 1 mile W.S.W. of the North end of *Malicut* in 7 to 9 fathoms, but the tides run strong at springs.

The interval between Sulu and Basilan, a space 43 miles wide, is occupied

by several groups of islands, which have open and clear channels between them. The south-easternmost of these openings, between *Point Tandu*, the East point of Sulu, and *Bengao*, the island next eastward of it, is $5\frac{1}{2}$ miles wide, and, as far as is known, is safe, the only danger being a reef off the N.W. point of the latter island. The channels between this and Belauan, separated by *Batanguingi* and *Tongkuil Islands*, are also safe.

In the space to the northward of Sulu Island are several detached rocks and dangers. *Teomabal Island*, 12 miles East of Panducan, has a reef extending 8 miles E.N.E. from it, and 5 miles northward of the eastern end of this reef is a detached $1\frac{3}{4}$ fathom bank. *St. Lucia Shoal*, of $3\frac{1}{2}$ fathoms, is in lat. $6^{\circ} 24' N.$, long. $121^{\circ} 14' E.$ *Wilhelmina Rock*, awash at high water, lies 7 miles E. $\frac{1}{2}$ N. from this, and at 8 miles S.E. from the St. Lucia is a rock awash, with a $3\frac{1}{2}$ -fathom patch just northward of it, and shallow water extending for 6 miles to the S.W.

Belauan or *Belawn* is the south-easternmost of a cluster, and is apparently low land, and on the N.W. island is a high, round mount. The East point of Belauan is in lat. $6^{\circ} 7' 30'' N.$, long. $121^{\circ} 52' E.$ A mile to the N.E. of it are two small islets, called *Dipulul*. *Tataran* is also of moderate height, and is 6 miles northward of the East point of Belauan.

The channel between *Tataran* and *Lanauan*, which is 533 feet in height, is 6 miles in breadth, and the edge of the bank of soundings on which the islands stand is very steep to the eastward of them. This occasions a ridge or line of strong rippings, appearing sometimes like breakers when the current runs swiftly, but there is no danger, the least depth being 9 and 10 fathoms. *Tapiantana Island*, which forms the N.E. limit of this channel, has a high hill, forming a regular peak on its western part, with low land stretching out to its East point, which is in lat. $6^{\circ} 17' N.$, long. $122^{\circ} E.$ *Bubuan Island*, to the northward of Tapiantana, is very similar to it, and has a mount of similar form 983 ft. high. To the eastward of them are the *Salipen Islands*, from the North side of which a reef extends towards the South point of Basilan. The channel between the South end of Basilan and the reefs which lie off it is safe, but in some parts is very narrow, so that that South of Lanauan is much to be preferred.

BASILAN, the largest of the eastern group, belongs to the Spanish Government. It was a nest of thieves and pirates, the most expert in the archipelago, and in consequence was taken possession of by the Spaniards, and attached to the province of Samboangan in Mindanao. It is about 20 miles long, and is a mountainous country. The highest point, on the South side, is 3,970 ft. high; the East end rises to 2,540 ft., and the western point to 1,116 ft.

Point Matanal, the eastern extremity, is in lat. $6^{\circ} 37' N.$, long. $122^{\circ} 19' E.$ Above it is the high land before mentioned. The N.E. shore of the island is quite bold to, and trends to W.N.W. for 20 miles to the mouth of a narrow

strait, formed by *Malaunavi Island*, in which is the Spanish post of *Isabela* or *Passanhan*.

Passanhan or *Isabela Harbour*, at the N.W. side of *Basilan Island*, can be entered from the North or South, and there is sufficient depth of water for large vessels. The channel has an average width of $1\frac{1}{2}$ cable; the shoals which in some places narrow it are marked by buoys, as is also the shoal off the southern entrance. Large vessels should moor in the stream; smaller vessels may lie closer to the shore of the harbour.

The tides during the stay of the *Hertha*, in the month of April, were regular, of six hours' duration each, and no slack water; they are, however, frequently influenced by the wind. The flood set S.W. and the ebb to the N.E., at the rate of $1\frac{1}{2}$ or 2 knots.

Isabela, the residence of the Spanish Governor of *Basilan*, is situated on the western slope of a chain of hills, 590 ft. high, and densely wooded. The bar of the rivulet *Passanhan*, West of the town of *Isabela*, is impassable even for small craft. It supplies the only drinking water to be obtained, but so high up that boats cannot ascend. Provisions cannot be obtained. There is a coal depôt for the use of the Spanish vessels of war, at a small island adjoining the mainland; no other store of coal is kept.

The population consists of 5,000 or 6,000, chiefly Malays and Chinese, who live in bamboo huts, the Malays, according to their custom, over or near the water. Some convicts are kept on the island where the coal depôt is placed.—(Ship *Hertha*, Imperial German Navy, 1875.)

The bay to the West of this, called *San Rafael Bay*, has anchorage in 12 to 15 fathoms, protected in some degree by the shoals which extend westward from the island.

To the westward of *Basilan* there are numerous islands, the channels between which appear to be safe, but should only be used with caution. *Bubuan*, 983 ft. high, lies off the South point in lat. $6^{\circ} 21' N.$, long. $122^{\circ} 0' E.$ The *Basilan* coast, to the N.W. of this, is clear, as also the channel 3 miles wide to the North of it, but to the eastward there are some shoals which very much contract the passage to the eastward. *Malusa*, a settlement of the Spaniards on the S.W. coast of *Basilan*, is deserted (1875), and its vicinity should be avoided, the inhabitants being hostile. On the S.E. side of *Basilan*, between the island *Cauluan* and *Matanal Point*, there is a bank of soundings against the shore of the wide bay which opens to the S.E.

Sibago Island, which lies $6\frac{1}{2}$ miles N.E. by N. from *Point Matanal*, is high, with low land projecting from the hill. It is in lat. $6^{\circ} 45' N.$, long. $122^{\circ} 24' E.$ *Langil Island* is 3 miles to the W.N.W. of *Sibago*; it also has low land extending from its high hill, and the two islands when seen in nearly the above or opposite bearing, appear as one saddle hill. *Cocos*, a high and small island, is 5 miles W. $\frac{1}{2}$ S. from *Langil*, and 5 miles off *Basi-*

lan. The *Helena Bank*, coral, lies about $1\frac{1}{2}$ mile N.W. from Cocos, which is in lat. $6^{\circ} 46' N.$, long. $122^{\circ} 14' E.$

The STRAIT of BASILAN, between that island and the South point of Mindanao, is about $6\frac{1}{2}$ miles wide where narrowest. To the south-eastward are the islands just mentioned, and to the westward are the clusters which lie to the N.W. of Basilan and northward of Pilas.

Pilas is all low level land, except the North part, where there are two hills about 710 ft. high. It is about 6 miles long North and South, and a small island, *Tagowlu*, lies on its eastern side.

Of the islands West of Pilas the *Salleolukit Isles* are the westernmost, and are 25 miles westward of the West point of Basilan. A 3 miles N.W. of this is this *Favourite Rock*, 12 ft., in lat. $6^{\circ} 44' N.$, long. $121^{\circ} 22'$, which is the farthest to the N.W. The *Griffin Rocks* lie 6 miles N. by E. from Salleolukit. They must have a berth to the eastward, as the sea does not always break on them. There is another rock, *Batu Balu*, about $7\frac{1}{2}$ miles to the S.E. of Salleolukit. Besides these there are several other shoals to the westward of Pilas and *Sangboys Islands*, the latter lying 18 miles N.W. by W. from Basilan; they are two high islands close to each other, and are sometimes called the *Hare's Ears*. The hill on the South, or Great Sangboy, resembles a dome.

Teinga or *Teynga* is about 3 miles N.N.E. from the North Sangboy. It is in lat. $6^{\circ} 54' N.$, long. $121^{\circ} 38' E.$, and is the northernmost of the Sulu Archipelago. It is very low, covered with trees. A reef extends a short distance South of it, and another a considerable distance to the North of it. There is also a 6-fathom spot at $6\frac{1}{2}$ miles E. by N. $\frac{1}{2}$ N. from it, reported by the ship *Wild Rover*, in 1870.

Between Pilas and Basilan are *Mataga* or *Mataha*, low and woody, and *Buluk* to the northward of it, a considerable island, with a sloping hill at the North part, and low land to the southward. With Pilas Island it forms a safe channel 3 miles wide. About midway between Mataga and Baluk there is said to be a bank or dangerous rock.

The Santa Cruz Islands, on the North side of the strait, adjacent to the South point of Mindanao, are two in number and small. There are numerous coral reefs in their vicinity. One of these has 13 ft. water, and lies 4 miles S.W. $\frac{1}{4}$ W. from the western island, the eastern peak of Basilan bearing S.E. by E. There are other patches between this and the island to the eastward. There is another coral reef of 16 feet, with the western Sta. Cruz Island bearing E. by S. $\frac{1}{4}$ S. 7 miles. A 6-fathom patch lies 3 miles off the North coast of Basilan, at 14 miles westward of Cocos Island.

With the exception of these reefs, and that near the Cocos Islands, the Strait of Basilan appears to be safe, although the depths in it are very irregular, with rocky bottom in many places.

THE PHILIPPINE ISLANDS.

This noble archipelago belongs to the Spaniards by right of discovery. Twenty-nine years after the discovery of America by Columbus, and two years after the conquest of Mexico, Fernando Magalhaens, or as he is commonly called Magellan, after having passed round Cape Horn, and discovering the Ladrone Islands, came in sight of Samar, one of the Philippines, on Sunday, March 17th, 1521, the feast of St. Lazarus, and thus named them the Archipelago of St. Lazaro, which was subsequently changed by Villalobos 21 years later, to their present appellation, in honour of Philip Prince of Asturias, the unworthy son of Charles V. Magellan, coming to Zebu or Cebu, began the work of conquest and conversion simultaneously, and was shot by the Indians in a foolish fray on the island of Mactan, adjacent to the East coast of Zebu, on August 26th, 1521. Thus died the first circumnavigator, his ships being brought to Spain by his cousin and historian Barbosa. A monument is erected to his memory at Zebu, as hereafter described.

The archipelago numbers thirty-one islands of importance, exclusive of numerous tiny islets, rocks, and reefs. They extend from North to South over sixteen degrees of latitude, a circumstance which endows them with a striking variety of climate, which in its turn is exemplified in the growth of products belonging to both the temperate and torrid zones, the palm and the fir, the pine-apple, the potato, and wheat flourishing alike on their shores. The situation of these fertile islands, occupying as they do a central point between Japan, China, Annam, the English and Dutch settlements in the East Indies and Australia, not to speak of their favourable position for communication with the West coast of America, ought to ensure them a world-wide trade. But hitherto, in spite of the early trade with Manilla in the 16th century, commerce has languished hopelessly through the elaborate and short-sighted restrictions imposed by Spanish protectionists. There is, however, good ground for anticipating better days, for a decree of the 5th of April, provided that the differential duties, which were framed in a spirit of the most extraordinary hostility to all foreign traders, should expire at the end of two years, that all export duties should be abrogated, and that the more annoying port dues should be consolidated into one single charge. The most important products of the islands are tobacco, coffee, cacao, cocoa-nut oil, sugar and Manila hemp. Manila, Samboanga, Zebu, Ilo Ilo, Tacloban, and Legaspi are open ports.

The rest of the islands, excepting Mindanao and the Bashi Islands, are known collectively, as the *Bisayas*, or *Visayas*, a native word signifying "painted man," as the people were found to be so when first discovered by the Spaniards. But they are all under one government, that of the Captain-

General, resident at Manila, whose jurisdiction not only extends over all the islands, but also over the Marianas in the Pacific. The people are of different races. The mountain tribes are called *Negritos*, diminutive negroes, who also inhabit the island Negros, adjacent to Zebu. Another race are the Igorrotes, a copper-coloured race, who resemble the Dyaks of Borneo, and are eager head-hunters. The great mass of those subject to the Spanish rule are the Tagals inhabiting Luzon, and the Bisayans, who live on the other islands, each having a variety of dialects and customs. A large Chinese population also exists.

The number of the population has been variously and vaguely estimated. the latest account being that given by Dr. Meyer, in 1875, who states that the population of the archipelago, according to the latest Spanish accounts, numbered 7,451,352; of these 4,540,191 were in Luzon, and 1,052,586 in Panay.

The seasons may be divided into the wet and dry, the former extending from June to November, and the latter from December to May.

Tides.—It is only in recent years that the tides of these islands have been understood. Owing to their great irregularity, it required a long series of observations at frequent intervals to gain sufficient knowledge to make known the system. These observations have been made, and the conclusion come to, that in the course of the lunar day in the Bay of Manila there are two high waters and two low waters of *different relative heights*, and that the difference between the height of the two high waters has reference to the age of the moon. Senor Don Francisco Carrasco, who has written an elaborate paper on the subject (translated in Nautical Magazine for July, 1868), thus speaks of these differences:—

“If we follow the curve during the lunar month, we see that at the beginning of the lunation there is a high water of great comparative importance; and another most minute one, corresponding to the passage of the moon over the inferior meridian (antipodes). The important high water goes on decreasing in height with the age of the moon, when the heights of both high waters are nearly equal; the first goes on decreasing and the second increasing until full moon, when the great tide of new moon is converted into the least and this into the largest. Starting from this conclusion, the same phenomenon presents itself in the large tide diminishing, and the smaller one increasing, so as to become equal at the last quarter, and at the next new moon returning to its former greater height and the other to its lesser.” The rise of the tide varies from $3\frac{1}{2}$ to 6 or 7 ft. in Manila Bay.

MINDANAO, or **Magindanao**, is the southernmost of the Philippine Islands, and next to Luzon is the largest. It is very little known, but some trade is done with Labuan. Up to a comparatively recent period the Spaniards only held the North and N.E. portion of it, leaving the great bay on the South, and this part of the island in the hands of those pirates whose

name of Llanuns or Illanuns derived from the bay, spread terror over the surrounding seas.

Mindanao is about 270 miles long from East to West, and 245 miles from North to South. Its mountains are of great altitude, and, like many other islands of the eastern seas, clothed with the richest forest growth nearly to their summits. There are many volcanoes, some extinct, others more or less active. Among the latter is *Mount Calalan*, in the S.E. part. It is intersected by these mountains in many directions, and in the valleys they form are many extensive lakes, a circumstance to which the island owes its name. It is or was divided by the Spaniards into four provinces, that of *Caraga* on the N.E. side, *Neuva Guipuzcoa* on the S.E., *Misamis* on the N.W., and the small district of *Samboangan* on the South end of the western peninsula. Of the people little can be said here. M. Meyer estimated the population to number 191,802, in 1871. The whole of the interior is occupied by those piratical people of very various races, but known generally as the Illanos or Illanuns before mentioned. They profess Mohammedanism. The climate is hot and humid, but from its lying so near the equator, it is beyond the reach of typhoons. This renders the coast much more safe than it otherwise would be, although in the extensive bays which indent it there are many places of shelter.

CAPE SARANGANI, or **Panguitan**, is the South point of Mindanao. It is in lat. $5^{\circ} 35' N.$, long. $125^{\circ} 21' E.$ The land adjacent is lofty, and may be seen 30 or 40 miles off. Off it lie the *Sarangani Islands*, two in number, bearing E.N.E. and W.S.W. of each other, and about South from Cape Panguitan. The easternmost is much the lowest, and has a hill on its South end. *Linitan* is a small low island, about 3 miles northward of the eastern Sarangani Island, and has reefs projecting from its North, South, and East points.

The Channel between the cape and the Sarangani Islands is about 5 or 6 miles wide, clear of hidden danger. There is a passage between the islands, the eastern side of which is the best, as there is a shoal projecting nearly into mid-channel from the western side in the narrowest part.

To the north-westward, 20 miles distant from the South point, is a deep bay, with a bank lying S.W. of its western entrance point. It is known as the *Bahia de Sarangani*, and from this the southern coast trends to the north-westward towards the great bay which so deeply indents the South side of the island. A sunken rock lies 3 miles off the land in lat. $6^{\circ} 12' N.$, long. $124^{\circ} 7' E.$, and a bank West of Leno Bay, in lat. $6^{\circ} 41' N.$, long. $123^{\circ} 55' E.$

Illana Bay is 40 miles wide in its opening, and in its eastern part is the island of *Bongo*, lying off the mouths of the *Rio Grande*, the largest river of Mindanao. It is near the mouth of this river, at *Cotabatu* or *Cota Batto*, 6 miles from its bar, that the Spanish fort has been established. In the

eastern part of this bay, at 5 miles N. $\frac{1}{2}$ E. from the North end of Bongo, is the Pinatayan Bank, extending to 2 miles off Point Matimioz. The piratical people of Illana Bay have been known to drag their vessels over the isthmus to the North shore, to escape pursuit. We have no particulars of the great bays which lie to the westward of this, named the *Puerto de Dumanquilas* and the *Seno* or *Bay of Sibuguey*.

Circe Bank, of $3\frac{1}{2}$ fathoms, lies on the eastern side of the entrance to Sibuguey Bay in lat. $7^{\circ} 17' 30''$ N., long. $122^{\circ} 37' 30''$ E. To the south-westward of it are two other banks, one of $2\frac{3}{4}$ fathoms, N.E. by E. 10 miles from Tanalutan Island, and another, Samar Bank, of $2\frac{1}{4}$ fathoms, at 4 miles E.N.E. of the same island.

SAMBOANGA and its vicinity were surveyed by Sir Edward Belcher in the Samarang in 1844, the examination including the Santa Cruz Islands before mentioned. The fort at the eastern end of the town is regularly built and equipped. It is in lat. $6^{\circ} 54' 55''$ N., long. $122^{\circ} 6' 30''$ E. There is a church at the western end. The anchorage off the town is not good, the bottom being foul and the bank steep, the depth of 12 fathoms being close in. Samboanga, a free port, is a penal colony of the Spaniards, and is not specially adapted for the refreshment or refitment of passing vessels. Bullocks, fowls, yams, fruits, rice, and vegetables are procurable. The water is excellent, and easy to obtain; it runs behind the beach in a fine stream, but it should be filled early in the morning, before the whole female population commence their washing.

Light.—There is a small pier or mole, at the head of which a *red fixed* light is shown, elevated 32 ft. It is in about lat. $6^{\circ} 54'$ N., long. $122^{\circ} 4'$ E.

Tides.—From information acquired from the Spanish surveying vessel at Samboangan, it appears that the times of high water and turn of the streams are extremely irregular, the time of high water, full and change, varying from 7 to 10 hours after the meridian passage of the moon; and the same phenomena is observed here as in the China Sea, viz., that in the S.W. monsoon the day tide is the highest, and in the N.E. monsoon the highest tide is at night.

La Caldera is 12 miles westward of Samboanga. It is a small harbour, at the head of which is a small fort, where the Spanish flag is hoisted to vessels passing through the Strait of Basilan, and here also is anchorage for ships when they cannot lie in the open roadstead in front of Samboanga. Fresh water, but not good, can be procured here. At 2 miles to the N.W. is a place called *Daumalong*, with a small stockaded fort. This occupies the S.W. point of Mindanao, and is the N.W. entrance point of Basilan Strait.

The *North-West Coast* of Mindanao is more irregular than any other por-

tion of the Bisayas Islands. The charts will show its configuration. The province of Misamis on the northern side of this portion is the most important of the island. The principal inlet is the *Bahia de Iligan*, an extensive bay, at the head of which, on the western side of a deep inlet, with a low marshy head called the *Laguna de Panguil*, stands the pueblo of *Misamis*, the chief place of the province, lat. $8^{\circ} 10' N.$, long. $123^{\circ} 49' E.$ It has some trade, and is protected from the Moro pirates by a small fort built on the beach. It is said that the bay and inlet afford safe anchorage even for the largest ships. The *Bay of Macajalar* or *Macahalao* is 40 miles N.E. of Misamis, and at its South part is the third Spanish post on this coast, that of *Cagayan* which is some distance up the river.

Camiguin Island lies to the North of this, and, with the exception of some shore reefs, is apparently clear. Mr. W. J. J. Spry, R.N., thus describes the visit of H.M.S. *Challenger*:—"To the East we could see at the distance of 50 or 60 miles the island of Camiguin, its volcanoes giving out both smoke and steam. From this distance the volcanoes seemed just on a level with the water, the most prominent part of the island being an older volcano, which rises up behind the active cone to a height of upwards of 5,000 feet.

"On the morning of the 26th January, 1875, we gradually approached the island, and at noon were close under the volcano, when parties of naturalists landed to explore, and the vessel proceeded on, and came to anchor off the little village of Abaji. It seems early in the year 1871 this island was visited with several violent earthquakes, which resulted in the first eruption; from this date the accumulation of the mountain has been going on gradually, and apparently with little violence. The general colour of the cone is a rich chocolate brown; it has now reached some 2,000 ft. in height, and its base has gradually extended until it entirely covers the town of Camiguin, formerly the largest on the island (with a population of 10,000 inhabitants). Now only a few ruined walls remain of this town, which was formerly in one of the most prosperous and fertile of the small islands of the archipelago. Since the eruptions, the island has become almost desolate; only a few hundred inhabitants remain; most of the houses are in ruins, and the paddy fields and groves of flax are deserted and overgrown with a second jungle. For miles on either side of the volcano the trees are blighted and vegetation is destroyed by the sulphureous exhalations. Temperatures were taken in 185 fathoms; but that shown 57° was in no way other than usual at similar depths in these seas."

From this the North coast of Mindanao runs irregularly to the East and northward, forming the *Golfo de Butuan*, which affords good shelter, and terminates in *Point Bilaa*, which forms the narrowest part of the Surigao Passage. A 2-fathom bank extends nearly 2 miles northward of Point Bilaa, and between it and Gipdo Island, 6 miles north-eastward of it, are two

rocks lying $1\frac{1}{2}$ mile apart, and in the centre of the channel. One of these is 6 feet below water. This portion of Mindanao forms the province of Caraga, which is said to possess the chief gold mines of the island. It is very hilly, covered with a dense vegetation, and is very thinly inhabited.

Surigao, the chief place of the province, is 4 miles to E.S.E. of the above-mentioned point, and lies on the North side of a small bay of difficult access. You may anchor in 14 or 15 fathoms, fine grey sand, with the village bearing S. by W. 1 or $1\frac{1}{2}$ mile. If brought more westerly, it is a chance if the anchors hold, on account of the violent tides. If intending to water here, and the wind being at southward and westward, carry all possible sail, taking care to haul close round Surigao Point between *Rozol*, or the Southwood Island and Mindanao, keeping this coast aboard until the village bears as above. The currents rush past it with great rapidity during the N.E. monsoon, when this side of the island becomes a lee shore. There are some building-yards here, and the native vessels are well constructed of the excellent timber from the adjacent hills and interior mountains, where it is said that teak is abundant. The people are mild and docile, but several forts are kept up to prevent piracy.

At $5\frac{1}{2}$ miles northward of Point Bilaa is a small island, $1\frac{1}{2}$ mile E. by N. from which is a rock which breaks. *Gipdo*, a high island 5 miles long, N.N.W. and S.S.E., forms the eastern side of the passage leading to Surigao, the land of Point Bilaa forming the western side. In the middle of this passage are two small rocks E.N.E. and W.S.W. a mile apart. Two miles North from the N.W. end of Gipdo is a small island with a rock just North from it. *Sibanag* has a rock off its southern end 3 miles North from the last named rock.

The STRAIT of SURIGAO or Panaon, which passes between this North part of Mindano, and the South point of Panaon is 12 miles broad where narrowest. To the eastward it is fronted by the group of Surigao Islands, of which *Dinigat*, or Gurbo, or Bella Vista is the largest, and is 40 miles long. This island offering a direct resistance to the course of the great equatorial current drifting to the westward across the Pacific in one season, or in the reverse direction at another, causes the channels separating them and leading to the Surigao Passage to be most dangerous, from the violent tides and currents which rush through them. It should therefore be never attempted from choice, for, in addition to the tidal and drift currents, the course through must be carried nearly at a right angle, so that it is almost impossible to have a fair wind throughout, and in a calm the danger is much increased, as there are neither soundings nor good anchorage. These remarks are especially applicable late in the season, or when there is a chance of the N.E. monsoon setting in prematurely. But if a ship, in proceeding to China, should be carried into it by the westerly current not later than the early part of October, she might venture through.

The *Eastern Coast* of Mindanao is not described, nor visited by commerce, although the interior country affords much good timber, and abounds with trees producing large quantities of wax and honey. It is a lee shore much to be avoided, as before said, during the eastern monsoon.

A singular fact remains to be noticed. Dampier tells us that there is a large island, 38 miles long, 34 broad, lofty, and covered with forest, called the *Island of San Juan*, lying 30 miles eastward of this coast. Modern knowledge is not sufficient to affirm satisfactorily that it does *not* exist, though it does not appear to have been seen since. Its existence is therefore incredible.

Panaon is 17 miles long from N.N.W. to S.S.E., and at its North end is a narrow strait separating it from the S.E. point of Leyte. At the North end of the island is the village of *Liloan*, and this strait is called the *Puerto di Liloan*. It has 7 fathoms least water, and there is anchorage in the small bay off the village.

LEYTE is the next large island to the N.W. of Mindanao, and is 115 miles long N.N.W. and S.S.E. It is generally mountainous, and several of its peaks are quiescent volcanoes. Forests cover a great portion of its surface; among the trees, that which produces the "brea," or pitch, is the most remarkable. Since the active measures which have been taken for the suppression of piracy by the Moros, the population of this island has increased in a remarkable manner. The people are all of the Visaya race, and have long been converted to Christianity. The town of Leyte, which gives it its name, is at the N.W. extremity, but the chief place is *Tacloban*.

Tacloban, opened to foreign commerce in 1873, is situated at the N.E. end of the island of Leyte, and at the South entrance of the straits which separates Leyte from Samar. It is a safe harbour during both monsoons, but the passage to it through the Juanico Straits is somewhat difficult for sailing vessels, owing to the strength of the current running between the island of Samar and the island of Leyte. To steamers drawing 14 ft. of water there would be no difficulty in making this harbour.

Leyte is thinly inhabited, and the people of *Tacloban* are poor and miserable, as are those of the rest of the island. It is mountainous and covered with forest. Volcanic craters are found, and sulphur abounds in some places. Cocoa-nut oil is made, but the trees are sometimes destroyed by hurricanes.

The Strait of *San Juanico* separates Leyte from Samar. It is about 30 miles in length, and not more than a mile wide in its narrower portions, and the two sides of the strait being so similar and parallel, lead to the inference that the two islands were once united. In making for this strait, of the navigation of which we have no particulars, the Samar or northern shore must be kept on board. Its N.W. portion is called the *Canal de Janabatas*.

To the westward of this the North shore of Leyte forms a deep bay, at the head of which is the poor village of *Carigara*, where the first cacao tree was planted in the Philippines.

Palompon Harbour is an entrance through the reefs on the western shore of Leyte, in lat. $11^{\circ} 4' N$. *Port Bello* lies S.E. of and on the opposite side of the promontory to Palompon. It is in lat. $10^{\circ} 50' N$. *Ylongos* is on the S.W. coast of Leyte, in lat. $10^{\circ} 24' N$.

SAMAR is larger than Leyte, and forms a separate province. It was called *Ibabao*. Its eastern shore being washed by the Pacific, has but little shelter, and its north-western side forms the principal entrance from the great ocean to the Bisayas and other islands of the archipelago. The S.E. point is continued seaward by a chain of islands, the outer point of the south-easternmost, called *Punta Sangui*, is in lat. $10^{\circ} 54' 30'' N$., long. $125^{\circ} 50' E$. It is mountainous and lofty, its northern peaks being visible from Zebu serving as a good mark for the adjacent channels. Like the other islands it is covered with forest, and in its central portion is a considerable population of Indians, but not Negritos. Cocoa-nut oil, cacao-bean, abaca or Manila hemp, wax, pearl oysters, and tortoise shell are the productions, and the people trade with the Pelew and Mariana Islands. *Catbalogan*, on the North side of a bay on its western shore, is the chief town and residence of the Alcalde.

Puerto de Palapa, on its N.E. end, affords good shelter to vessels about to pass through the San Bernardino Strait. It is formed by the island of *Batag* on the East, and the islands of *Laguan* and *Cahayagan* on the West, and is a channel about 8 miles long. Off each of its eastern entrance points reefs extend for some distance, but the channel midway is quite clear, with depths of from 7 to 12 fathoms. From this the opening is nearly a mile wide, and extends westward for $3\frac{1}{2}$ miles, when it turns to northward, and between the islands on either side there are good depths of water for anchorage, and a free outlet into the strait to the northward. Good water is to be got on Laguan Island, which forms the S.W. side of the port, and there is a narrow but useless channel to the South of it, which leads into *Laguan Bay*. In this bay a vessel may anchor in 6 or 7 fathoms between Laguan and the Samar shore, sheltered from East and N.E. winds, but exposed to the N.W. and West.

From this northern entrance, to the *Balicuatro Islands* which form the eastern limit of the Strait of San Bernardino, the distance is 39 miles due West. To the eastward of *Viri*, the northernmost of these islands, there is a bank of soundings, varying from 7 to 35 fathoms, which has been traced for 16 miles to the E.N.E., and may be a guide in approaching the strait.

The Western Coast of Samar.—At the northern part of the coast between Points Lipata and Quinabasaran there is a slight bay, which, although

having little depth, affords good anchorage, particularly in the season of the N.E. winds, and although at a good distance from it, large rocks are scattered over the sandy bottom, yet when nearer the coast these are not so numerous, and the ground is much cleaner. In the interior of the bay there is a rivulet from which a vessel may complete her water.

About $1\frac{1}{4}$ mile from Quinabasaran Point, and E.S.E. from the North end of Puerco Island, is the mouth of the *River Mobo*, across which there is a narrow opening with a depth of 2 fathoms at low water. A steam launch might enter here and obtain water at the cascades, some little distance up the river.

About 4 miles S.S.E. of the River Mobo is the little port of *Canaguaion*. It may be used by any vessel in case of necessity, and is formed by a bend in the coast and two islets in its mouth that leaves two narrow channels for entering and leaving.

The STRAIT of SAN BERNARDINO, which separates the N.W. part of Samar from the S.E. extremity of Luzon, is named from the small islet which lies in its eastern entrance. This narrow passage is all to which the name is applicable, but it has been extended to the whole of the track between the islands leading towards Manila, formerly the only point of general maritime interest in the Philippines. It was formerly the great highway for the Spanish galleons on their way to Manila from Acapulco.

Tides.—The greatest range of tide occurs generally in June and December, and is about 6 ft.; the smallest range of tide is about $3\frac{1}{2}$ ft., generally in March and September.

The phases of the moon have but slight influence on the time of high water or on the tidal range. The highest tides follow the moon's greatest declination; the lowest tides follow the moon's least declination; at the moon's greatest North or South declination there is only one flood and one ebb in the twenty-four hours; at the moon's least declination there is one flood and one ebb in twelve hours.

The points on which the pilots are mostly agreed is that in the channel the water begins to rise at about two hours after the moon is up. That the greatest rise and fall is 8 ft. That from the eastern mouth of the strait to about the meridian of Bondog the flood sets westward, and the ebb eastward when it falls: and that from that meridian to the western mouth of the strait the reverse of that takes place. That from the eastern mouth of the strait to the above meridian, the stream of flood runs longer than that of ebb in the N.E. monsoon; the reverse being found in the S.W. monsoon, and the opposite condition to this is found in the western part of the strait. That the night tides are commonly higher than those of the day.

With the foregoing considerations the navigator may be advised that on

entering the strait, he should immediately look to the state of the tide, and follow up his observations closely while he is in it, and to depend more on what he sees than on any calculation. (See also page 896.)

In making for the strait from the Pacific, *Cape Espiritu Santo*, in lat. $12^{\circ} 32\frac{1}{2}'$ N., long. $125^{\circ} 13'$ E., the N.E. point of Samar is in general made for. It is bold high land, and may be seen 12 or 13 leagues off. But should the wind be northerly it would be better to make directly for the entrance of the strait, or you may become embarrassed with the islands and shoals on the North side of Samar. The entrance to the *Embocadero* or strait is contracted by the Balicuatro Islands before mentioned. The islet of *San Bernardino*, covered with trees, many of which are ebony, lies to the N.W. of these, directly in the entrance of the strait, lat. $12^{\circ} 46'$ N., long. $124^{\circ} 15'$ E. There is a small islet close to it on the North and some rocks on the East side, otherwise it is clear, and on either side there is a channel 4 or 5 miles wide, with soundings of from 30 to 60 fathoms. Having passed this island, the fairway of the strait will bear to S.S.W. between *Capul Island*, off the N.W. end of Samar, and *Tielin Juag* and *Colinton Islets*, on the Luzon side; these are bold-to, but at 2 miles S.W. by S. from the latter island is the *Calantas Bank*, surrounded by depths varying from $3\frac{1}{2}$ on the East to 26 fathoms on the North side. Avoiding this, the passage is clear either to the N.W. by W. to clear the North end of Ticao in proceeding towards Manila, or to the southward towards Zebu or Ilo-ilo. There is a channel to the East of Capul Island, between it and *Puercos Island*, which is 2 miles wide, with reefs on the port hand, but a rock of $2\frac{3}{4}$ fathoms, called *El Diamante*, lies in its southern entrance, 2 miles S.S.E. of the South end of Capul. There is no anchorage around Capul, except at a bay at its South end, but it may be had around Puercos Island.

TICAO, the first island to the westward, is 24 miles long. *Port San Jacinto*, about the middle of its N.E. side, is an anchorage sometimes used in passing the strait. It may be known by a building or fort with round bastions on a rocky cliff, the land rising behind it. It is in lat. $12^{\circ} 34'$ N., long. $123^{\circ} 44'$ E. The anchorage in the road is in 15 or 16 fathoms, sand and gravel, a little more than half a mile off shore, with the house or fort bearing S.W. $\frac{3}{4}$ W., a pyramidal rock to the southward of it, South, the sugarloaf hill on Luzon N. $\frac{1}{4}$ W., and the mouth of Sorsogon Harbour N. by E. $\frac{3}{4}$ E. 13 miles. The bank is steep, so anchor as soon as possible. There is very little stream in the road. High water at $6\frac{1}{2}$ hours; rise 6 ft. The South point of the entrance to the harbour is fronted by a reef which stretches along shore to the southward; and a reef projects nearly half a mile from a point where there is a black rock, about a mile to the North from the North point of the harbour's mouth. The latter is contracted by a reef on the South side, but inside the harbour there is room for several ships. The northern

arm being very shoal, vessels are obliged to anchor on the South side, with the entrance partly open. The watering place is about 2 miles to the northward. Good beef and fruits may be procured. It was in this port that the galleons from Manila awaited a favourable wind for their voyage to Acapulco. At 3 miles to the N.W. is *Togagauno Bay*, and at the N.W. end of the island is the bay or port of *San Miguel*, protected from the East.

MASBATE is the next of the Visayas Islands, south-westward of Ticao. It is somewhat of a crescent form, 36 miles long, and has a chain of mountains running along its entire length, from the slopes of which the rivulets bring down sufficient gold to make the washings for it payable. It is very thinly inhabited. *Puerto Barreras*, near the N.W. point, offers safe anchorage, but requires great care in entering. Its S.E. point, *Cape Caduljuan*, has a reef around it, a continuation of that fronting the East coast of the island. The land surrounding this port is for the most part mountainous and of a red colour, from whence it seems that various handsome patterns of wood are obtained. There is no watering place in the bay, and therefore a vessel must send well up the river for it. The town is at a considerable distance from its mouth, and has thirty or twice that number of families in it from Balino, very poor in spite of the beautiful place, and the washings for gold hard by. The natives are held in such terror that the inhabitants dare not even go to fishing in the bay.

The N.E. part of Masbate from the Bay of Mobo as far as Port Magdalena has anchoring ground of 30 to 35 fathoms at half a mile off shore. The *Port of Magdalena*, in lat. $12^{\circ} 27\frac{1}{2}'$ N., long. $123^{\circ} 33'$ E., is very small, but is an excellent anchorage, for notwithstanding being open to the N.W. it may be considered safe in all seasons. Even a large vessel may be secured with as many fastenings as required to trees, and although she might be blown on shore with the few winds to which it is exposed, she would come to no harm on mud. The margin of the port has no settlement, but about $1\frac{1}{2}$ mile to the westward is the town of *Balino*, containing about eighty families, in the inlet of which there is shelter for small boats, and a small river. Some vegetables, fowls, and honey, are all that is to be had there.

Between Masbate and Sibuyan are several known dangers. *Bennet Bank* is a patch of sand and mud, a mile in diameter, its centre being in lat. $12^{\circ} 24'$ N., long. $123^{\circ} 6'$ E. It bears S.W. $\frac{3}{4}$ S. 15 miles from Bugui Point, the N.W. point of Masbate. At 7 miles S.S.W. from it is a sunken rock. A $4\frac{1}{2}$ -fathom patch lies 4 miles West of Mirabeles Point, the North point of entrance of Nin Bay. *Las Llagas* is the name given to five patches, separated by deep water, lying in the middle of the strait. Of these the northernmost, in lat. $12^{\circ} 15'$ N., long. $122^{\circ} 54'$ E., has only 4 ft. water over it. At 3 miles South from this is a $2\frac{3}{4}$ -fathom patch, and S. $\frac{1}{2}$ W. of this is a patch of $3\frac{3}{4}$ fathoms. There is a depth of 107 fathoms between the two last men-

tioned. The easternmost has only $1\frac{3}{4}$ fathom water over it, and lies in lat. $12^{\circ} 13' N.$, long. $122^{\circ} 59' E.$, 5 miles E.S.E. from the northernmost. A sunken rock lies 4 miles S.W. from the eastern patch.

Cervera Bank, of $1\frac{3}{4}$ fathom, lies S.E. by E. $\frac{1}{2}$ E. 8 miles from Cambalayan Point, the East point of Sibuyan, in lat. $12^{\circ} 21' N.$, long. $122^{\circ} 49\frac{1}{2}' E.$ At $1\frac{1}{2}$ mile East from it is another small bank. *Perseus Bank* is $4\frac{1}{4}$ miles S.S.W. from Cervera Bank, and another bank is marked at 2 miles S.W. from it.

Cresta de Gallo is a small islet, S.E. $\frac{3}{4}$ S. 6 miles from Point Cautit, the South point of Sibuyan. Shoal water extends a mile North from it, and $3\frac{1}{2}$ miles to the S.S.W. *Prueba Bank*, of 6 fathoms, lies South from Point Cautit, and N.W. from the Cresta de Gallo, and there are two $4\frac{1}{2}$ -fathom patches, one lying N.N.E. 3 miles, and the other S.E. by E. the same distance from the Cresta de Gallo.

ZEBU or Cebu is an island of some importance and interest, as its port has been thrown open to foreign commerce. The island is 120 miles long, and narrow, with ranges of hills of no great height traversing it in a longitudinal direction. The town of Zebu, the oldest in the Philippine Islands, and the seat of government of the southern Philippines, lies in an extensive and well cultivated plain, at the foot of the mountains, and is considered healthy.

The population consists of 80,000, principally Malays and Chinese. The huts of the poorer Malays, mostly fishermen, on the sea shore, constitute the western part of the town, while beyond them stand numerous massive houses, with good streets. The town is well built, and has large barracks, two churches, and a lazaretto. Zebu has also a naval station.

The exports consist chiefly of sugar, hemp, tobacco, coffee, and piña lace; the imports embrace European goods, rice, and coal. Coal is imported from Australia; a vessel cannot depend upon a supply with certainty. There is coal on the island, but not properly mined. Provisions are plentiful. In 1874, 6,933 tons of shipping entered at Zebu.

The channel between Zebu and Leyte is clear as far as is known, with the exception of the following banks, which are easily avoided. *Calangaman Island* is low, and lies S.E. $\frac{1}{4}$ E. 15 miles from the N.E. extreme of Zebu. Its western end should not be approached within 3 miles. *Capatancillo* is another small, low island, 2 miles off the coast of Zebu, and S.W. 12 miles from Calangaman. Shoal water extends 4 miles N. by E. from it. About midway between Zebu Island and that of Mactan, E.N.E. of the city, are the *Camote Islands* against the Leyte shore, but which leave good channels around but not between them.

The Port of Zebu is protected by the small island of Mactan or Magtan, before mentioned. It is about 9 miles long, and the town lies in about mid-

way through the strait on the shore of the larger island. The strait forming Port Zebu is easily navigated, as there is always the ripple on the edges of the banks, and their colour marks the channel. Fort Zebu is a triangular building, painted red, and armed with small guns.

On the small island of Mactan, Magellan was killed, soon after he first discovered the Philippines in 1521. In memory of the great navigator, Queen Isabella II. has erected a conspicuous monument.

Light.—A small fixed light, elevated 46 ft., is shown on Bagaca Point, the West side of the northern entrance to the Port of Zebu. It is difficult to distinguish from fishing lights shown in the vicinity. Lat. $10^{\circ} 4' N.$, long. $123^{\circ} 59' 20'' E.$

The narrow channel entrance bears about S.S.W. from the light, and in entering, the South or Mactan side should be kept, as a shoal extends a great part of the way over the channel from the opposite side, but in mid-channel there is nothing to pick up a ship in her route to the town, the fort forming the outer point of the city. From this to the southern entrance the route is also clear, but in mid-channel in the southern opening is the *Bajo Lipata* (mentioned below), which must be cautiously approached.

The best anchorage off Zebu is S.S.W. of the fort, in 5 to 7 fathoms, mud; nearer the southern reef the water is deeper, and bottom hard. From the anchorage off the fort a south-westerly course should be steered until the dome of San Nicholas church bears N. $\frac{1}{4}$ E., when a course of S. $\frac{1}{4}$ W. leads in the fairway between Lipata Bank and the reef on Mactan Island.

The harbour is difficult of access for large vessels from the North, owing to the narrowness of the channel, unless with a leading wind. With a fair wind it is not dangerous, the passage between being deep enough, and only requiring to be less imperfectly buoyed off. To the South the entrance is more open and easy of access, though care is required to avoid the Lepata and Narvaez shoals.

H.M.S. *Challenger* visited Zebu in January, 1875, one object of her visit being to obtain some specimens of the beautiful sponge *Euplectella* or Venus' baskets, said only to be obtained near Zebu. "The pinnacle, taking guides who knew the bank where they grow, went out to get some. The natives lowered their apparatus—a bamboo triangle of two sides, on which thirty-six fish-hooks are fastened; with this they always brought several up, sometimes as many as ten. They were very fine specimens, the skeletons covered with brownish animal matter, but so that the skeleton tracing was not hidden, while the top is usually bare. One day's drying in the sun will take the animal matter off, leaving the bleached skeleton clean."—*Lord George Campbell*.

Dalaguete Village, about 40 miles southward of Zebu, is marked by a conspicuous church, which may be seen a long distance both from the North

and South. On Tañon Point, the southern point of Zebu Island, there is also a large village, with a church. *Sumilon Island*, lying to the N.E. of Tañon Point, is about 150 ft. high.

Bohul forms a part of the province of Zebu. It is about 50 miles long, and possesses no point of commercial interest. Its North and West coasts are bounded by rocky shoals, and to the N.E. the channel between it and Leyte is nearly closed, but a narrow passage will be found close to the Leyte shore, between it and the small island of Camigao. A $1\frac{3}{4}$ -fathom patch lies 7 miles North of Point Acio, the eastern point of Bohul, 2 miles off shore. *Fuegos* or *Siquijor Island*, 20 miles to the S.W. of Bohul, has also nothing to be described. A sunken rock lies 2 miles off its N.E. coast, N.E. from the highest peak.

Cervera Rock is 2 cables long, N.E. and S.W., and has 13 ft., coral and sand, on its shoalest part. From the rock, the S.W. extreme of Bohul Island bears N. 60° W., the North extreme of Pamilacan Island N. 82° E., the South extreme S. 88° E., the Mount N.E. of Pangalo N. 4° E.

NEGROS was formerly called Baglas. It is 110 miles long, and although larger, is not so rich or populous as Zebu. Its interior is but little known, but is peopled by the Negritos, who have given the name to the island. The villages are generally built on the sea shore, with the exception of *Tanay* and *Iloc*, which are in the interior. The chief place of the island is *Jimamailan* or *Himamaylan*, about the centre of the western coast, seated on an open bay at the mouth of a small river, over the bar of which small craft are floated by means of bamboos placed under their keels. The only harbour deserving of mention is *Bacolot*, opposite to the island of Guimaras, against the Panay shore. From the North point an extensive reef extends for 20 miles, connecting it with *Bantayan Island*. The western side is in general safe and sandy, but the eastern side is very dangerous, especially in the South, where the *Strait of Tanon* separates it from Zebu. This is not more than 2 miles in width, and subject to most violent currents.

BURIAS is a long, narrow island, 40 miles from N.W. to S.E. by 5 miles broad. Its surface is rocky and hilly; rice, maize, and abaca (hemp), are the chief products. It was long without inhabitants, or only visited by piratical Moros, but is now used as a place of transportation for criminals from Manila, and, in order to create an excellent population, abandoned women are also sent here.

Busin.—At its N.W. end is the harbour of *San José* or *Busin*, formed by the island of San José, with Fort San Pascual on a hill commanding the narrowest part. There is a safe entrance from the N.E., as well as a narrow one from the westward; but the following off-lying dangers require mentioning. At 2 miles North from the East end of Busin Island, and 4 miles W.S.W. from the small island of *Anima Sola*, is a sunken rock. Numerous islets and dangers extend N.W. to the distance of 2 miles from the West end

of Busin, and N.N.W. $2\frac{1}{2}$ miles from this end is a small detached islet, with a bank N.N.E. a mile from it. *Templo Island*, 3 miles long W.N.W. and E.S.E., with sunken rocks off each of its extremities, lies 3 miles West of Busin. *Sombrero Islets* are 2 miles West of Templo Island; and *Sand Island*, 2 miles West of Sombrero Islets, has sunken rocks to 2 miles off its North end.

By night the entrance of Busin Harbour is facilitated by *three fixed lights*—one at the North entrance, a second at the West entrance, and the third on the end of the bank. Brought in one with the last they lead through the respective channels. The N.E. side of Busin is quite bold-to, but a reef projects from its S.W. side.

Busainga Harbour is on the N.E. coast, 6 miles South from the *Anima Solo Rock*, which lies off the North point of Burias. A fixed *blue* light is shown here.

Boca Engano Harbour is about 15 miles from the S.E. point. Its position is marked, by night, by a *blue* fixed light.

Malaguing Gilog Harbour is on the S.W. coast, about 12 miles from Boca Engaño. Its situation is also shown by a *blue* light at night.

We have no particulars of these three last-named ports or anchorages.

PANAY is, next to Luzon, the most important of the Philippines, and is the largest of the Visayas Islands. It is, for its area, the most fertile and densely populated. It is somewhat of a triangular form, 95 miles long, and with an area of 3,960 square geographical miles. A chain of high mountains runs from North to South throughout its whole extent; but little is known of the interior. From its physical features, being abundantly elevated, and lying in the midst of the archipelago, it is a flourishing island; and the opening of its chief port Ilo-ilo to foreign commerce, will lead to a great advance in its commercial prosperity. It is divided into three provinces, Capiz on the North, Ilo-ilo on the East, and Antigue on the western shore. The population of the whole island was estimated to number 1,052,586 in 1875.

Between the S.W. point of Masbate and the N.E. point of Panay is the island of *Jintotolo*, with a reef off its western part, and 8 miles W.S.W. from it are the two *Zapatas*, nearly of the same size and height. *Zapata Menor* being 270, and *Zapata Mayor* 260 ft. high, the former bare, and the latter wooded and partially cultivated. *Jintotolo* is flat, and thickly wooded to the water's edge, the trees being about 120 ft. high; it is apparently uninhabited.

The **Capiz Coast**, or North side of Panay, is about 80 miles in extent.

There are numerous off-lying reefs about its western part, and therefore it should not be made free with. At 19 miles West of the eastern point is the island *Olutaya*, surrounded by a reef, with no good channel inside it, but that between it and *Zapata Menor* is quite safe. *Punta Bulacaue*, the N.E.

point of Panay, is low, and in lat. $11^{\circ} 36' 30''$, long. $123^{\circ} 13' E$. It is surrounded by a reef, and at from 5 to 6 miles N.N.E. of it there is a dangerous reef of 18 ft. least water, called the *Cucaracha*. A dangerous $1\frac{3}{4}$ -fathom patch also lies 3 miles off shore, at 10 miles W.S.W. from it.

The *Silanga Islands* lie off the N.E. point of Panay. This portion of the Philippine Islands, comprising the strait between Panay and Negros with the South and S.W. coasts of the former island, were surveyed by Lieut. D. Claudio Montero, of the Spanish navy, in 1854, and therefore the charts are deserving of more confidence here.

The *Gigantes Islands*, North and South, are the north-easternmost of these. A bank extends eastward from the northern one, but there is a 12-foot channel between them, and the channels West of them are open. *Calagnan* and *Sicojan Islands*, both high, lie about 8 miles S.W. of them. A 4-fathom bank lies $2\frac{1}{2}$ miles South from the South point of the latter. The most conspicuous land-mark here is the *Pan de Azucar*, or Sugar-loaf Island, the summit of which is in $11^{\circ} 17' N$. A series of islands extends south-westward from it towards the Strait of Iloilo, but they are generally bold-to. *Tagil* is next South of the Pan de Azucar, separated from it by a narrow but shoal channel. Between the South end of Tagil and the Panay shore is the anchorage of *Bacahuan*, in the strait separating the islands.

A written description of the shoals which encumber the channel North of Negros and S.E. of the Gigante Islands would be useless; they can only be understood from the chart.

Tagubanhan Island is the last of the larger islands, and has a safe channel on either side. At $1\frac{1}{2}$ mile North from its N.W. part is *Apiton*, where there is a watering place. From this to the *Calabazas Islets* is 5 miles, and at $1\frac{1}{2}$ mile S.S.W. of them, and the same distance off the Panay shore is a sunken rock, the *Pepitas*.

Turia Rock lies in this part of the channel, and is *very dangerous*. It presents a surface of 33 yards, over which there is no more than $5\frac{1}{2}$ ft. water, with 8 fathoms close to.

The commander of the gun boat *Prueba* took the following bearings from a spot 73 yards North of the said rock, in $4\frac{1}{4}$ fathoms:—the S.E. part of Anauayan Island N. $47^{\circ} 20' E$.; the South part of Ilacaon Island, S. $85^{\circ} 52' E$.; the North part of the Calabazas Isles, N. $63^{\circ} 14' W$.; Visita Manapla, S. $11^{\circ} 10' E$.; and the North part of the southernmost of the Binanan Isles, S. $29^{\circ} E$.; placing the rock in lat. $11^{\circ} 2' 15'' N$., long. $123^{\circ} 5' E$.

ILOILO having been opened to foreign commerce, as before said, possesses more interest than most other ports in the Philippines. The town or village stands on a low point of land at the eastern entrance of a creek near the S.W. end of the strait which forms the harbour. H.M.S. *Challenger* visited Iloilo in October, 1874, and obtained a supply of coal. A few English merchants were there doing business in sugar and hemp. The town was

found to be not at all attractive, part of it being flooded at high water, and the streets generally in a dirty condition. In 1875, 52 vessels entered Iloilo, aggregating 35,453 tons, of which 14,886 were British.

The *Isla de Guimaras*, 22 miles long by $\frac{3}{4}$ in breadth, forms in front of Iloilo a sheltered passage, running N.E. and S.W., with a breadth varying from $2\frac{1}{2}$ to 6 miles, with deep water and good anchorage. The best entrance which is from the South, is considerably narrowed by the *Otong Bank*, which stretches from the Panay shore to the W.S.W. for a considerable distance, above 4 miles, and is increasing to the westward. The channel is clear to the southward of it, and there is a narrower one to the northward. It is no obstacle when once made out during the S.W. monsoon, and with a contrary or N.E. monsoon, vessels can work or drag through with the tide, keeping well over towards Guimaras, anchoring, if necessary, on the edge of the sand, which affords good holding ground. This southern entrance should be used by all large ships if unprovided with a pilot. The edges of the Otong Bank are marked by fishing stakes, and at its N.E. end there is good anchorage.

If blowing hard in the southern channel a vessel may proceed to Port Buluagan or Santa Ana, on the West side of Guimaras, which is easy of access, and capable of admitting vessels of large tonnage, and affords good shelter under almost any circumstances.

The *Fort of Iloilo* occupies the extremity of a low spit, with deep water close-to. It is in lat. $10^{\circ} 41' 50''$, long. $122^{\circ} 36' E$. The town lies on the beach to the N.W. of it, and to the North of it is the entrance of the river or creek, on the South point of which is a post-house, or Ventay, a small bamboo watch-box. It is high water, full and change, at 12 o'clock; rise $5\frac{1}{2}$ feet.

The strait beyond this assumes a more northerly direction, with the shore bold-to on the eastern side. At 7 miles to the north-eastward in the eastern entrance of the Narrows, is a cluster of remarkable rocks, called the *Siete Pecados*, the Seven Sins Rocks. At $1\frac{3}{4}$ mile East of them is the West end of the *Iguana Bank*, a narrow spit $2\frac{1}{2}$ miles long East and West, with 6 feet least water. The best channel is to the North of it, but it is also clear to the southward. *Punta Dumangas* forms the N.E. point of the entrance.

Having arrived at the southern entrance of the strait according to the directions subsequently given, you will at once see at daybreak whether it is ebb or flood tide; if ebb, it is necessary to stop at anchor till it turns (that is with the wind at N.E.), as with the flood tide you can easily work up in short tacks under the Guimaras shore. A bank lies in the bay, on the West side of Guimaras, 3 miles South from Iloilo Fort. Making Iloilo Strait from the southward, Bondulan Point, which is high and bold, should be brought to bear N.E. $\frac{3}{4}$ N., and steered for until the remarkable clump of trees in Iloilo is seen. These trees brought about half their width open of the point,

until the southern angle of the fort opens of Bondulan Point, will lead clear of the Oton Bank. In thick or hazy weather, when you cannot see the fort (which is very seldom the case), you must never bring the point of *Bondulan* on Guimaras to the East of N.E. $\frac{1}{2}$ E. ; but keeping the fort a little open of this point is the best leading mark with a fair wind. When past Point Bondulan, and the wind is fair, you ought to keep the fort a little on the port bow.

The best anchorage to load is with the fort bearing S.W. $\frac{1}{2}$ W., and the small bamboo watch-box near the port entrance of the river N.W. $\frac{1}{2}$ N. It is dangerous to keep near the starboard entrance of the river, as the surf is heavy at times, and the tide runs strong. At spring tides high water a vessel drawing 16 ft. can come out, but at ordinary tides only 15 ft. Always have a pilot for entering the river.

The depth of water on the bar at the entrance of the creek or river Iloilo is about 10 ft. at low water, but within the river there are nearly $2\frac{1}{2}$ fathoms with the sides of a vessel nearly touching the mangroves, and off the town it deepens to 5 fathoms. A vessel drawing about 15 ft. can enter or leave; and when, as is proposed, a dredging machine is employed to clear away the mud which has been allowed to accumulate at the shallower parts near the entrance, vessels of almost any burthen will be able to complete their cargoes. The banks of the creek being of soft mud, there is little or no risk to be apprehended from grounding. Proceeding about $1\frac{1}{2}$ mile up the creek, the coasting craft bring up at the jetties of their respective owners, and have the great advantage of discharging and loading at the stores without employing boats. Coasting vessels can go beyond this point as far as Molo by passing a drawbridge.

The channel for entering the river is marked by *four beacons* (1864), formed each of three piles, two on each bank. The direction of the channel is N. 7° W., and the depth in the channel is 14 ft. at lowest tides, deepening to 17 ft. inside the bar. Great care should be used to guard against the violent currents in the entrance.

The country around Iloilo is well cultivated, the inhabitants quiet, and apparently industrious. The chief exports are sugar, sapan wood, tobacco, hides, hemp, and rice. The women make large quantities of *pina* goods from the fibres of the pine-apple leaf, and from cotton, silk, and hemp. Fresh beef is cheap and good, and by giving a few days' notice two or three hundred bullocks could be procured, each weighing about 200 lbs., at the rate of about 7 dollars a bullock. Fowls, eggs, &c., may be obtained.

Provisions and coolies are much cheaper, and good water can always be got to the North and South of the village of *Tilas*, opposite to Iloilo on the Guimaras shore. The tide changes very suddenly, and runs down very strongly.

Port Santa Ana, or *Buluagan*, on the West coast of Guimaras Island, 10

miles S.S.W. of Iloilo, affords excellent shelter. It is a landlocked basin, a mile in extent, with from 3 to 9 fathoms water. The entrance channel runs East and West. The South side is the best, as there is a sunken rock on the North side of the entrance, and a spit runs off from the North point. Within the harbour, towards its head, is another sunken rock, which must be looked to in seeking an anchorage. There is a river of good water at the head of the bay.

DIRECTIONS.—The ensuing remarks by Mr. Vice-Consul Loney, as to the routes toward Iloilo, will be applicable generally to the navigation of the inner channels of the Philippine Islands either to the port in question or towards Manila or Zebu.

South-West Monsoon.—Vessels making the voyage from Australia or any place to the southward of the Philippines, will find it the best course in the S.W. monsoon to enter the Philippine Archipelago by the Strait of Basilan (page 894), between that island and Samboangan; and in passing Point Batalampon, the S.W. point of Mindanao, to keep well up to Point Gorda, 58 miles to the northward, and the N.W. point of the western peninsula of Mindanao, and make the *Murcielagos Islands*, 17 miles farther to the N.E., and thus avoid being swept off to the westward by the strong currents setting from off the Mindanao coast during both monsoons.

After passing the *Murcielagos*, the high land of Negros soon becomes visible, and the course is clear and safe along its western side towards the island of Guimaras. When off the S.W. point of Guimaras, the route is direct for the narrow channel between that island and Iloilo. On making and entering this channel, care should be taken to keep on the Guimaras shore, so as to clear the Otong Shoal. This shoal, being of soft sand, may be approached pretty closely, in the event of its being necessary to beat through. The tides run through the passage with considerable strength; but if unable to make head against the ebb, bring up on the edge of the shoal, and wait for the flood to the northward.

The North-East Monsoon.—During this monsoon it is generally considered to be the best route for ships from Australia to Manila, to make a detour to the eastward of the Philippines, and enter the Archipelago by the Strait of San Bernardino. In coming from Australia to Iloilo, it will therefore be advisable, during the period of northerly wind, to beat up outside as far as Samar, and enter the Bernardino Straits by that island and Masbate. If bound from Manila, or ports to the northward, vessels may also safely proceed towards Iloilo through the Mindoro Passage, and onwards through the chain of islands off the N.E. coast of Panay. After passing Tablas and Romblon, the latter with an excellent light and a good harbour, make for the Silangas Islands, the group off the N.E. end of Panay, a good mark for which is the high conical island, the Pan de Azucar, which is visible from a great dis-

tance. In approaching these islands during the N.E. monsoon, vessels should keep along between the islets of Jintotolo and the larger Zapata; and during the S.W. monsoon move in towards the Panay shore, between Olutaya and Zapato Menor. After leaving the Zapatas, the course is to the northward or southward of the Gigantes, as preferred, and the channel through the group of islands is generally entered between Sicogon and Calaguan, from whence the route is continued past Culebra, Pan de Azucar, Bagabu, and Tagubanhan, though for vessels of heavy tonnage it may possibly be found preferable to adopt the outer and broader passage between the groups of islands and Negros, keeping within 2 or 3 miles of the Negros shore, in order to avoid the dangerous *Turia Rock*, described on p. 910.

If the inner route among the islands be taken, good anchorage will be found throughout, more particularly at Pan de Azucar and at Bacauan or La Concepcion. At Bacauan assistance and supplies may be had through the commandant of the district, and at Apiton good water and live stock can be obtained. After passing Tagubanhan, and emerging into the broad channel (after passing the *Turia Rock* above mentioned), the best course is to steer direct for the highest land visible on the island of Guimaras, care being taken to clear the Calabazas and the Pepitas Rock, and then proceed as above directed.

It should be remarked that the coast from the Gigantes to Iloilo affords good anchorage, and vessels have been known to ride out heavy gales in the open channel between Negros and Panay.

The ebb tide to the North of the Pepitas Rock runs to the eastward, but to the South of it it sets to the West. It runs through the Silanga Islands, and as far as the Seven Sins, about 3 or 4 miles an hour, but in the strait, owing to its being so constricted, it is said to run at 6 or 7 miles an hour.

From Manila to Iloilo, the best and safest route, according to Captain Ganswyk, is to proceed along the West coast of Panay, or close along the coast of the Province of Antiques), at any season, because the West monsoon is not very regular, and seldom or ever blows strongly between the Cuyos Archipelago and Panay, or to the North of Basilan. To the North and along the East coast of Mindoro is safe and easy, and if it should happen that you meet with strong S.W. winds near Tablas, it is time enough then to keep off and go along the East coast of Panay. The South coast of Panay is free from dangers till near the Oton Shoal, and the wind scarcely ever blows on the land. The bights along the coast have deep water, and you can work close in-shore, or from point to point, with perfect safety; but there is no good anchorage, as the coast is steep, and the holding ground not good. You may sail close to the West side of Panay, or the coast of Antiques anywhere to the South of *Balbatan Island*, lat. $11^{\circ} 36' N.$, which is very steep, only avoiding *Maralison Island*, lat. $11^{\circ} 20' N.$, which has a reef

to the East and West, and sunken rocks near the shore at Nalupa, in lat. $11^{\circ} 11' N.$, and at San José in lat. $10^{\circ} 44' N.$ There is also a 6-fathom patch near Tibiao in lat. $11^{\circ} 18' N.$ When you double the S.W. point of Panay during the night, you must not go too close to the islands off it, *Juraojurao*, off the South extreme, and *Nugas*, which is 4 miles to the W.N.W., as both of them have reefs around them to the southward, but not to a great distance. When clear to the eastward of these islands, and not too far South, you may safely steer N.E. by E. 32 miles without any danger; but at that distance it is necessary to lie-to during the night; or, if the night is very clear, to run in towards the shore of Panay, and steer carefully along the coast, at the same time keeping the lead going, and as soon as you are in shoal water to anchor at once till daylight, because if you keep over towards the Guimaras shore (particularly during the N.E. monsoon), you will find no anchorage, and will lose ground. Thence proceed as above directed.

The voyage from Iloilo to Manila, during the north-easterly monsoon (from November to March), usually occupies the better class of square rigged vessels from 10 to 15 days, and from 4 to 6 on the return voyage. Owing to the protection afforded by the chain of the Silanga Islands, and by other harbours on the route, the Iloilo vessels do not (as is usually the case between the ports on the northern part of the more exposed coast of Luzon and the capital) lay up during the stormy months from September to November, and communication, though less frequent during these months, is seldom altogether suspended.

The Coast of Antique, as the western coast of Panay is called, from its being the province of that name, runs nearly North and South. General directions for it have been just given. It is commercially unimportant, for the people are not so industrious as those of other parts of this fertile island. During the S.W. monsoon it is in general highly dangerous to approach it, and at this period the coasters scarcely venture out for fear of pirates. There are one or two points where ships call for water and provisions. It is composed of alternate hills or mountains, and plains, and when the rice grounds are green some parts appear very pleasant. Generally the temperature is agreeable, and the climate healthy.

Aniguig, near the South point, may afford some refreshments; it is in a deep bay. The country inland and for some distance is formed by a ridge of rugged mountains, called the *Cresta de Gallo*, the Cockscomb Mountains forming part of the great chain which runs through the length of the island.

San Jose de Buenavista, 17 miles from the S.W. point of the island, and in lat. $10^{\circ} 45'$, is with the village of *Antique*, 3 miles southward, considered to form the capital of the province. It is a miserable place, founded in 1733, with a few forts to guard against pirates. There is good anchorage off it, but it is not safe, and, as a sunken rock exists, should not be approached at

night. It is a convenient place for water and refreshments, as a Spanish resident will lend his aid. In coming here with a brisk wind, sail must be reduced in time, as the bank is very steep, decreasing rapidly from 30 to 7 or 8 fathoms, the proper depth.

To the northward of San José the coast may be approached with caution, and in daylight to within 3 or 4 miles. But caution should be used, as the coast is not well known. *Napula* (or *Nalupa*), in lat. $11^{\circ} 10\frac{1}{2}'$, is 25 miles North of San José, and 5 miles southward of *Tibiao*, a small pueblo on a projecting point. Also while proceeding southward from the village of *Tibiao* on the West coast of Panay Island, Captain Fagg obtained soundings on a coral reef well known to the small coasters, off the pueblo or village of *Napula*; some parts of the reef appeared awash, but he had $1\frac{1}{2}$ fathom with the village of *Nalupa* bearing E. by S., distant about 2 to $2\frac{1}{2}$ miles. In lat. $11^{\circ} 20'$ is the high island of *Maralison*, and 4 miles farther North is the low point of *Lipata*, surrounded by a reef; 9 miles North of this is the larger islet of *Balbatan* or *Maniguig*. A bank exists near the coast, $7\frac{1}{2}$ miles North of Point *Lipata*. Point *Pucio*, the westernmost point of Panay, is in lat. $11^{\circ} 46\frac{1}{2}'$ N., long. $121^{\circ} 50'$ E., and has a rock near it.

The outlying rocks off the West Coast of Panay belong more particularly to the Sulu Sea, and are hereafter described.

THE SULU SEA.

The space included between the Sulu Archipelago on the South, to Mindoro on the North, and having the Philippine Islands on the East, and Palawan on the West, is distinguished by the term of the Sulu Sea, or sometimes as the Sea of Mindoro. Although of great depth (1,778 fathoms), this sea is thought to have no greater depths than 250 fathoms in the passages which join it with the surrounding seas. The deep sea temperatures, taken by Commander Chimmo, showed that from a surface temperature of 84° in each sea the thermometer fell to 55° at 200 fathoms, and 37° at 1,600 fathoms in the China Sea. While in the Sulu Sea, although it was the same at 200 fathoms, yet the bottom temperature was 50° , or about equal to that at a depth of 300 fathoms in the China Sea. He therefore argues, from this and other data, that the water filling the deep basin of the Sulu Sea cannot be drawn from a greater depth than 250 or 300 fathoms out of the surrounding seas.

Winds.—The N.E. monsoon in the Sulu Sea prevails from December to June. The first burst of the S.W. monsoon was experienced at Ilo Ilo on the 10th of June (1871), when it blew a heavy gale from that direction,

with torrents of rain, the wind shifting to the N.E. again two or three days afterwards, and blew generally from that direction at Zebu and Camiguin in the middle of July.

Crossing the Sulu Sea in H.M.S. *Nassau*, during July, the wind was light, from W.N.W. to N.W., with heavy clouds in the S.W. and gloomy weather. On her arrival at Cagayan Sulu, the wind shifted to S.E., after which it blew from N.W. to S.W., squally, with heavy continuous rain. Between Cagayan Sulu and Labuan the winds were light and variable.

Currents.—During the N.E. monsoon the current runs regularly in the direction of the wind, and varies in strength according to the force of the wind. In the early months of this monsoon, when the wind blows strongest, the current runs with the velocity of a mile an hour, decreasing to about half a mile an hour in May and June.

The eastern limits of the Sulu Sea have been just described; the coast of Palawan is given in former pages, from the surveys and remarks of Captain Bate. The Sulu Group is also described previously.

The North-East Coast of Borneo is so little known that to describe its shores and dangers would be useless. We, therefore, only notice its more important harbours and their off-lying dangers. Unsang Anchorage has been mentioned on page 888.

SANDAKAN HARBOUR.—In 1873 a trading settlement was established at Sandakan Bay, very centrally situated for collecting the valuable productions of that neighbourhood. The subsequent hostile operations of the Spaniards against the people of the Sulu Archipelago have given additional importance to this place, and the bay is visited by a steamer from Labuan.

Caution is necessary in approaching Sandakan Harbour, as the shoals in the neighbourhood are imperfectly known; to the north-westward they are said to extend 7 miles from the shore. The entrance of Sandakan Harbour may be recognized by Bahalatalis Island, situated on the western side of the entrance of the harbour, in lat. $5^{\circ} 50' N.$, long. $118^{\circ} 11' E.$ The south-eastern side of the island descends abruptly from a height of 980 ft., while the north-western side slopes gradually. The islets on the reef extending North from this island are densely covered with wood.

The shoal of 13 ft., lying on the eastern side of the entrance seaward of Towsan Dooyon Island, does not show by discoloured water. The S.E. point of Bahalatalis Island bearing S.S.W. leads clear of dangers on either hand, and when the island is passed the vessel may steer direct for the anchorage abreast Buy Island.

Good anchorage will be found well inside the entrance on the western shore, in from 9 to 6 fathoms, with a high peak bearing N.W. The *Hertha* anchored in mid-channel in $10\frac{1}{4}$ fathoms, mud, with the N.E. point of Buy Island, bearing S.S.E., about 10 miles distant from the European settlement.

There are two small villages in the harbour, also a station of the Labuan Trading Company. Firewood and good water can be obtained from the natives, but no other supplies.

Tides.—The flood tide in Sandakan Harbour sets at the rate of a half to $1\frac{3}{4}$ knot for 6 hours, the last 3 hours being after the turn of low water; and the ebb at the rate of a half to $1\frac{1}{2}$ knot for 18 hours.

There are several islands lying to the north-eastward of the entrance of Sandakan Harbour. *Taganac Island* is 15 miles N.E. from Bahalatolis Island, and E. by N. 8 miles from Taganac is Baguan Island. Each of these islands is less than a mile in diameter. *Clotilde Rock* rises about 10 ft. above the level of low water, and is about 100 yards long N.N.W. and S.S.E., and about 20 yards broad. From the rock Baguan Island bears S.E. by S., southerly, $9\frac{1}{4}$ miles, and Taganac Island S. by W. $\frac{1}{2}$ W. 9 miles; these bearings place it in lat. $6^{\circ} 9' 50''$ N., long. $118^{\circ} 25' E.$ *Laurel Rock* is about double the height and size of Clotilde Rock. It lies N.E. by N. 4 miles from Baguan Island. At 11 miles westward of Clotilde Rock is another rock, 3 miles N.E. of the Bukkungan Islets.

CAGAYAN DE SULU is a small group in the south-western part of the Sulu Sea, bearing about 100 miles N. by W. from Cape Unsang, on Borneo, and 75 miles East of Mallawalle Island, South of Banguay. It seems to belong to no power, unless claimed by the Sulu Sultan, and *was* a resort for pirates. There are several islets to the northward; the northernmost, *Quinapusan*, is 11 miles N. $\frac{1}{2}$ W. from the chief island, and the southernmost, *Mutigins*, 5 miles to the S.W., are two in number, one in form of a saddle, with anchorage near them, and they are safe to approach.

The chief island, Cagayan, is large, 1,000 ft. high, and well clothed with trees. It is of volcanic origin, and a portion of it appears as a complete crater, having one or more very deep circular basins within the edge, but they are quite barred from approach from the sea. Captain Sir Edward Belcher's observatory was set up on a small islet, at the entrance of this most romantic basin, lat. $6^{\circ} 58' 5''$ N., long. $118^{\circ} 24' 11'' E.$, being nearly on the meridian of the great island. Reefs appear to extend fully a mile from the western shore, with rocks dry at low water.

“Cayayan is about 25 miles in circumference, nearly on every point surrounded by a fringe reef of coral, in a very active and progressive state, and which affords protection to canoes, and rafts made of bamboo, to travel from one point to another in smooth lanes of water, enabling the natives to pursue their fishing, on which they chiefly exist, without being subject to heavy seas.

“The men fish, while the women do all laborious work, such as carrying water, pounding rice, &c. We found them very friendly all round the island, constantly coming on board, and accompanying us when on shore,

and very useful as guides (for a trifle) in cutting down trees and clearing away bushes.

“There are safe anchorages around the island in both monsoons; that in the N.E. is safe and good on the S.W. side in from 8 to 10 fathoms; another good anchorage on the S.W. side of Keenapoussan in 10 fathoms; a third about a mile South of the little islet at the entrance to the crater on the S.E. side in 12 fathoms, but all coral bottom.

“The water on the East side of the island is the deepest, having 240 fathoms 1 mile off the land, and strong tide rips around here often frighten the mariner; but they are about the deepest water.

“The S.E. side of the island is by far the most picturesque and interesting, but not the best anchorage; the land here slopes to the South, is richly wooded, and many parts cleared, having plantations of bananas and sweet potatoes; but no dwellings were visible from the ship, nor did any natives visit us, as they so readily did at the S.W. end on our first arrival.

“I do not know any island I have seen over the world more favourably situated for trade, or more suitably adapted for cultivation. Rice, sugar, cocoa, coffee, maize, potatoes, and vegetables, would all grow if cultivated. Cotton-tree and tobacco-leaf were already growing there. The soil is excellent, rich, of trap formation, with sufficient sand to make it loose and friable. Cattle of all sorts—horses, cows, sheep, pigs, and poultry—would fatten and thrive here. Enterprising men, with some Chinese labourers, would soon make it a valuable island, and not a disagreeable one, to live on.”—*Captain Chimmo, R.N.*, 1871.

Keenapoussan, a small island, 811 ft. high, is the northernmost of the Cagayan Sulu group. Anchorage will be found on the S.W. side of the island, in from 7 to 10 fathoms, coral and sand, with Keenapoussan summit N.E. $\frac{1}{2}$ N., and Pomelikan summit S.S.E. $\frac{1}{2}$ E. *N.E. Bank*, with only 4 fathoms on its shoalest part, lies N.E. by E. about $3\frac{1}{2}$ miles from Keenapoussan. *N.W. Bank* has a 4-fathom patch N.W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles from Keenapoussan, and runs in a N.W. and S.E. direction.

Between Bisu Bintoot and Bisu Bohan there is a safe channel, but Bisu Bohan, Bohan, and Mandah are connected by a reef dry at low water. All these islands, with the exception of Bintoot, are thickly wooded, Mandah having a sharp peak 283 ft. high. Bintoot appears a vast block of dark sandstone. There is a good channel between Pomelikan and Bintoot, but the latter island should be kept aboard, as a reef runs off Pomelikan to the southward and westward about 3 cables.

Tides.—At Cagayan Sulu, during the N.E. monsoon, it is high water, full and change, at 6^h 10^m, springs rising 6 ft.; the tides are, however, irregular and uncertain, the tidal stream being scarcely perceptible.

Muleege Islands lie 8 miles South from the West end of Cagayan Sulu. They are two small islands, 410 and 232 ft. above the sea respectively, and

bear N.E. by N. and S.W. by S. from each other. The channel between them should not be attempted. *Mambahenauan*, another small island, lies 20 miles S. by E. $\frac{1}{2}$ E. from Muleegee Islands.

The *Muleegee Patches* consist of a number of coral banks with from 5 to 10 fathoms; the shoalest lies W. $\frac{1}{4}$ N. 26 miles from the great Muleegee Island. A patch of $6\frac{1}{2}$ fathoms was sounded on in lat. $7^{\circ} 3' 36''$ N., long. $117^{\circ} 56' 24''$ E. The *Pudsey Dawson Dangers* are a series of coral patches, the western of which, with 15 ft., bears E. $\frac{3}{4}$ S. nearly 19 miles from the East extreme of Mallawalle Island, in Banguay South Channel; from this danger, on the bearing of E. by N. $\frac{1}{2}$ N. for about 13 miles, are several banks with from $2\frac{1}{2}$ to 10 fathoms on them. These banks are principally coral and sand, with deep water between; as a general rule they are not steep-to, and thus, if the lead be kept going, warning of their vicinity will be given. Dangerous reefs also lie westward and southward of the Pudsey Dawson dangers, and are only to be understood by studying the chart.

Viola Reef, having only 4 ft. at low water spring tides, and on which the Spanish vessel *Viola* struck and remained several hours, is reported as lying in lat. $7^{\circ} 50' N.$, long. $117^{\circ} 40' 50'' E.$ Another rock of doubtful position is marked at 5 miles N.N.W. of the Viola Rock.

St. Michael Islands consist of four islets; they lie about 40 miles to the northward of Cagayan Sulu; the largest, *Bancawang*, is about three-quarters of a mile long, and at 2 cables from the N.E. point is nearly divided by the sea. The N.E. point rises to a peak, 123 ft. high. Bancawang is connected with a small coral islet, lying $1\frac{1}{2}$ mile to the northward, by a reef extending from the North and West sides, with sand cays and large boulders on it. The islet is steep to the S.E.

Manuk Manukan, the larger of the two S.W. islets of the group, is thinly covered with trees, the tops of which are 32 ft. above the sea, and lies about W.S.W. $5\frac{3}{4}$ miles from the N.E. point of Bancawang.

There is no safe anchorage around any of these islands; in the progress of the survey, H.M.S. *Nassau* anchored in 6 fathoms, South of Manuk Manukan, and had 70 fathoms over the stern.

Two and a quarter miles N.W. of Manuk Manukan is a coral reef of $2\frac{1}{4}$ fathoms, which is considered to be connected with Manuk Manukan by shoal ground, and therefore to be avoided.

The *West Bank* is 4 miles to the westward of Manuk Manukan, and runs about N.N.W. and S.S.E. $3\frac{3}{4}$ miles long. The least water found was $6\frac{1}{2}$ fathoms, near the South end. The eastern extreme of the extensive *S.W. Bank* lies S.W. $\frac{1}{2}$ S. $4\frac{3}{4}$ miles from Manuk Manukan. H.M.S. *Nassau* anchored on this bank on several occasions in good holding ground. Red bream and large cod-fish in great numbers were caught on most of the banks when in depths exceeding 10 fathoms.

Java Reef, between St. Michael Isles and Bancoran, was discovered by

Captain Kempton in 1869. He found a depth of $2\frac{1}{2}$ fathoms least water, surrounded by depths of 5 and 6 fathoms. From the bank, St. Michael's Island bore S.W. by S. $\frac{1}{2}$ S.; Bancaran Island, N.E. $\frac{1}{2}$ N.; and Mount Mantaleengahan, in Palawan, N.W.

Bancoran Island, the centre of which is in lat. $7^{\circ} 57' N.$, long. $118^{\circ} 40' E.$, is about $4\frac{1}{2}$ cables in extent, flat, and covered with trees, the tops of which are 140 ft. above the sea.

Tub Bataha.—This dangerous line of reefs consists of small islets, sand cays, and large boulders, all connected by sand ridges, and fringed with steep-to coral reefs, running S.W. and N.E. for a distance of about 16 miles.

The N.E. islet, which is the highest, is 15 ft. above the sea, with verdure in the centre, and lies in lat. $8^{\circ} 53' 48'' N.$, long. $120^{\circ} 0' 45'' E.$

The S.W. islet is 10 ft. above the sea, with the trunk of a large embedded tree on the N.E. side. Apparently a channel exists through the reef about 5 miles North of the S.W. islet, but it was not examined. Both of these islets were teeming with sea birds, numbers of them flying round the ship before the reef was sighted.

To the eastward of Tub Bataha two rocks are marked, one in lat. $8^{\circ} 46' N.$, long. $119^{\circ} 57' E.$; and the other, *Temerario Rock*, lat. $8^{\circ} 48' N.$, long. $120^{\circ} 5\frac{1}{2}' E.$

Jessie Beazley Reef lies about 14 miles N.W. by W. from the northern islet of the Tub Bataha; this position can only be considered approximate, as the reef was alone seen from the mast-head of H.M.S. *Nassau* on passing the Tub Bataha.

South Tub Bataha was supposed to exist in lat. $8^{\circ} 4' N.$, long. $119^{\circ} 50' E.$ H.M.S. *Nassau* tried for soundings there, finding no bottom with 180 fathoms; 6 miles W. by N. of this position, at noon, with good observations, bottom was obtained in 1,878 fathoms, pale yellow sand. As the observations were made on a clear day, and a good look-out kept from the mast-head, there is no doubt this shoal has been misplaced on the charts.

Nicholson Rock is marked in lat. $8^{\circ} 52' N.$, long. $119^{\circ} 43' E.$, 12 miles W. $\frac{1}{2}$ N. of the South end of Tub Bataha.

Clotilde Breaker is in lat. $8^{\circ} 11' N.$, long. $119^{\circ} 16' E.$

Rosalia Rock, discovered in March, 1868, is in lat. $8^{\circ} 54' N.$, long. $119^{\circ} 6' E.$

The **CAGAYANES ISLANDS** were very imperfectly described and delineated on the Spanish charts, until Sir Edward Belcher made a cursory survey of them in March, 1846. Cagayan, the largest and southernmost of the group, is about 5 miles long; at its broadest part, which is towards the southern end, it is 2 miles across; the highest hill, 285 ft. above the level of the sea, lies 68 miles West of Negros West point. The remaining islets of this group are low, and covered with trees. A reef which curves to the eastward, and is steep-to on all sides, extends $8\frac{1}{2}$ miles to the northward of Boombong. The Observatory was fixed on a small rocky islet in the channel

between the two largest islands, lat. $9^{\circ} 35' 30''$ N., long. $121^{\circ} 15' 30''$ E. The bays or creeks situated in the interior of the extensive sound formed by the two great islands are very picturesque and retired, and have at their entrance, or chord of the bay, a depth of not less than $3\frac{1}{2}$ fathoms. If the entrance to this sound from the northward should be found clear from danger, or even accessible by dint of pilotage, this group would form an important naval position, but not more than 12 ft. could be found by the *Samarang*. The cottages of the inhabitants are scattered about in the little nooks or bays, but are not neat or cleanly, although the people they saw were clean limbed, light coloured, vigorous, and very respectful and courteous in manner. Sir Edward was assured that bullocks, vegetables, and fowls, could be procured, and inferred that whalers frequently visit the pueblo, a pretty large village, with a whitewashed fort and a church. The islands are surrounded by a reef, which extends nearly 9 miles to the northward.

Calusa Island, lying 10 miles W. by N. $\frac{1}{2}$ N. from the South point of Cagayan, is about 60 ft. high, covered with trees, and visible 8 miles off. There is a deep channel between it and Cagayan. *Cavilli* and *Sandy Islands*, with their outlying reefs, extend $8\frac{1}{2}$ miles in a N.E. by E. and S.W. by W. direction, with a deep channel $1\frac{1}{2}$ mile wide between. As these islands are steep to on all sides, the mariner should be cautious when navigating in their vicinity, the lead giving no warning.

Between the Cagayanes group and the South end of Panay there are several shoals. The southernmost was announced in 1839, as the *Nicholson Bank*, 3 fathoms (perhaps less), 9 or 10 miles North of the larger Cagayan. Another was announced by Captain Wedge, of the *Sultana*, in 1845, with only 9 ft. least water, in lat. $9^{\circ} 59' N.$, long. $121^{\circ} 24' E.$ Another, an extensive reef, on which the *Golconda* struck in 1837, and the *Bell* in 1839, reaches to within 23 miles S. by W. of the South extremity of Panay. The charts must afford all further information.

Piedra Blanca, or *white rock*, lies in lat. $10^{\circ} 27' N.$, long. $121^{\circ} 3' E.$, about 20 miles S. $\frac{1}{2}$ E. from the S.W. point of the Gran Cuyo, but far to the westward of the ordinary track of vessels.

Queen of the Seas Bank, an 8-fathom patch, was discovered by Captain Smiley Reid, in 1868. The bottom was distinctly seen, and the bank appeared to be about $1\frac{1}{2}$ or 2 miles in diameter. From the bank, Carlandagan Island bore N.W., and Quiminatin N.E. $\frac{1}{4}$ N., which places the shoal in lat. $10^{\circ} 26' N.$, $120^{\circ} 29' E.$, or 15 miles eastward of the position now assigned to it.

The **CUYOS ISLANDS**, or *Islas de los Amantes*, is an extensive archipelago between Panay and Palawan. The charts of them will give the only account we have; there is no good description. *Gran Cuyo* is the largest and one of the southernmost. Its centre is in lat. $10^{\circ} 52' N.$, long. $121^{\circ} 2' E.$ It is well cultivated with rice in some parts; the village is on the N.W. side.

Many of the other islands are high and rocky; the easternmost is in lat. $10^{\circ} 58\frac{1}{2}'$ N., long. $121^{\circ} 16'$ E., 9 miles N.E. of Gran Cuyo. *Quinuluban*, the northernmost, is in lat. $11^{\circ} 27'$ N., long. $120^{\circ} 51'$ E., and is a high island, with others near it, to the southward.

There are safe channels among the various islands, with depths varying from 30 to 60 fathoms, but a large ship should not get entangled among them, as many of the reefs extend a long way around them, and there are detached coral patches either not known or not properly placed. Of the sunken dangers known there is a $1\frac{3}{4}$ -fathom patch, S.W. by W. $\frac{1}{2}$ W., 21 miles from the peak of Cuyo Island, and S.E. $10\frac{1}{2}$ miles from Paya, a small island, the south-westernmost of the group. *Canipo Island* is N.N.W. 10 miles from Cuyo, and the space between is nearly filled up by a shallow bank. A sunken rock is placed in lat. 11° N., $120^{\circ} 38'$ E., W.N.W. 25 miles from Cuyo Island. *Agatuya* is an island 3 miles long North and South. A sunken rock lies N.W. 3 miles from its North extremity, and S.W. the same distance from *Dit*, another small, high island. A 4-fathom patch was discovered by Captain Mackenzie, of the ship *Chinaman*, in 1871, in latitude $11^{\circ} 17'$ N., $121^{\circ} 6'$ E., 10 miles E.N.E. of *Dit*.

The **Sombrero Rock**, midway between the S.W. end of Panay and the Cuyos Islands, is not larger than a long boat, and can only be seen when within 8 or 9 miles; it generally shows black. Soundings appear to extend from the Sombrero Rock to the Cuyos. It is in lat. $10^{\circ} 43'$ N., distant 20 miles from Panay, and can only be made out at the distance of 8 or 10 miles. It bears from Point Naso N.W. 29 miles, from the centre of Gran Cuyo E. by S. $\frac{1}{2}$ S., and from Paguayan, the easternmost of the Cuyo Islands, S.E. distant 24 miles.

Pontud Bank is a small dry patch, in lat. $11^{\circ} 20'$ N., long. $121^{\circ} 41'$ E., S.W. by W. 16 miles from Balbatan Island. A 7-fathom coral patch lies 4 miles N.N.W. from it; and *Sultan Bank*, with $5\frac{1}{2}$ fathoms water over it, lies 13 miles West of the 7-fathom patch.

The Panagatan Shoal lies to the S.W. of Semirara. It is also called the *Camden Reef*, and is a coral reef, 4 miles in extent East and West, and 4 miles broad. There are three coral islands on it, all covered with trees, that to the westward being the highest, only 12 ft. above high water. No fresh water found; but they are visited by fishermen. The S.E. point of the North island is in lat. $11^{\circ} 50' 40''$ N., long. about $121^{\circ} 16'$ E. Its native name is derived from the enormous shells of the tridacna or *Chama gigas* which abound on it.

Falmouth Bank, of 11 and 12 fathoms, lies 15 miles West of Panagatan Shoal. *Leonidas Bank*, of $5\frac{1}{2}$ fathoms, lies 15 miles N.N.W. of Falmouth Bank, and 12 miles S.W. of Ambolon Island. Three shoal patches lie eastward of the Calamion Islands, one of $5\frac{1}{2}$ fathoms 7 miles E.S.E. from the East end of Bulalacao. *Magellanes Bank*, of $5\frac{1}{2}$ fathoms, 8 miles East of

Delian, in lat. $11^{\circ} 51' N.$, long. $120^{\circ} 29' E.$, and a $4\frac{1}{2}$ -fathom patch S.S.E. 10 miles from Magellanes Bank, and 14 miles eastward of the $5\frac{1}{2}$ -fathom patch just mentioned.

MINDORO is 76 miles from North to South, and its northern coast is about the same length. Its western shore has been described (p.p. 586—592) as forming a portion of the limit of the China Sea. It is an island of great natural fertility, its climate is very hot, and the rains almost incessant. *Cape Calavite*, its N.W. extremity, is formed by the slopes of a lofty mountain, and from this the North coast trends nearly eastward, and at 25 miles from Cape Calavite is the *Abra de Ilo*, where is good anchorage, and between them are the ruins of a remarkable church. They stand on a narrow plain called Punta de San Tomas, now deserted, but their existence shows that the island must have been once populous before the incursions of the pirates about the middle of last century. This coast of the island is exceedingly unhealthy, and is uninhabited. It is believed that to sleep a single night on it is certain to produce a putrid or tertian fever. At 12 miles eastward of the *Abra de Ilo* is the *Puerto Galera*, only fit for boats, and thus named because it was a refuge for the galleys in pursuit of the pirates. Inland of this is the loftiest mountain of Mindoro. The coast to the eastward is deserted and inaccessible, and only visited occasionally by the wild inhabitants to take the honey which is abundant among its rocky cliffs. *Calapan*, the chief place of the island, is 14 miles E. by S. of the *Puerto Galera*, and is on a point from which an extensive reef projects. It is a miserable place, with a small fort. *Point Dumali*, its N.E. point, is bold and steep-to, and when coming from the eastward may be recognised by a remarkable white patch on the face of it about 400 ft. high.

Mindoro is at present very unimportant. The remnant of its once civilized population now live in the interior, a miserable and degraded remnant, and the alleged unhealthiness of its shores prevents immigration to restore its former fertility.

SIBUYAN is 13 miles in diameter; it is only inhabited by Indians, nearly uncivilized, and therefore it is quite unimportant. On its N.E. side is a reef of sand and rocks, which uncovers at low water, 5 or 6 miles in extent. It runs parallel with the coast, leaving a channel half a mile wide within it, having from 6 to 10 fathoms water, and which perhaps affords some shelter.

The channel between Sibuyan and Masbate, with its shoals, has been before noticed (page 905).

ROMBLON is 8 miles West from the western point of Sibuyan. It is 10 miles long, and at its N.E. end is an excellent small harbour, and a well kept village. There is a fort here built by a priest to resist the piratical Moros, which he did so effectually as to gain the name of Capitan Terror.

There are *four small fixed lights* shown at Romblon, but no account is given of their use or application. They are on the *Sabang, Agbatan, Binagon* and *Rosas Points* beacons.

TABLAS, next West of Romblin, is 33 miles long, but is narrow. We have no account of its coasts. It has three small villages, and a fort for protection against the Moro pirates.

Marinduque is 25 miles long and 11 broad. It is lofty, and *Mount Marlangas* is of considerable elevation, rising over its southern cape. The island is fertile, rice the chief product; the principal outlet of which is at *Malauigi*, an open road on its southern coast. On the N.E. side is a town and harbour, called *Sta. Cruz de Napo*, spacious and sheltered, and on the N.W. side is that of *Sant' Andres*, a shoal lying in front of it.

Port St. Andrews, in the N.W. part of the island, has a very narrow entrance, with some dangers extending from the shore on the northern side. Within is a deep well sheltered basin. There is no town here, but at $4\frac{1}{2}$ miles to the southward is *Buac*, with 1,100 inhabitants. *Gazan* is nearly 20 miles further down the coast.

Of the islands to the northward of Tablas, *Dos Hermanas* are flat and about 150 ft. high, *Maestro de Campo* being high and steep-to. *Banton* and *Simara Islands* are readily recognized from the northward of *Maestro de Campo*; the former is high, peaked, and rugged, and apparently uncultivated, while the latter is moderately elevated, flat-topped, and well cultivated, with a village, church, and fort on its South side.

LUZON, LUCON, or, as it is sometimes corrupted, "Luconia," is by much the largest and most important of *Las Islas Filipinas*. It is of an exceedingly irregular figure, participating in this character with the other volcanic islands of the archipelago, such as *Mindanao, Halmaheira, and Celebes*, the volcanic agency being apparently continuous throughout all these, and extending northward towards *Japan and Kamtchatka*. Measured along its greatest length it is 550 miles in extent, but the great mass of the island is in the northern peninsula, which is 135 miles broad in some parts. Its form has been compared to the bent arm "brazo doblado," and its aggregate area is nearly equal to double that of *Ireland*.

It is divided by the Spaniards into nineteen provinces, of which that of *Tondo*, which contains the capital, *Manila*, is by far the most important; the others need not be enumerated. The whole commerce of the island and most of the civilization and European residents are centred in its capital.

From its great extent in latitude, between latitudes $12^{\circ} 30'$ and $18^{\circ} 43' N.$, it lies in the main strength of the monsoons, which exert their whole force on either coast alternately. Throughout its length ranges of volcanic mountains extend, commencing in the South with the active volcano of *Balusan*, on the North side of the Strait of *San Bernardino*, and continuing through

many lofty peaks along the southern peninsulas, exhibiting more or less the results of former or recent activity. On the south-western side of the northern peninsula and on the opposite coast are separate ranges, and in the northern portion are those of the *Sierra Madre* or *El Gran Cordillera*, which runs generally parallel with the eastern coast, terminating in the North at Cape Engaño. On the western side, and in a similar direction, are the *Cordillera Central* and *del Norte*, which are generally known as the *Montes Caraballos*.

These mountain chains, although of no great elevation, probably nowhere 6,000 or 7,000 ft., have an important influence on the climate of the eastern or western coasts, in a similar way that the Ghauts, in about the same latitudes, have on the meteorology of the Indian peninsula. There are numerous volcanoes along this chain, of which those to the S.E., such as *Mayon*, above Albay, *Taal* in the centre of a lake, *Bonolano*, &c., are the best known. Earthquakes are consequently frequent, and have been in some cases very destructive.

The seasons are divided into the wet and the dry. In the *western portion* the rains last from the beginning of June until the middle of September, while at this season there is fine weather in the eastern and northern parts of Luzon. This monsoon is not so regular on the western coast as farther at sea, and in other portions of its course, being much interfered with by the various islands and mountains. In October the westerly monsoon gives place to the northerly winds, which then bring similar rains, derived from the evaporation in passing over the Pacific, on to the eastern coast. When these rains set in the fall is so abundant, that the whole country becomes inundated and generally impassable, and the flat plains are then little better than vast lagoons. A surprising fertility is the consequence of this abundance of moisture, combined with the tropical heats which are constant throughout the year. From the wetness of the climate for so large a portion of the year roads and bridges are deficient, and a great portion of the commerce is carried on coastwise, a traffic which is much aided by the peculiarly indented coast line of its more densely peopled parts. The heat is very great, but the humidity qualifies this. The great heats commence about the middle of March, when the winds from East and S.E. set in, and which last about two months. At the changes of the seasons hurricanes and typhoons are frequent and very violent.

Of the North and eastern coasts we know very little; our hydrographical knowledge of it is almost entire ignorance. This portion of the island is scarcely subject to Spain, has no trade or productions, and being moreover a lee shore for so large a portion of the year, it is avoided by ships at all times, on account of this and of the strong currents which prevail close to them.

The **SOUTH COAST** of **LUZON** is imperfectly known. *Cape Santiago*, its

western extremity, in lat. $13^{\circ} 46' N.$, long. $120^{\circ} 40' 20'' E.$, is low, with reefs extending a quarter of a mile from it, and *Minerva Rock*, 4 miles S.E. of it. *Verde Island*, 9 miles to the S.E. of the East end of Maricaban, is 4 miles long N.W. and S.E., and 1,500 ft. high. By taking care not to shut in its North point by Maricaban, the Minerva Rock will be cleared by at least 3 miles. Between Cape Santiago and the western end of Maricaban Island, which is surmounted by rocks, 11 miles S.E. by E. from it, is the entrance to *Balagan Bay*, the S.W. part of which is called *Pagapas Bay*. In these bays there is good anchorage. *Maricaban Island* is 7 miles long, high, and covered with trees. On its eastern end there is a mountain, which is remarkable for being on land which is higher than any part of the island. At the western end there is another, not so high, terminating in a peak, and is very distinct from the neighbouring heights of Point Santiago. Vessels may anchor on a sandy bottom off all the beaches on the northern and southern sides of this island; but it is necessary to do so close to them, for they are very bold. To the northward of the western end of the island there is a small islet extending North and South surrounded by rocks. Rocks and islets extend to 2 miles off the East end of Maricaban. The channel northward of Verde Island is generally preferred, as a rock is said to exist about $1\frac{1}{2}$ mile S.E. $\frac{1}{2}$ E. from the South point of Verde Island, and a reef running 5 cables North of the Bacos Islands.

The entrance to *Batangas Bay* is between the East end of Maricaban Island and *Matoco Point*, high and covered with trees, 5 miles to the eastward. The best anchorage is in its N.E. part, near the town of Batangas or Bauang. The *River Rosario* is 10 miles eastward of Matoco Point, the coast between being sandy. *Point Malabrigo*, 4 miles S.E. by E. from Rosario, is covered with trees. Northward of it is some high ground, 3,500 feet high, called the Sierras of Rosario, which forms a useful landmark in approaching from the eastward. The next high ground to that at Point Malabrigo is at Sigayan promontory, 10 miles N.E. by E. of it. There is anchorage near the coast between these places. The eastern extreme of Sigayan promontory is called *Cape Bantigui*. One and a half mile N.W. from it is a small bay with some wooded islets in it. *Pagbilao Island* lies $11\frac{1}{2}$ miles N.E. from Point Bantigui. Its irregular shape forms a bay on its southern coast, and the island itself, nearly filling up the bay in which it lies, forms two harbours, Pagbilao to the westward and *Lagummanoc* to the eastward. The first of these is much embarrassed by shoals, and requires a pilot. Vessel not drawing above 24 ft. can enter Lagummanoc, but great caution is necessary in doing so, for the reefs which extend from its two points very much reduce the breadth of the entrance.

From the S.E. point of Pagbilao Island, in lat. $13^{\circ} 53' N.$, long. $121^{\circ} 48' E.$, for 28 miles to the south-eastward to Point Tuguián, the coast should not be approached within a distance of 2 or 3 miles, as numerous sunken rocks

lie off it. Between Point Tuguian and Point Pinamuntangan, $26\frac{1}{2}$ miles to the south-eastward, a shallow bay is formed. In the southern part of this bay, 5 miles N. by W. from the last named point, is a patch of rocks 2 miles in extent and 3 miles off shore. Mulanay, a mall bay, with the town of *Yendo* on its shores, is in lat. $13^{\circ} 30' N.$, long. $122^{\circ} 25' E.$ This bay is backed by high ground, and to the southward of it the peninsula is high, terminating in *Mount Bondog*, 1,250 ft. high, 24 miles to the southward.

Bondog Head lies 2 miles S.S.E. from Mount Bondog, and from it the coast trends about N.E. for 8 miles to Point Arena, and has several sandy bays with anchorage. A shoal, 3 miles N.E. from Bondog Head and a mile off the shore, should be avoided. *Sombocagon Bay* is 4 miles N.N.W. from Point Arena, and several sunken rocks lie near the intervening coast. In this bay country boats resort for anchorage, but there is a large rock in the midst of it, leaving a channel between it and the shore. In the N.W. part of the bay is the town of the same name. The North point of the bay has a reef extending from it to the S.E. in a semicircular form, under which there is good sheltered anchorage in 4 fathoms, fine sand.

Alibijaban Island, on the western side of the Gulf of Ragay, and 6 miles North of Arena Point, is 3 miles long North and South, and surrounded by rocks. There is a channel $1\frac{1}{2}$ mile wide between the rocks off its western side, and those extending a mile from the main. N.N.W., 5 miles from the North end of this island, is the *Palad Bank*, 3 miles off shore. The entrance of *Pusgo Harbour* lies N.W. 7 miles from Palad Bank, and has Point Pusgo on its eastern side, a mile southward from which is a $1\frac{3}{4}$ -fathom patch, the best entrance to the harbour being on the western side of this patch.

Guinayan is a town at the head of the Gulf of Ragay, on its western side, 25 miles above Point Pusgo. In approaching this place there are two dangers to be avoided, one lying S.E. by E. 8 miles from it, and a $1\frac{3}{4}$ -fathom patch $3\frac{1}{2}$ miles E. $\frac{1}{2}$ S. from it. *Ragay* is on the eastern shore of the gulf, E.S.E. from Guinayan. The S.E. entrance point of the Gulf of Ragay may be considered as Tamba Point, which lies S.E. from the North end of Burias Island. Between Tamba Point and St. Bernardino Strait are several harbours worthy of mention. *Visita* and *Marigondon* are towns near the coast, respectively in lat $13^{\circ} 1' 30'' N.$, and $13^{\circ} 0' 30'' N.$ *Donson* lies 4 miles above the mouth of a small river, off which is shallow water. At $5\frac{1}{2}$ miles S.E. of Donson River is the entrance of *Port Putiao*, in lat. $12^{\circ} 53' N.$, long. $123^{\circ} 40' E.$ The channel into Port Putiao is in the middle of the mouth leaving the islet off the point on the left hand. But it is necessary to enter lead in hand and with small sail to keep the channel, for there are rocky shoals on both sides which dry at low water. In the mouth there are 25 to 10 fathoms, mud.

The port of *Parlatuan*, 2 miles to the eastward, has scarcely 3 fathoms mid-channel, although it has 5 and 6 fathoms inside. To get into it a vessel

must be towed and sound to keep the channel and avoid the rocks which appear at low water.

Sosogon Bay, 12 miles deep, is the best port to be found hereabouts, and on its shores are several towns, where provisions may be obtained. Bagatao Island, 2 miles long W.N.W. and E.S.E., lies across its entrance, and the best passage in is between its western end (lat. $12^{\circ} 52' N.$, long. $123^{\circ} 46' 30'' E.$), and Malumahuan, a small island, $1\frac{1}{2}$ mile to the westward. There is anchorage on a sand-bank South of the West end of Bagatao Island, in 12 or 14 fathoms. When inside the port a vessel may anchor where suitable. If large she must not approach the vicinity of Sorsogon, for from the third part of the extent the depth decreases 20 fathoms. But there is the satisfaction of knowing that the whole of the ground is mud, and that in the event of touching it, a vessel cannot do herself much harm. Water is got from the East side of the outer harbour. It was in this bay that at one period the great galleons which went to Acapulco were built, and here also were established roperies for the making of cordage from the Manilla hemp, the produce of a species of banana.

Bulan is a town 13 miles southward of Bagatao Island. The coast between has anchorage off it; but, at $2\frac{1}{2}$ miles northward of Bulan, a shoal bank of sand stretches some distance off the coast. At the town of Bulan (formerly Gate) is a river, the bar of which has but 5 ft. on it at low water. Within this, however, it is navigable with but little change of depth. The town is seated on the right bank at a short distance inside. On the bare sandy point which extends out a tolerable distance is a fort.

Butag Bay, 3 miles to the south-eastward of Bulan, is $1\frac{1}{4}$ mile wide between Points Angas and Barugo, off each of which are some rocks. A town lies at the head of the bay. The shore of the bay is mountainous in some parts towards the shore and well wooded, and the depth of the water in it admits of vessels of all kinds. *Tagiran Point*, formed of a hill with a flat top, is $7\frac{1}{2}$ miles S.E. by S. of Butag, and there are several bays where anchorage may be obtained, lying between. This point is in lat. $12^{\circ} 32' N.$, long. $123^{\circ} 58' 30'' E.$, and several bays with anchorage in them, lie to the eastward of it. *Calantes Bank* is a small coral rock, $5\frac{1}{2}$ miles E.S.E. from Tagiran Point. It is mentioned on page 904. The small islands of *Calintan*, *Juac*, and *Tielin*, off the S.E. end of Luzon, have many rocks near their shores, but the narrow strait which separates them from the coast of Luzon has plenty of depth for any vessel.

The EASTERN COASTS of LUZON,* washed by the Pacific, are very

* "LEGASPI, opened to foreign commerce in 1873, is situated at the S.E. end of the Island of Luzon. It is an open roadstead much exposed to the violence of the N.E. mon-

irregular, and in their southern portion very deeply indented by large bays and inlets. The Strait of San Bernardino, which separates it from Samar, and is the great inlet from the Pacific to the Bisayas Islands, has been described on page 903.

The *Volcano of Bulusan*, lat. $12^{\circ} 47' N.$, stands as a sentinel on the northern side of this *Embocadero* or strait, and being in constant activity, its flames have been a good mark by night for approaching it.

Magnoe Bay has its entrance at 2 miles westward of Tielin Island (page 929). At the southern point of Tielin Island a shoal extends out S.E., and as its neighbouring isle, Juac, has another extending in the contrary direction, they leave but a small channel between them, which is used by the trading craft of the country. Magnoe Bay is not large, but may afford anchorage to any vessel, whether the weather may be fine or blowing between North and S.S.W. ; but to all other winds she would be exposed and subject to a considerable swell. The town is very small and poor. To the northward it has a river, and may afford water and a few provisions. The southern point of entrance of Magnoe Bay has shoal water extending off it for more than half a mile to the northward. Having passed Point Padan, which is next to the E.N.E. from the North point of the Bay of Magnoe, there is neither bay nor place for anchorage as far as that of Albay. The whole coast is composed of ravines with rocky terminations or sandy beaches, and although off these the ground may be clean, at some distance there is a rocky ridge which extends from Point Padan as far as the shoals of Montufar, leaving only some few breaks or cuts which the pilots, who know them, pass through in their small craft for *Bulusan*, lat. $12^{\circ} 42' N.$; *Gubat*, $12^{\circ} 56\frac{1}{2}' N.$; *Bagacay*, $13^{\circ} N.$; or for any part of the coast, inside the ridge.

The Gulf of Albay is 22 miles deep in an East and West direction, and lies between the three islands of Rapurrapu, Batan and Cacararay, on its North, and the coast of Luzon on its South side. Its entrance is between Ungay Point, the S.E. point of Rapurrapu, lat. $13^{\circ} 11' N.$, long. $124^{\circ} 9\frac{1}{2}' E.$, and Montugan Point, 5 miles South from it. The latter point has sunken rocks off it. The narrow channels between the islands forming the North side of the harbour are intricate and dangerous, and some sunken rocks also lie off the South side of the islands. The South shore of Albay Gulf forms two large bays, in the eastern of which are the villages of Nabug, Sugob, and Bacon ; and in the western, called Poliqui Bay, are Manito and Caguayan, on its eastern shore, and Poliqui on its western. Sunken rocks lie all round

soon. There being also deep water close to the shore, vessels at anchor run great risk of dragging during the gales which often prevail on that part of the coast. Coral reefs are also said to exist in the Bay of Legaspi, though not entered on the chart."—Mr. Consul Ricketts, 1873.

There is no mention made of this place on the charts.

Poliqui Bay, at 1 or 2 miles off shore. *Albay Town*, in lat. $13^{\circ} 9' N.$, long. $123^{\circ} 43' E.$, lies 2 miles inland from the head of the bay. A village lies on the coast East of it, at the mouth of a river. N. by E. 5 miles from this village is that of *Livoc*, with rocks on the shore. Two detached rocks also lie 3 miles S.E. of the mouth of the river in which Livoc is situated. *Port Sula*, at the S.W. end of Cacraray Island, lies 5 miles East of Livoc.

Tobaco Gulf, next North of Albay Gulf, has its chief town, named *Tobaco*, just within its western entrance point, which is in lat. $13^{\circ} 22' N.$, long. $123^{\circ} 43' E.$ This gulf is 7 miles broad East and West. The island of San Miguel shelters it from the northward, and round the western end of this island is the entrance to the gulf, a mile broad. The North side of this island is bordered by dangers to a mile off, and the channel eastward of it, between it and Cacraray, is unsafe. The West end of San Miguel should not be approached when bearing South of S.S.E. Besides Tobaco, the villages of Malilipuy, Bagacay, and Pilis, are built on the shores of Tobaco Gulf. On the South side of Canamuan Peninsula, 17 miles to the northward, is *Lagonoy Gulf*, with several villages on its shores.

The *Volcana of Albay*, in perpetual agitation, lies 5 miles W.N.W. from Livoc, and is constantly threatening the neighbourhood, which is fertile and well cultivated. The roads too are better here than in other parts.

CATANDUANES ISLAND is 34 miles long by 15 to 18 broad. It is lofty and fertile. The heat of the climate is tempered by the sea breezes. Rice, cotton, abaca, and maize are produced. The abundant forests of its interior yield good timber for ship-building. There are several islands in the strait named *Maqueda Canal*, which is 10 to 20 miles broad, separating it from *Punta Rungus* on Luzon, above which rise the lofty mountains of *Canamuan*.

Iot Point, the North point of Catanduanes Island, is in lat. $14^{\circ} 8' N.$, long. $124^{\circ} 13\frac{1}{2}' E.$ *Matulin Island* lies 5 miles E.N.E. of it, and is surrounded to of 1 or 2 miles by sunken rocks. *Horadada Rocks*, above water, lie 6 or 7 miles N. by W. from Iot Point, and *Abriop Bank* 2 or 3 miles N.W. from Horadada Rocks.

Panay, 4 miles long N.E. and S.W., lies off the N.E. coast of Catanduanes, in lat. $14^{\circ} 4' N.$ Along its western side, which is bordered by rocks, is the entrance to a small bay, in which are situated the villages of Bagamanoe, Payo, and Biga. On the East coast of Catanduanes is *Tambongon*, in lat. $13^{\circ} 59' N.$, and *Port Baras* in lat. $13^{\circ} 39' N.$ Sunken rocks lie off the coast at Pandaran Point, in lat. $13^{\circ} 51' N.$, at Jimoto Bay in lat. $13^{\circ} 46' N.$, and at Binurun Point in lat. $12^{\circ} 41' N.$

Nagumbuaya is the S.E. point of Catanduanes Island. It is in lat. $13^{\circ} 32' N.$, long. $124^{\circ} 31' E.$ Between this and another point 10 miles to the westward is a deep bay, into the eastern part of which a large river flows, having Cabugao and Balo villages at its mouth. On the S.W. coast of Catanduanes is anchorage off the village of Caloblong. On its western coast is no place

of importance. Palumbanes Island lies 5 miles West of its N.W. point, where is a small bay named Carao.

Puerto de Sisiran is on the North shore of Canamuan peninsula, the entrance being 32 miles W. by S., of the North point of Catanduanes. It is safe, and sheltered by a group of islands, the entrance to it being in lat. 14° N., long. $123^{\circ} 41'$ E. The channel leads South, and when round the East point of the island haul West, and anchor to the N.E. of the village of *Basi* on the Luzon shore. At 24 miles to the S.W. is the peaked mountain *Ysaroc* and *Psarroc*, near the head of the bay of San Miguel.

In approaching this bay care should be taken to avoid some sunken rocks, which lie at 7 miles north-eastward of its eastern entrance point. They extend for $1\frac{1}{2}$ mile N.W. of a small island. To the southward of them is *Tagun Bay*, West of Lahuy Island.

Botavanan Island, in lat. $14^{\circ} 10'$ N., long. $123^{\circ} 20'$, lies 23 miles N.W. by W. from the entrance of Sisiran; the coast between is broken up into three deep bays. At 5 miles S.W. by W. from Botavanan Island is Pinitan Point, with sunken rocks extending a mile N.W. from it. Between this point and Siruma Island, 5 miles to the S.W., is the entrance of *Siruma Bay*, at the head of which is a village of the same name.

San Miguel Bay.—The entrance of this bay is 5 miles wide between Siruma Island just mentioned and the Canimo Islands to the westward. At the head of the bay is *Cabusao*, at the mouth of a river which has formed a bank extending for 5 miles to the N.N.E. *Colasi*, on the western shores of the bay, lies S.W. from Siruma Island. This bay is open to the northward, but some sheltered spots may perhaps be found on its eastern side. The western shores of the bay are low and unhealthy.

The *Canimo Islands* form the N.W. side of the entrance to St. Miguel Bay. The channel between them and the shore is closed by reefs. West of the largest and northern island of this group is the mouth of the Daet River, in lat. $14^{\circ} 5'$ N., long. $122^{\circ} 59'$ E. Gold is reported to be found in the streams hereabout, and a town to exist. Mount Labot, 5,092 ft. high, lies S.W. 15 miles from Canimo Island.

Off this part of the coast an extensive bank is reported to exist; its S.E. end is in lat. $14^{\circ} 38'$ N., long. $123^{\circ} 38'$ E., thence, with a width of from 5 to 7 miles, it extends for 20 miles to the N.W.

Matandumaten Island is small, and lies 12 miles northward of the entrance to St. Miguel Bay. To the N.W. of this is the *Calagnas Group*, with sunken rocks extending 3 miles from their S.E. side. *Cacbalisay Island* is the eastern of the group, and 5 miles S.E. from its eastern end is a small islet with a sunken rock off its South side.

Quinamanocan Island, 7 miles N.W. of Canimo Island, lies within a mile of the shore, and 22 miles north-westward of this is a small group with a bank off their northern side called the Tonaos Isles. They lie 8 miles West of

Maculabo, the western of the Calagnas Isles. *Mount Bagacay* is in lat. $14^{\circ} 11\frac{1}{2}'$ N., long. $122^{\circ} 48'$ E., and on the coast 8 miles N.N.W. from it is *Paracale* village. *Mambulao* is at the head of a bay, the entrance to which faces the N.W., and lies 7 miles westward of Paracale. The *River Capalonga* enters the sea in long. $122^{\circ} 22'$ E., 16 miles westward of the Tongao Isles. To the westward of the mouth of this river is Jaulo Island. *Dagdap Point*, with a rock off it, lies 9 miles W.S.W. Jaulo Island, and between them lies Sogod Bay. *Paranjo Point* is 4 miles S.W. from Dagdap Point, and about 3 miles West of it is Palupari Island, the intervening space being dangerous. At 4 miles S.S.W. of Paranjo Point is Silanja Point, the space between being occupied by a bay, at the head of which is the town of *Calagua*. Silanga Point is separated by a channel 2 miles wide from the East end of *Alabat Island*, which, with a width of about 4 miles, thence extends for 15 miles in a N.W. direction, sheltering *Lamon Bay* to the southward. The West end of Alabat Island is surrounded to a distance of a mile by sunken rocks. *Panguiren* is on the South side of the West end of Alabat Island, and at 8 miles West of it on the main is the town of Mauban. *Majajaquin* and *Talolen* are villages in the S.E. head of Lamon Bay, and *Gamaea* is 7 miles West from them. *Cabaleta Island*, 5 miles long N. by W. and S. by E., is separated by a strait 3 miles wide from the N.W. end of Alabat Islets lie a mile off the North end, and $1\frac{1}{2}$ mile off the N.W. end of Alabat.

Balesin Island, $1\frac{1}{2}$ mile in diameter, lies N.W. $1\frac{3}{4}$ miles from Dagdap Point, and at 13 miles N.E. of it is the West end of *Jomalig Island*, which thence extends for 12 miles to the E.S.E. Two small islands lie East 2 miles, and S.E. 3 miles from its eastern end.

The Polillo Islands, consisting of one large island 30 miles northward of Alabat, with some others on its East coast, are very little known. The centre of the large island is occupied by an extensive mountain, named Malolo. It is probable that there is shelter during the N.E. monsoon close under the lee shore of Polillo, perhaps in a small bay where the principal village lies S.W. of Mount Malolo. To visit this bay Mount Malolo should be kept bearing South of E. by N. on approaching the coast, as many rocks lie within 4 miles of the shore to the southward, and leave the channel inside them a mile wide and 4 miles long near the shore.

On the Luzon shore, on the parallel of the South point of Polillo, is the small harbour of *Lampon*, having 15 ft. water in the entrance, with 3 or 4 fathoms inside. The strait separating Polillo from the main island has soundings, although deep water. The N.W. coast of Polillo is bordered by sunken rocks, as is also the coast of the mainland to the westward. The *Gulf of Dingala* is in lat. 15° N., long. $121^{\circ} 32'$ E., 17 miles W.S.W. of Panampatam Point, the N.W. point of Polillo. *Dumages River* lies 4 miles southward of the Gulf of Dingala.

The *North-east Coast* of Luzon is but very little known, and never visited.

The Nueva Provincia, although nominally under Spanish sway, is really occupied by independent tribes, who have no commercial relations with the world, and scarcely a village is marked on the official maps on the 230 miles of coast intervening between the above and the N.E. point. Beaten incessantly by the whole fetch of the Pacific surf, at best it must be an iron-bound coast, and is so indicated, and probably with very strong currents drifting past it. This must be especially the case in the N.E. monsoon, which brings the rainy season here, and when the remark before made is remembered, that the mountain ranges intercepting the S.W. monsoon, bring the rain on to the opposite coast, although in a less continuous manner, it will be inferred that they reach the eastern shore very much mitigated in their force, and are probably felt as light and baffling winds, or as more violent squalls. In the absence of any recorded experience, it may be the safest course to entirely avoid it as far as possible.

Baler Bay, in lat. $15^{\circ} 49'$ N., has a village of the same name in its inner angle, and may afford shelter from southerly winds. The *Seno de Casiguran* is a large bay open to the S.E. and from its eastern point, *Cape San Ildefonso*, in lat. $16^{\circ} 1'$ N. a range of cliffs extends for 36 miles N.E. by N. to the entrance of the *Puerto de Tumango*, in the northern bend of which is the village of *Dauilican*, in lat. $16^{\circ} 50'$, which may have shelter from the north-eastward. From hence to Cape Engaño there is nothing to remark, more than what the charts explain. *Mount Moises*, 4,085 ft. high, lies 7 miles W.N.W. of Paranan Bay, and in lat. $17^{\circ} 13'$ N. *Mount Cresta* lies 10 miles West of *Divilican Bay*, and in lat. $17^{\circ} 21'$ N.; *Mount dos Cuernos*, in lat. $17^{\circ} 30'$ N., is 4,008 ft. high, and near the coast; *Mount Cetaceo*, in lat. $17^{\circ} 44'$ N., is within 5 miles of the coast; *Mount Cagua*, a volcanic peak, is in lat. $18^{\circ} 13'$ N., and between it and Cape Engaño are two other elevations of 3,451 and 2,086 ft. respectively.

CAPE ENGANO is the N.E. point of Luzon; its name "deceit" may be the reason why the term should also be applied to the N.E. point of Palabi Island.

PALAU ISLAND, N.E. point, is 7 miles to W.N.W. of the N.E. point of Luzon, and is sometimes called Cape Engaño; it is moderately elevated. A coral reef, with high breakers and several rocks above water, extends E.N.E. about 3 miles from the point of the cape; and patches of shoal water project a mile beyond it. This reef fronts the eastern side of the island at the same distance, extending southward about 4 miles, until abreast a round hill forming its South point, and joins the N.E. end of Luzon. Close to the northward of the cape are two islets, the outermost of which, called *Lava*, is a square, steep mass of lava, about half a mile in extent, and may be seen at the distance of about 27 miles.

The channel between Cape Engaño and Camiguin Island to the N.N.W.

is about 20 miles wide, and clear of danger. As the currents set strong to the northward in the S.W. monsoon, it will be prudent for vessels proceeding to the eastward to keep on the South side of the channel.

Port San Vicente is formed by a small island of the same name, lying between the N.E. end of Luzon and the adjacent island of Palau. There is room in this port for three or four ships, sheltered from all winds; but the entrance is narrow and intricate, being formed between shoals on each side, which project from the S.W. part of Palau, and from Vicente Island; a vessel is therefore obliged to warp in. There is good anchorage in 5 fathoms opposite the mouth of the port, and sheltered from all winds but those between West and S.W.

The N.E. extremity of Luzon forms a peninsula, which projects about 15 miles beyond the line of the North coast, so that between Cape Engaño and *Pata Point* is a deep bay with a chain of mountains inland, and a considerable space of moderately elevated, or rather low land fronting the sea, interspersed with villages and intersected by rivers. There is a continued beach along this coast with regular soundings, generally 30 or 40 fathoms, about 1½ or 2 miles off the western part, and similar depths extend 3 and 4 miles off shore when farther eastward.

There is a missionary station on the coast S.W. 17 miles from the S.W. end of Palau Island, and W.N.W. from the volcanic Mount Cagua. At 8 miles westward of this station is the village of Bugay, N.W. 13 miles from which is the mouth of the Rio Grande de Cagayan.

The Rio Grande of Cagayan rises in the eastern range of mountains called the Sierra Madre, and, after a course of some 120 miles, enters the China Sea at Aparri, 13½ miles eastward of the mouth of the Abulag. There being but 14 or 15 feet of water at flood tide on the bar of this river, large ships anchor outside. The rapidity of the current and the sudden floods render the navigation of the Rio Grande at times exceedingly dangerous. It may nevertheless be termed the highway of the tobacco-producing province of Cagayan. Small steamers run to Guagua, Bulacán, and Manila. There is good anchorage in 10 or 11 fathoms, about 2 miles N.N.E. from the mouth of this river. The point on the S.E. side is known by the church and convent of the town of *Aparri* built on it; abreast of which or North from the church is the best anchorage, with the volcanic mountain on Camiguin Island bearing N.N.E. easterly.

From the mouth of the Rio Grande de Cagayan the sandy coast continues for 14 miles to the bar of the *Abulag* and *Pamplona Rivers*. Point Pata is 15 miles N.W. of Pamplona Bar, and appears as a round hill of middling height. Hence to Cape Bojeador the coast is steep, without any soundings until near the shore. The coast to the westward is described on pp. 605-6.

The BABUYAN or Five Islands form a kind of circular chain fronting

the North coast of Luzon. The channels between them are *said* to be safe, without soundings, and their coasts are generally steep-to.

Dalupiri Island, the westernmost of the group, has a level appearance, extends 6 or 7 miles in a N.W. and S.E. direction, and may be seen from a distance of 30 miles. About $1\frac{1}{2}$ mile off its South point is *Rijutan Islet*, surrounded by shoals.

Fuga Island, distant about 8 miles S.E. of Dalupiri, is lower, and of an even appearance, terminating in low land at the eastern part. It is about 10 miles long, East and West, and there are irregular soundings along its S.W. side, where a vessel may occasionally anchor.

The *Bay of Musa* is formed between the West end of Fuga and two small islands adjacent, called *Barrete* and *Mabag*. The best channel into the bay is from the southward, between Barrete and the West point of Fuga, the depths being 14 and 16 fathoms outside, and 9 to 12 fathoms in mid-channel. Barrete Island has a reef lying off its West side, and another projecting from its South point. Water may be procured, but with difficulty, some distance inland. Musa Bay, although sheltered from the sea, is only fit to run for in case of necessity.

Calayan Island, lying about 15 miles N.E. of Dalupiri, is formed of mountainous and uneven land, highest in the centre, with low gaps in some places; it is steep-to, without any safe anchorage, and may be seen in clear weather at a distance of 45 miles. Some rocks above water extend about a mile from the South and East points; and about $1\frac{1}{2}$ mile off the N.E. point is an islet called *Panuctan*, about a mile in extent North and South.

Wyllie Rocks, consisting of two clusters above water, with high breakers between, are dangerous to vessels passing through the Babuyan group at night. The southernmost rock, which is the largest, bears N.N.E. distant about 5 miles from Panuctan Islet; the other cluster lies about $1\frac{1}{2}$ mile in a N.N.E. direction from the largest rock. Sunken rocks lie between the Wyllie Rocks and Panuctan.

BABUYAN CLARO, the most northerly and highest of the Babuyan Islands, is about 25 miles E.N.E. from Calayan. On its West end is a volcano, between which and the mountains on the eastern part is a concave curve in the form of a crescent, when viewed from the North or South; but when the island is seen at a great distance from the eastward, it appears as one round mountain with a detached hummock to the northward. A reef projects from the West point of the island. The South point is steep and rocky, and about a mile off it is a black rocky islet, in the form of a sugar-loaf.

CAMIGUIN ISLAND, about 10 miles in extent N.N.E. and S.S.W., is high and hilly, and lies about 26 miles South of Babuyan Claro. Its shore in some places is bordered with coral rocks, having soundings of 30 to 35 fathoms about a mile off; and the land is low close to the sea, along its

eastern and northern sides. The southern part of the island is formed of a high mountain, formerly a volcano, visible at a distance of 60 miles. To the westward of this mountain some steep cliffs front the sea, about 2 miles to the southward of the South point of Port San Pio Quinto.

Port San Pio Quinto may be considered the only place amongst these islands tolerably safe for a large ship, for the bottom in it is not so rocky as in Musa Bay, Fuga Island. The port is formed by a concavity in the land about 3 miles wide and $1\frac{1}{2}$ mile deep, a little southward of the middle of the West side of Camiguin, and is sheltered from the westward by Pio Quinto Islet, which lies in the middle of the entrance. This islet is high, about $1\frac{1}{2}$ mile in circumference, steep to seaward, and has on each side a safe channel leading to the port.

It is high water, full and change, in Port San Pio Quinto at 6^h 0^m, and springs rise about 6 ft.

GUINAPAE ROCKS (or Southern Pillars), bearing E. by S. about 10 miles from the North point of Camiguin, consist of two rocks like towers, one larger than the other, with some smaller rocks contiguous. There are no soundings within a short distance of their eastern side; between them and the nearest part of Camiguin is a channel 6 miles wide, which is safe on the island side.

DIDICAS ROCKS (or Northern Pillars), about 7 or 8 miles N.E. $\frac{1}{2}$ E. of the Guinapae, are a group of four sharp-pointed rocks, much higher than the latter, and when seen at a considerable distance appear like ships under sail. They are about 2 miles in extent N.E. and S.W., and among them are many rocks of various sizes, which render their approach dangerous in light winds; for the currents run strong to the northward, producing ripples like breakers in the vicinity of and among these dangers, and there are no soundings near them where a vessel could anchor in case of necessity.

The **BASHI** or **BATAN ISLANDS**, so called by Dampier from the name of an intoxicating liquor much used by the natives, lie northward of the Babuyan group, and consist of a chain of islands, mostly high, extending from lat. $10^{\circ} 58'$ to $21^{\circ} 13' N.$, and the channels among them are *thought* to be safe and free from hidden danger. During the N.E. monsoon strong winds prevail amongst these islands, and the currents are occasionally very strong; the flood sets to the S.W., the ebb to the N.E.

These islands, with those just described, form part of that great volcanic band before alluded to, which may be traced far to the northward. The islands of Batan and Sabtan are mountainous, with many broad cultivated spots; the highest peak, apparently an old volcano, is about 5,000 ft. above the level of the sea, and thickly covered with trees. Abundance of vegetables and fruits are to be got. Cattle, pigs, poultry, sheep, and goats are also

abundant. Deer are found on Sabtan and Ibugos, and quail on all the islands. Wood is reasonable and plentiful, as well as water; but this latter necessary is difficult to procure.

Balintang Islands, said to lie in lat. $19^{\circ} 58' N.$, long. $122^{\circ} 14' E.$, and the southernmost of this group, consist of three small but high-peaked islets or rocks, visible about 27 miles off, in clear weather, and, when in one, bear E. by S. and W. by N. The westernmost islet is much larger than the others, and a hole is seen through it when bearing N.E. They are steep-to, and may be passed on either side at 2 or 3 miles distance, but the sea beats violently against them in bad weather.

The Balintang channel, between these islets and Babuyan Claro, is about 25 miles wide, and is frequently used by vessels when proceeding by the eastern passages to China.

BATAN ISLAND is about 9 miles long, N.N.E. and S.S.W., and Mount Irada, on its northern extremity, is 3,806 ft. above the sea. The rest of the island is mountainous, and has several broad and cultivated spots.

Captain Sir Edward Belcher in the *Samarang* anchored in the bay of San Domingo, on the western side of Batan Island, on a fair clear bottom of fine coral sand, the best berth being with the convent barely open, when moored off the northern point of the bay in 13 fathoms; this, however, is not very secure with a northerly wind. Although the holding ground is good, this bay can only be resorted to in the N.E. monsoon.

The authorities recommended the anchorage off *San Carlos*, about 2 miles to the N.W., as the best for obtaining a supply of water; but this position is exposed. The next anchorage is that of *San Vincente*, which is the port of *Ivana*, or landing-place for that village; it, however, ought not to be resorted to, as it is very confined, and must be quitted the moment a northerly wind threatens.

Sabant Island is separated from the S.W. end of Batan, by a channel 2 miles wide, which appears clear of danger. Off the North end of Saban are two ledges of rock, with a passage between them carrying 14 and 10 fathoms water.

Ibugos Island is small and rather low, excepting a hill on its South end, where there is a village. It is separated from the West side of Sabtan by a channel from a mile to half a mile wide, which affords indifferent anchorage, the bottom being rocky, with sandy patches between. There are no facilities for watering. *Dequez Island*, also small and rather low, lies nearly half a mile westward of the N.W. point of Ibugos.

As the current sets strong to the northward between the above islands in the N.E. monsoon, it is advisable to work westerly round Dequez, and not to cross the channel between Batan and Sabtan until the dividing neck of San Carlos is clearly open, E.S.E., as the stream dividing at Mabatui Point

sends one current southerly; the other, which is an eddy, is favourable from thence north-easterly to San Domingo.

Ibayat Island, about 8 miles long, N.N.E. and S.S.W., lies 14 miles N.N.W. of Batan, and the channel between is free from danger; *Mount Sta. Rosa* at its North end rises 680 ft., and *Mount Riposet* at its north-eastern part, 800 ft. above the level of the sea. The island is without anchorage; the interior is, however, highly cultivated. Abundance of refreshments can be easily obtained.

Diogo is a small island, 848 ft. above the sea, lying $3\frac{1}{2}$ miles eastward of Ibayat, and the channel between is clear of danger.

Madubis Island, lying N.N.E. 6 miles from the North end of Ibayat, is about $1\frac{1}{2}$ mile long in a N.E. and S.W. direction, high and steep-to. One mile S.S.W. of it is Siayan Island, about $1\frac{1}{2}$ mile in circumference, having off its N.E. side several detached rocks. The channel between Mabudis and Siayan is rendered unsafe by detached rocks; that between Ibayat and Siayan is about 4 miles wide, and free from danger.

Y'Ami, the northern island of the Bashi group, is about a mile in circumference and tolerably high. The position of the islet lying off its S.W. point (by Sir Edward Belcher) is lat. $21^{\circ} 4' 56''$ N., long. $121^{\circ} 58' 24''$ E.

North Island, lying 2 miles S.S.W. from Y'Ami, is high and steep-to, except on its eastern side, off which, at a cable's length, there are three islets and some detached rocks. The channel between Y'Ami and North Island is safe, and carries soundings with rocky bottom, but too deep for anchorage; that between Mabudis and North Island is 9 miles wide, and free from danger.

The North Bashi Rocks could not be found by Capt. Sir E. Belcher, who states "they have no existence in the position assigned them in the charts, nor in the visual radius from the mast-head of the *Samarang*, 108 ft. above the level of the sea."

The islands on the North side of the Bashi Channel will be described hereafter.

DUGAY TROUIN REEF was reported by the captain of a vessel of that name in 1875, to lie N.E. of Luzon, in lat. $19^{\circ} 5' N.$, long. $124^{\circ} 43' E.$

THE COAST OF CHINA.

The coast line of this important empire, which contains more than one-third of the population of the globe, is about 2,500 miles in extent, and has been well surveyed by our Admiralty. The charts and directions between Canton and the Yang-tze Kiang will be as safe guides as in any other portion of the globe. This is a triumph of hydrography, and was a result of the inglorious war commenced in 1839-40, consequent upon the destruction of the opium at Canton, April 3, 1839. On July 5th, 1840, Chusan was taken possession of by a British fleet, among the officers of which were Admirals Sir Richard Collinson and Henry Kellett. To their energy and skill the commencement of the noble survey is due. The survey continued between the years 1840-6, and the result is a fine series of charts and instructions, describing, with minute accuracy, a coast which might be claimed as almost first discovered by them, as there were no prior nautical surveys of by far the largest portion.

While foreign commerce was so sedulously confined to the single port of Canton, the only attempts at true delineation were the partial surveys of the rivers by that excellent surveyor Daniel Ross, 1807—1816. Some other observers, such as R. Wallis, D. Inverarity, &c., added a few particulars. In other respects we were almost entirely indebted to the noble work of Jean Baptiste du Halde, a Jesuit missionary, who arranged the vast mass of information collected by his brother missionaries in China, and published them in four splendid volumes in 1735. The series of maps accompanying this work deserve some notice. The whole of the empire was carefully surveyed, by astronomical observations and triangulation by these Jesuit missionaries, under the authority of the Emperor Chang-hi; commenced in 1708, and completed in 1718. These maps and their text deserve most honourable consideration.

Now, however, the Admiralty surveys, chiefly conducted by Capt. Collinson, have totally superseded these imperfect representations of the coast line, while the survey made by the squadron when in the upper Yang-tse Kiang, and other observations have given us a much clearer insight into the inner geography of China.

To add to the completeness of our knowledge, in the year 1877, H.M.S. *Nassau*, Commander Napier, commenced to examine the several dangers discovered near the shore by the hugging of the land during the strength of the N.E. monsoon by the numerous large steam-ships engaged in trade between the Treaty Ports.

The troublesome wars which were forced upon the British Government by the insolence and duplicity of the Chinese authorities, added to the great internal disorganization, terminated in the Treaty of Tientsin, which was concluded by Lord Elgin on June 26, 1858, and this placed the external commerce of China on a satisfactory basis. A fresh treaty was entered into after Peking was entered by the British and French armies, on October 24, 1860, and a new treaty not yet completed will further open the country to foreigners.

The whole coasting trade of the empire is open to foreign commerce, though, of course, this is but of limited utility. The wonderful commerce which has sprung up since its establishment, and its probable future development, may be judged by the fact that in 1863 there were only four or five ordinary lights on the Chinese coasts, which are now pretty well lighted.

The following is a list * of the Treaty Ports and the tonnage (coast trade) entered at each during the year 1875:—Shanghai, 847,443; Chinkiang, 599,118; Kinkiang, 515,503; Chefoo, 295,313; Hankow, 283,375; Amoy, 277,259; Ningpo, 267,428; Swatow, 206,633; Tientsin, 167,217; Foochow, 133,823; Newchwang, 117,194; Canton, 102,700; Takow, 34,914; and Tamsui, 26,516. The two latter ports are in Formosa. There are 343 foreign firms and 3,579 foreign residents at these ports, 211 firms and 1,611 residents being British, 46 firms and 541 residents American, and 52 firms and 367 residents German. Pakhoi, at the head of the Tongking Gulf, and Hoi-how, in Hainan, two recently opened ports, are described previously.

The coast generally is low, but with bold headlands, in the S.W. portion. At the entrance of the Canton River it commences to be high and rocky, and thus continues to Chusan, where it becomes very low, and so continues as far as the Gulf of Pechili, with the exception of the bold, rocky, gold-bearing promontory of Shantung. The ensuing descriptions commence with the S.W., and follow those of the shore of Tong-King and Hainan, given on pages 468 *et seq.*

* Report on the trade of China for the year 1875, by H. Kopsch, F.R.G.S.

CHAPTER XX.

THE COAST OF CHINA, BETWEEN HAINAN AND HONG KONG.

NOW-CHOW, in about lat. $20^{\circ} 58' N.$, long. $110^{\circ} 36' E.$, bearing S.W. about 45 miles from Tien-pak, and lying off the north-eastern part of the peninsula of Lien-chew, is a small port dangerous to enter, but when in it there is good shelter. This place was a rendezvous of the Ladrones (pirates), whose vessels anchored in great numbers alongside the forts and town, their crews being part of the inhabitants.

The anchorage of Now-Chow, some 5 miles in width, and abounding in sand-banks, especially requires surveying. At certain seasons it is likely to remain the place of call for vessels bound to Hainan, and the approach to it from either side requires much care. The difficulties of proceeding to the southward are mentioned on page 475.

Now-Chow Island is about 300 ft. high, 9 miles long, 3 miles broad, and well cultivated. Strangers should be careful to avoid the sand-banks on the northern shore. The North point of the island is 5 miles W. by N. from the eastern point, and the space between is full of rocks, awash. Off this point is a dangerous horn of sand, and it would be advisable to obtain a pilot from a fishing boat, or anchor, and send to the town for one, before proceeding farther. Low water would be the best time to enter, as the shoals are then visible.

The town stands in a small bay on the western point of the island, which is S.W. by S. 6 miles from the northern point. Here may be obtained good pilots for the dangers in the vicinity of the island.

In addition to the bank in the centre of the channel, there is a bank with only 6 ft. water, extending from the island. The least water found (4 fathoms) by H.M.S. *Algerine*, in 1868, was off the North end of the island, 7 fathoms were carried through the channel, it then deepened to 10, towards the fort. The best anchorage is off the village, on the S.W. side of the island, but not too close to the fort, as the water is deep. Wood and water can be obtained at Now-Chow.

Quan-Chow-Wan Bay is extensive, and has its narrow entrance at 8 miles within and off the N.W. point of Now-Chow Island. By some it is recommended as a superior stopping place to Now-Chow, but the banks off its entrance will prevent its becoming much used. From the Now-Chow anchorage, with clear weather, the mountain *Kam Loong* (Golden Dragon) or Toong hong Shan, bearing about S.W. by W., over 20 miles distance, may be seen; the successive bearings of which are of great service when entering Quan-chow-wan by the southern channel, the channel most recommended. This bay was formerly a great resort for pirates.

TIEN-PAK, or Tihen-Pien, is the principal place on the South Coast of China, where salt is produced, and several hundred junks are employed transporting it to Canton.

The high land on the N.E. side of the road, called *Lintoa*, has the appearance of a high round mountain in coming from the eastward; its southern extreme is called *Sey-ho*, or *Sye-ho Point*. From this point, E. by S. $1\frac{1}{2}$ mile and 1 mile distant from the high land, lies a reef of rocks, on which the sea often breaks. From Sey-ho Point, S.W. about half a mile, lies *Pauk-pyah*, a large white rock, having between it and the point 6 and 7 fathoms water; *Foong-kye-chye*, a small island, lies about $1\frac{1}{2}$ mile to the westward of it. *Ty-fung-kyoh*, about 2 miles to the south-westward of the latter, is of considerable height, being the outermost island of the road, in $21^{\circ} 22\frac{1}{2}'$ N., long. $111^{\circ} 10\frac{1}{2}'$ E.

The city of Tien-pak is walled round, and is of considerable extent. A ship touching here in distress may procure temporary masts, and get iron-work done in the city; refreshments of all kinds may be got from the villages contiguous to the harbour.

A small ship in want of shelter from a N.E. or East gale, may keep near the reef of rocks to the eastward of Sey-ho Point, then steer between that point and Pauk-pyah, and anchor in 4 fathoms, sand and mud, about three-quarters of a mile westward of the point. She must not go farther to the northward. Large ships ought to pass about a mile to the southward of Pauk-pyah and Foong-kye-chye, in 7 or 8 fathoms water, and anchor in 6 fathoms water between the latter and Ty-fung-kyoh, or rather a little inside this island, which will shelter them from the S.W. winds.

To the N.W. of the bar about $1\frac{3}{4}$ mile lies *Marble Rock*, and nearly 4 miles farther westward there is a reef of black rocks; neither of these can be approached, the water being very shoal on that side of the bar.

It is high water, full and change, on the bar of Tien-pak Harbour at 12 hours, and the tide rises 8 ft. After the 1st of September, there is almost a constant westerly current along this coast, running from half to $1\frac{1}{2}$ mile per hour.

Ty-Chook-Chow is an island lying about 7 miles E. by N. from Sey-ho Point, and 3 miles distant from the coast. It has rocks on the North side,

stretching to the north-westward and towards the coast; but there is anchorage on its West side.

Chin-Chew, bearing N.E. by E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles from Ty-chook-chow, is high, and covered with grass; it should not be approached on the South side nearer than $1\frac{1}{2}$ or 2 miles, in 10 and 11 fathoms water, for a reef of rocks, on which the sea generally breaks, projects S. $\frac{1}{2}$ E. from it about three-quarters of a mile.

SONG-YUI POINT, bearing from Chin-Chew E. by N. $\frac{1}{2}$ N. about 10 miles, is the S.W. extremity of the Great Bay, at the N.E. part of which is Hai-ling Harbour; close to it there are 9 or 10 fathoms water. *The Brothers*, distant 3 miles N.N.E. from Song-yi Point, are two islets near the high island, having rocks projecting from them about half a mile.

HUI-LING-SAN HARBOUR.—Hai-ling-shan, or *Hui-ling-san*, is a high island, extending E.N.E. and W.S.W. about 12 miles, separated from the coast on the North side by a narrow passage, and having an extensive shoal bay to the N.E., and a harbour on the West side. Two small islands, sometimes called the *Twins*, and by the Chinese *Mamee-chow*, bear from Song-yui Point E. by N. $\frac{3}{4}$ N., distant 10 miles, and lie close to the S.W. point of Hai-ling-shan, being united to it by a reef and sand-bank. They form the outer point of Hui-ling-san Harbour; and, in coming from the eastward, being on with each other, appear as a single island.

Bluff Point, bearing E. by N. 3 miles from the Mamee-chow Islets, is high, and has 9 and 10 fathoms water close to; and 4 miles N.E. by E. $\frac{3}{4}$ E. from that point are two rocky islets close together, appearing as three small hummocks. A little inland from these stands Sugar-loaf Hill, which does not show its peak when seen to the eastward of Bluff Point.

Close to the East point of Hai-ling-shan, and bearing E. by N. $\frac{3}{4}$ N., distant $5\frac{1}{2}$ miles from the two rocky islets, there is a small island, having 7 fathoms water close to it, and to the East end of Hai-ling-shan; but S.W. by S. $1\frac{1}{4}$ mile from the small island, there is a reef of rocks nearly covered at high water. On the East part of Hai-ling-shan, contiguous to the sea, there is a remarkable patch of red sand, discernible when off the Mandarins Cap.

To sail into the harbour, if coming from the eastward, pass about a quarter of a mile from the South side of the Mamee-chow in 8 fathoms water, and round them about the distance of a cable's length in 7 fathoms. Steer direct for *Deep Water Point*, which bears N.N.E., distant rather more than half a mile, which pass at rather less distance than a cable's length, for the edge of a $2\frac{1}{4}$ -fathom bank is within a quarter of a mile of it.

From this point steer N.N.E. $\frac{3}{4}$ E. about a mile, for a fort on the summit of a small hill covered with trees, until abreast of *Teep-chow*, a small island about mid-way between them, to the westward of which, about a quarter of a mile distant, large ships should anchor with the fort bearing N.E. by N.

The West side of the bay, between the Mamee-chow and the Brothers, should not be approached under 5 fathoms water, the bottom being sandy, with shoal water under that depth.

The bay between Teep-chow and Deep-water Point has only $2\frac{1}{2}$ fathoms water; here, adjacent to a small joss-house in ruins, fresh water may be procured. The harbour for small vessels is in the bay formed between Teep-chow and the fort, where the depths are 8 and 9 ft. *Chino Village* stands in this bay, where water and refreshments are obtained; carpenters and caulkers may be got to work on board, and smith's work can be executed at the village.

In Hui-ling-san Harbour it is high water, full and change, about $8\frac{1}{2}$ hours, and the tide rises from 7 to 8 ft.

Ty-oa Point and Bay are about 16 miles E.N.E. from the East end of Hai-ling-shan, and N.N.W. $\frac{1}{4}$ W., $16\frac{1}{2}$ miles from Mandarins Cap. The depths decrease regularly coming from Mandarins Cap, to $4\frac{1}{4}$ fathoms at low water close to Ty-oa Point. Inside the point, and in the extensive bay to the north-westward, the water is shoal.

The following islands and rocks lie off the coast, between Hai-ling-shan and Hawcheun :—

MANDARINS CAP, called Fan-shee-ak, "White Rock," by the Chinese, in lat. $21^{\circ} 28' N.$, long. $112^{\circ} 21\frac{1}{2}' E.$, is a barren white rock, about 200 ft. high, converging gradually to the summit, and terminating in a sharp peak. Near it, to the northward, lie two other rocks, one of which is very small. From Mandarins Cap, Nam-oa Harbour bears N.E. by E. distant 13 miles, and the South end of St. John Island E. by N. $\frac{1}{2}$ N., nearly 24 miles. On the South and West sides there are 15 and 16 fathoms, mud bottom, within a cable's length of the rock, and 13 fathoms a little to the northward.

Currents.—In August and September, when easterly winds frequently prevail, the current sometimes sets to the westward 3 miles per hour off Mandarins Cap, abating only to $1\frac{1}{2}$ mile per hour when the tide, under ordinary circumstances, would be setting to the eastward. The westerly current constantly prevails along this coast during the easterly monsoon, and frequently in the S.W. monsoon, particularly if the wind veer to the eastward.

Nam-Pang, bearing N.W. by W. $\frac{3}{4}$ W., distant $10\frac{3}{4}$ miles from Mandarins Cap, is high at the West end, and about $1\frac{1}{2}$ mile in length. It is safe to approach all round. *Round Island*, bearing West $3\frac{1}{2}$ miles from Nam-pang, is small, and named from its appearance. To the S.S.W. of it about 2 miles there are *two rocks awash*. The *Quoin* is an islet resembling a gunner's quoin, lying near the East side of Nee-wok Island, and $2\frac{3}{4}$ miles N.N.W. of Nam-pang. *Nee-wok* is an island of moderate height, about a mile in length, bearing from Nam-pang N.W. $\frac{3}{4}$ N. about $3\frac{1}{2}$ miles.

Ty-wok, about $1\frac{1}{2}$ mile N.N.W. of Nee-wok, is high, appearing like a

saddle when viewed from the S.W. S.W. by S. 1 mile from Ty-wok, and N.W. $\frac{1}{2}$ W. from the summit of Nam-pang, there is a rock with 7 fathoms all round, which is generally visible 3 or 4 ft. above water, and the sea always breaking upon it, renders it conspicuous in passing.

MONG-CHOW, bearing N.N.E. $11\frac{1}{2}$ miles from Mandarins Cap, is a high island, about $2\frac{1}{2}$ miles in length, and covered with verdure. There is a town near its summit, only discoverable from the S.E.; some rocks lie off its N.E. point. Small vessels may anchor in 3 fathoms at low water, on the West side of this island, during easterly winds; and fresh water may be procured at a small beach on that side, near the South point.

HAWCHEUN, or *False St. John*, is a high island, extending N.E. and S.W. about 11 miles. The S.W. end, in lat. $21^{\circ} 35' N.$, long. $112^{\circ} 31\frac{1}{2}' E.$, is a bluff point, having 7 and 8 fathoms water close-to; and close round it on the West side there are two small bays, with sandy beaches, having $3\frac{1}{2}$ fathoms water, where small vessels may take shelter. A large ship will be sheltered from easterly winds by anchoring in 5 or 6 fathoms, soft mud, about a mile off.

NAMOA HARBOUR is formed between the S.W. end of Hawcheun and Namoa Island, and, although rather small, it is safe and convenient for refitting a ship, after being disabled by a typhoon, or otherwise requiring shelter. The South or large entrance is about $1\frac{1}{2}$ mile eastward of the high bluff S.W. point of Hawcheun, and is preferable to the eastern entrance for ships drawing above 16 ft. water; having 6 fathoms in it, gradually decreasing to the sandy beach at the village of Namoa fronting it, and no danger whatever. It is three-quarters of a mile wide, having an islet on the East side, called *Passage Island*, joined to the West point of Namoa by a few rocks. With an easterly wind the best anchorage for a large ship is about halfway between Passage Island and Green Point, which has a round mound on it covered with grass, and forms the N.W. point of Namoa. Here she will have $4\frac{1}{2}$ or 5 fathoms, soft mud, at low water, according as her berth is near to or farther from Namoa, and will be sheltered by this island, which is 500 ft. high, to the eastward, and by the high land of Hawcheun to the northward, round to S.W., from whence, if it blow strong, a long ground swell rolls in, rendering it necessary to move further in, to the western part of the harbour, where there are $4\frac{1}{2}$ to 4 fathoms, mud, at low water.

The eastern entrance, between Namoa Island and the S.E. part of Hawcheun, has $4\frac{1}{2}$ fathoms, gradually decreasing inside to $3\frac{1}{2}$ fathoms at low water springs; and, although it is the most contracted of the two, will be found convenient for small ships. The channel is, with the exception of a few narrow passages, of about 90 or 100 ft. wide, staked completely across; but vessels very soon shoot through them. The best berth for a small ship is in 3 fathoms, abreast the sandy beach on Namoa, which forms Green Point,

not so far in as to open the South entrance, but to see it over the narrow neck of that point.

There are several watering places about the harbour, the largest and most convenient of which is in Watering Bay, a sandy bay on Hawcheun, bearing from Green Point N.N.E.; here the water comes close to the beach.

Barren Island, about a mile to the northward of Green Point, has a white conical rock inside of it; both are connected with Hawcheun at low water, and separate Watering Bay from Namoa Bay, in which is Namoa Village, consisting of about 100 brick houses, at a small distance from the shore. Here a few refreshments and fish may be procured; but guard against the crews of any Ladrone boats, which may be about the coast.

It is high water, full and change, in Namoa Harbour, at about 10 hours, and the rise of tide is 7 to 8 ft.; and then a small drain of ebb sets out through each of the channels.

Directions.—To enter Namoa Harbour by the eastern entrance, if coming from the eastward, after rounding the South end of St. John pretty close, steer about W. by N.; or, if the ebb is running, more northerly, which course will lead near the Boat Rock, which bears from St. John, South point W. $\frac{3}{4}$ N., distant 7 miles. It has 7 fathoms water close-to, is about the size of a small boat, never entirely covered, and the sea generally breaks on it. To the northward of this rock about three-quarters of a mile lies Round Island, the southernmost of a chain of five rocky islets fronting the East side of Hawcheun. Having passed a short distance southward of Boat Rock, steer about W.N.W. for the entrance of the harbour, distant 3 miles, taking care to avoid the rocks, which have 7 fathoms close to them, projecting nearly three-quarters of a mile from the S.E. part of Namoa.

The **FIVE ISLANDS**, fronting the East side of Hawcheun, are mostly small, and bound the West side of the channel between it and St. John. *Round Island*, the southernmost of them, and *Boat Rock* bearing S.E. by E. $\frac{1}{2}$ E. nearly three-quarters of a mile from it, have been mentioned above; there are also other rocks, high above water, near its South side. *Wasp Island*, next to the northward of Round Island, is the largest of the group; high at each end, and nearly separated in the middle, with some rocks close to its East side. *Cricket*, the third island, is high, and covered with grass. The fourth, called *Pipachow*, is of middling height, covered with grass, having some rocks above water projecting off its South end; there are $4\frac{1}{2}$ fathoms water close to these rocks, and also between them and the other island to the southward, and the same depth close to the East side of Pipachow. The fifth, or northernmost island, lies nearest the Hawcheun shore, with 4 fathoms at low water between it and that shore.

There is no hidden danger near these islands, and a vessel drawing not more than 15 ft. water may either pass or anchor between them and Hawcheun, keeping rather nearer to the island. Here she will find shelter in 3

or $3\frac{1}{2}$ fathoms, soft ground, at low water, and can be supplied with refreshments from the town of Hawcheun, which stands in a small bay fronting the islands. All the space between these islands and St. John is clear from hidden danger, with depths of 5 and 6 fathoms, soft ground.

To the northward of the Five Islands the depths increase to $4\frac{1}{2}$ and 5 fathoms, in a direct line towards the West point of St. John, and continue the same in passing about mid-channel between this point and the island lying off the N.E. end of Hawcheun. Here is the narrowest part of the channel, which is about a mile wide, where vessels may be sheltered during bad weather. The entrance of the channel, generally called *St. John Road* or *Bay* between the South part of St. John and the Five Islands, is more open to blowing weather; for some ships at anchor there have been obliged to cut their cables and put to sea.

ST. JOHN ISLAND, or *Chang Cheun-cham*, in length about 15 miles N.N.E. and S.S.W., has been generally considered as two islands, for in coming from the eastward or westward, the high land on each extremity appears separated by a large gap, which, on a near approach, is found to be a low, narrow isthmus of sand, uniting the high land, and having a bay on each side.

There are 7 and 9 fathoms near the East side of the island, and no hidden danger, excepting a small rock, visible only at low water, lying off a bluff point, about 2 miles to the southward of the N.E. point of the island, from whence the land stretches to the south-westward. About a mile off the N.E. point of the island there are some rocks, always above water, with a passage of 8 and 9 fathoms between them and the point; and to the northward of them there are 5 and 6 fathoms.

On the North side of the island there are two small bays separated by a narrow peninsula. The western bay, called *Sam-chow-tong*, or *Tree Island Bay*, is the largest, with several small islands in it, and only $2\frac{3}{4}$ fathoms water within the point; there is a village in this bay, where refreshments may be obtained. All this side of the island is free from danger.

The large bay on the West side of St. John, opposite the sandy, low isthmus, extends into the island about 4 miles; but a ship cannot enter it, the water being shoal 18 to 12 ft.

Shitoe or Satye Bay, on the S.W. side of St. John, has 6 and 7 fathoms water at the entrance, and a small vessel may go farther in, and anchor in 4 or $3\frac{1}{2}$ fathoms; but it is too narrow for a large ship, unless she were to warp in.

Wycaup is a small, high, rocky island, fronting the S.E. end of St. John Island, being separated from it by a narrow passage. There are 13 and 14 fathoms water close round this island on the outside.

Lieuchieu is an island of moderate height and barren aspect, separated from Wycaup and the S.E. part of St. John by a safe channel $2\frac{1}{2}$ miles wide.

The **WIZARD ROCKS** lie off the South end of Ty-kam, between St. John and Coucok Island, 12 miles N.E. $\frac{1}{2}$ N. from Lieuchieu. The outermost, named the *Flies*, consist of a group of five or six rocks, about 30 ft. high, having 10 fathoms mud, at the distance of a cable's length from them. The *Great or South Wizard Rock* bears from the Flies N. by W. $\frac{3}{4}$ W., distant 1 mile; and $1\frac{3}{4}$ mile northward from it lies a white conical rock, called the *Inner or White Wizard*. Near the South Wizard the depths are 6 and 7 fathoms, and near the White Wizard about 5 fathoms, soft ground. S.W. three-quarters of a mile from the White Wizard, there is a rock, covered at high tide, making it necessary for a ship passing between them to keep nearest to the South Wizard. There is another rock, always above water, bearing W. by N. from the White Wizard, having 4 fathoms near it; and there is a passage with $4\frac{1}{2}$ fathoms water between the White Wizard and the South point of Tykam.

Tykam Island, lying to the northward of the Wizard Rocks, is of considerable height, of darker aspect than the other land, and in clear weather appears with red streaks. Between this island and Tonquay, the next island to the westward, the water is shoal, and also in the large space to the westward of Tonqua.

COUCOK, the next island to the eastward of Tykam, is high, and 4 miles in extent East and West. Its S.W. point has a remarkable rock close to it, resembling a boat under sail. The West side of the island is formed by a steep hilly ridge stretching North and South, having good anchorage under it in 6 fathoms. Fresh water may be obtained at the westernmost of two small bays on the North side of the island.

Tymong Island lies to the northward of Coucok, having an islet, called *Samcok*, joined to the S.W. point by rocks visible at low water.

Tylou is a high island, with a large *white patch* on its eastern side, resembling a ship's mizen or mizen stay-sail, when viewed in some directions. The island is separated from Coucok by a channel about 2 miles wide, with 7 and 6 fathoms water in it. By passing close round the East point of Coucok, it appears that vessels of moderate draught might anchor to the northward of that point in 5 fathoms, sheltered from most winds.

CANTON RIVERS.

As vessels bound to Canton River from the southward in the S.W. monsoon endeavour to make Great Ladrone Island bearing about North, and then proceed towards the river by the Great West Channel, a description will first be given of the islands and anchorages on the West side of this channel, from San-chau Island to Cum-sing-mun Harbour (including the

Broadway and the Si kiang), and then returning to the Ladrone Islands the mariner will be taken through the different passages eastward of these islands to Hong Kong, and to the entrance of the river.

SAN-CHAU, which forms the West side of entrance to the Broadway, is the next large island north-eastward of Tylou Island, and its S.E. point bears W. by N. $15\frac{1}{4}$ miles from the Little Ladrone. The space between San-chau and Tylou is shoal, with some islets and rocks adjoining the N.E. end of the latter. The depths decrease gradually off San-chau.

MONTANHA, or *Wung Cum Island*, forming the East side of entrance to the Broadway, is a large high island N.E. of San-chau, and close to its N.E. side is Ko-ho Island. These two islands form the South side of the Typa anchorage; and the Great West Channel is bounded by them on the West, and by Potoe and the other islands adjacent on the East.

The **BROADWAY** is the chief and eastern entrance, and the only one yet surveyed, of the Si-kiang. It has sufficient depth to admit a vessel of moderate draught a considerable way up, and may be found useful to such as intend to make a long stay near Macao, or to those who have parted from their anchors, and draw too much water to attempt the Typa anchorage. Its entrance is 9 miles south-westward of Macao, between the islands of San-chau and Montanha.

The *Water Islands* are two small islets lying close off the South end of Montanha; and N.W. $\frac{3}{4}$ N. a mile from them lies Inside Islet, having a small inlet, called *Lark Bay*, between it and Morgan Point (608 ft. above the sea), the West extreme of Montanha. These islands are on the East side of the Broadway entrance, and Coffin Island, bearing S.W. by W. $\frac{1}{4}$ W., distant 4 miles from the Water Islands, is on the western side. At 5 miles in a S. $\frac{3}{4}$ E. direction from Montanha Peak and $2\frac{1}{2}$ miles from the Water Islands is a shoal patch of 12 ft.

Tides.—It is high water, full and change, at the entrance of the Broadway at 11^h, and springs rise $7\frac{1}{2}$ ft. The neaps are very irregular, there being then only one flood and one ebb, of any considerable strength, during the 24 hours. The direction of the flood outside is governed principally by the winds; with strong easterly winds it comes from E.S.E.; and when south-westerly winds prevail, from South. The ebb runs generally to the S.W. Inside the river the tides take the direction of the channel.

Directions.—The best time to enter the Broadway is with the first of the flood, and if at anchor in Macao Road and obliged to run for it with a N.E. or East wind, about three-quarters ebb will be the best time to leave the road, that the first of the flood may be met at the entrance, where it flows sooner than in the road. Having rounded the East point of Ko-ho Island, about $1\frac{1}{2}$ mile distant, in $4\frac{1}{2}$ fathoms, steer at any convenient distance round Apomi Point, the high S.E. extreme of Montanha.

When abreast the point, the Water Islands will be seen in one with each

other, near the western extreme of a bay with a sandy beach. Steer to pass about half or three-quarters of a mile southward of these islands, in $2\frac{3}{4}$ or 3 fathoms, then haul round the western island, preserving the same depth and distance. Do not exceed the distance of 1 mile westward from this island, for beyond that the water shoals fast to $2\frac{1}{4}$ fathoms, towards the San-chau shore. From abreast the islands about a N.N.W. $\frac{1}{2}$ W. course, giving a berth of three-quarters of a mile to Inside Islet, will lead up to abreast Morgan Point, the West point of Montanha.

From the above point the water shoals gradually towards Ross Island on the West side of the channel. There is generally a line of fishing stakes extending westward from the point, with passages among them for vessels. *Mong-chau*, or *Ballast Island*, bears N.N.W., distant $2\frac{1}{2}$ miles from Morgan Point. N.W. $\frac{3}{4}$ N. about $1\frac{1}{4}$ mile from Morgan Point, and fronting the first of the above passages, there is a rock which shows at low water about the size of a small boat. The channel is about a cable's length westward of this rock; for W. $\frac{1}{4}$ S. about a mile from it there is another rock, which also shows at low water, and shoal banks bound the channel on both sides. *Pak-tang*, a small island with a sharp hummock on its N.E. end, lies on the western bank, W. $\frac{1}{2}$ N. distant 3 miles from Ballast Island. The bank, composed of mud, has only 6 ft. on it, and extends $1\frac{1}{2}$ mile from Pak-tang towards Ballast Island, contracting it to about the breadth of from half a mile to a mile, with $2\frac{3}{4}$ and 3 fathoms in it.

If intending to proceed farther up than Morgan Point steer N.N.W. towards the rock fronting the first passage to Macao. When abreast the rock, steer N.N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles, and the vessel will then be abreast Ballast Island, in $2\frac{3}{4}$ fathoms. This is a safe and convenient anchorage, about 6 miles S.W. by W. of Macao, and the boats are kept in sight when passing to and fro from that place. Fresh water may be obtained in a small bay to the northward, under Beacon Hill, which is 690 ft. high, and has a remarkable stone on its summit.

TYPA ANCHORAGE.—The eastern entrance to this anchorage is between two high islands, that on the South side name Ko-ho or Apomee, and that on the North side named Typa or Kaikong. Ko-ho is separated from the N.E. point of Montanha by a narrow gut with 24 ft. water in it, decreasing to 9 or 10 ft. farther in towards the Typa. The anchorage is between the West end of Typa Island and the East end of Macarira Island, and affords secure shelter in $3\frac{1}{2}$ to 4 fathoms. H.M. ships *Herald* and *Modeste* refitted during the operations in China in 1841.

Tides.—In this anchorage, and in Macao Harbour, it is high water, full and change, at 10^h 0^m. The springs rise about 7 ft.; in the Typa they run $1\frac{1}{2}$ and 2 knots per hour, when not influenced by the winds. The ebb runs out of the Typa entrance, but it sets across it when outside the points.

Directions.—Vessels entering or leaving the Typa should weigh at half

flood. In entering steer for the North extreme of Ko-ho, and pass it pretty close, the deepest water being on this side of the entrance; continue on until the summit of Sylock Island is in line with the North extreme of Ko-ho. Keep this latter mark on, or the North point of Sylock just in sight, bearing about E. $\frac{3}{4}$ S., leads in the deepest water; and when the East end of the middle hill on Typa Island opens westward of a rocky mount forming the S.W. point of the same island, haul gradually to the northward, and anchor near the West point of Typa, with the South point of Sylock open of the North extreme of Ko-ho.

Here the depth is $3\frac{1}{4}$ to 4 fathoms at low tide, and vessels are sheltered from all winds by the high lands around. The deepest water is near the West point of Typa, for the bay abreast, at the East end of Macarira, is shoal. The watering cove is at the head of this latter bay, and from the North point a reef of rocks projects nearly a quarter of a mile eastward; a vessel ought not to go so far northward as to approach this reef. In the middle and eastern parts of the Typa the depths are only 14 and 15 ft. at low tide, in the fair channel leading to the anchorage, but no injury can be received by grounding, the bottom being remarkably soft.

MACAO HARBOUR.—Macao stands on a small peninsula projecting from the S.E. end of Macao Island. The peninsula is nearly 2 miles long, less than a mile wide at its broadest part, and is connected with the island by a low, narrow, sandy isthmus, across which extends a barrier wall to exclude foreigners from the interior of the island. The town is built on the declivities round the harbour, the shore beneath being embanked, so as to form a marine parade, backed by a terrace of white houses. Fort Guia stands on the hill to the N.W. of the town.

LIGHT.—A *bright light*, revolving every 64 seconds, is shown from Fort Guia. It is elevated 330 ft., and said to be visible 15 to 20 miles off. It is stated to be in lat. $22^{\circ} 11' N.$, long. $113^{\circ} 33' 30'' E.$

This settlement, known to the Chinese as *Ngao-mun*, was established by the Portuguese in 1557, but has never been recognized as a possession of Portugal by the Chinese government; the British government, however, has recognized the jurisdiction of its law courts as supreme. In December, 1873, the Portuguese government abolished the system of Coolie emigration which has been existing since the suppression of the slave trade. This traffic, if all is true that has been reported of it, equalled the old iniquities of the African slave trade.

The Inner Harbour is formed between the peninsula and Patera Island to the westward. Its entrance is narrow, but the depths are 20 ft. at low water close to Fort San Iago or Barra, which is built on the S.W. point; and from thence the soundings are 19 and 16 ft. along the western shore to the town. There is an excellent landing pier. Steamers ply daily to Hong Kong, and every other day to Canton.

Pedra Arèca, a rock lying S.E. 4 cables from Fort Barra, is marked by a beacon, and *San Francisco Bank*, $1\frac{3}{4}$ mile East of the fort, is a mud patch with two heaps of ballast, with 4 and 5 ft. on them, and 10 ft. close to.

Pilots.—Canton River pilots are procured at Macao, and each receives a chop from the residing mandarin, to deliver to the officer stationed at the Boca Tigris, describing the force of the ship and to what nation she belongs.

MACAO ROAD is shoal, the depth being generally from 3 fathoms at low water springs on the West side, to $4\frac{1}{2}$ or 5 fathoms close over to Samecock and the other islands that bound the East side. There is, however, said to be much less water in it of late years, but as the bottom is soft loam or loose mud there is no danger of a vessel striking on her anchors, for they immediately bury in it.

Vessels of large draught usually anchor in deep water near the islands, with Macao bearing between W. by N. and W.N.W., distant 6 or 7 miles, which render the communication with that place difficult and dangerous in blowing weather. With Ko-ho Point S. by W. $\frac{1}{2}$ W., and Macao W.N.W., distant 4 or 5 miles, a large vessel may anchor in about 4 fathoms at low water, and be more conveniently situated for procuring a pilot. If drawing under 18 ft. she can anchor with Macao on the same bearing about $1\frac{1}{2}$ mile off the Typa entrance.

Small vessels may anchor in the S.W. monsoon in the entrance of the Typa, off the Ko-ho shore, a little outside Ka-o Islet, in about 3 fathoms at low water. In the N.E. monsoon they can anchor abreast a sandy beach, between the Cau-chau or Nine Islands and Macao, in 3 or $3\frac{1}{2}$ fathoms; here they will generally have smooth water and an easy communication with the shore.

Directions.—The route to Macao Harbour for small vessels, through the Typa anchorage, has 7 ft. at low tide in the fair track between the Typa and the harbour, and 8 to 12 ft. between Typa Island and Macao. A vessel should steer a direct course from the Typa to the harbour, and to avoid the sunken rock, *Pedra-mea*, lying about a quarter of a mile eastward of the N.E. point of Macarira, keep the N.E. point of Montanha open eastward of Macarira; or, in passing it, keep rather towards the Typa Island side of mid-channel.

From thence, steer direct for the entrance of the harbour, avoiding *Pedra Arèca* Rock, from which the South point of the outermost of the two high Ma-lo-chau Islets, to the S.W. of the entrance, bears W. by S. $\frac{1}{2}$ S. $1\frac{1}{4}$ mile, and the point of Fort Barra N.W. about 4 cables. The N.E. point of Montanha in line with East point of Macarira leads westward of the *Pedra Arèca*, and a vessel will not be too near it if she does not go eastward of a line drawn from the West point of Typa Island to Fort Barra Point. This point should be rounded pretty close in entering and the eastern shore kept aboard

to the anchorage abreast the town, where a disabled ship may be hove down and repaired.

Entering from the outer roads, fort Barra Point in line with the South extreme of Anang village, W. by N., will lead between San Francisco Bank and Pedra Arèca in 9 feet least water, deepening as the harbour is approached.

CUM-SING-MUN HARBOUR.—From Macao the eastern shore of Macao Island trends N.N.E. about 11 miles to Bluff Head, where it turns abruptly westward, and forms a deep bight called Cum-sing-mun Harbour. This harbour is safe for small vessels, and it would be a desirable haven for vessels of large draught to run for from the anchorage off Lintin, at the approach of a typhon, were it not for the extensive shoal flat they would have to cross, the depths being only 2 to 3 fathoms at 2 miles outside the entrance; but they increase quickly to 7 and 8 fathoms when within half a mile of Bluff Head, which is the proper side to steer for in coming from the S.E., and also to keep nearest to when running into the harbour.

The entrance, about half a mile wide, is between the South part of Kee-ow Island and Bluff Head. Between this head and the small islet and sunken rocks, near the island shore, the depths are irregular, from 14 to 6 fathoms; but inside, about half a mile West, or W. by S. from the small islet, the bottom is soft, affording safe anchorage in 6, 5, or 4 fathoms, taking care, however, to avoid the shoal patches shown on the chart.

GREAT LADRONE (*Man-san* of the Chinese), being the outermost island directly fronting the estuary of Canton River, is generally used as a land-fall by vessels bound there from the southward during the S.W. monsoon; and with the Little Ladrone adjoining to the westward, and Potoe to the north-westward, bounds the East side of the Great West channel, leading to the river.

This steep, bold island may be easily known by its N.W. part forming a round mount or dome (1,465 ft. high), which, being more elevated than the other parts, can be seen, in clear weather, about 27 miles from a vessel's deck, and 40 miles from the mast-head; none of the other islands have a similar appearance, although most of them are high. The island is about 2 miles in diameter, with a rocky aspect close to the sea, but it is safe to approach, the depths near it being 14 or 15 fathoms; on the S.W. part there is a small inlet, named Pumice-stone Bay, where fishing boats take shelter in the N.E. monsoon.

LITTLE LADRONE (*Pocking-han* of the Chinese), is of a convex sloping form, not so much elevated as the Great Ladrone, and separated from its West side by a narrow channel of 9 to 18 fathoms water, but too confined for a vessel unless in a case of necessity. Near the West side of the island the depth is about 10 fathoms, decreasing gradually to 7 fathoms about half

a mile southward of Potoe; there are 12 fathoms near its South point, and 14 and 15 fathoms near the South and S.E. sides of the Great Ladrone.

A small rocky islet lies close to the N.E. part of the Little Ladrone; and North nearly three-quarters of a mile from this islet there is a black rock covered at high tide, with 10 fathoms close around; it will be prudent therefore, in passing this locality at high water when the rock is covered, to keep about mid-channel between the Little Ladrone and Tong-ho island, which lies $2\frac{1}{2}$ miles to the northward. This is the only danger near the Little Ladrone, excepting a high rock close to its N.W. side, having a depth near it of 9 and 10 fathoms.

Potoe, or *Passage Island*, bearing N.N.W. $\frac{1}{4}$ W. $5\frac{1}{2}$ miles from the south-west end of the Little Ladrone, is a flat sloping rock, visible about 9 miles. There are 5 to 6 fathoms near it on all sides, but it ought not to be approached too close in light winds, as the eddies occasioned by the freshes out of the river may render a vessel unmanageable, and probably drift her towards it, or Wong-mou, the adjacent island. The channel between it and the S.E. point of Montanha is about 5 miles wide, and safe.

Wong-mou Island, lying $1\frac{1}{2}$ mile E.N.E. of Potoe, is $1\frac{1}{4}$ mile long, North and South, and has a peaked hill on its northern part; at nearly half a mile from its West side there are some rocks above water. *Liungnib*, lying a mile eastward of Wong-mou, has a round islet off its South end.

About three-quarters of a mile N.W. from the North end of Liungnib lie two rocks, which cover at springs, and break in blowing weather; therefore, in passing the North end of this island, keep at least a mile from it.

PU-TOI or Pak-leak Island lies N.E. by N. nearly $1\frac{1}{2}$ mile from the Great Ladrone, and on its N.E. point is a remarkable cone hill, 855 ft. high, which is visible from Macao. The island is of irregular shape, and on its southern side the hills are much covered by black rocks. On its northern side are some small bays in which fresh water may be procured; and near its N.E. point there is a rocky islet, on which the fishermen have a hut and fishing stage. A rock, awash, lies close off its South extreme.

Clio Rock, on which H.M.S. *Clio* struck, 12th December, 1841, lies about 2 cables from the West side of Pak-leak, with the N.W. extreme of the island bearing N. by W., distant 4 cables' lengths.

TONG-HO ISLAND, about $2\frac{1}{2}$ miles N. by E. $\frac{1}{2}$ E. from the Little Ladrone, is $1\frac{3}{4}$ mile long, East and West, and of moderate and unequal height. On its N.E. side there is a small cove into which the ship *Boddam*, drawing 21 $\frac{1}{2}$ feet water, was taken by her pilot and remained in safety during a typhoon. The cove is about 2 cables wide, with 24 feet water at the entrance, 17 and 18 ft. well inside, at low-water springs, and the bottom all soft mud. Here a vessel may lie at anchor, or if she has none, be run into the mud without risk. Being the chief rendezvous of the fishing boats in bad weather, or a place of refuge from the pirates, it is protected by a fort on the N.W. point

of entrance. Good water may be obtained at Boddam Cove, also beef, fish, poultry, and some fruit.

Boddam Cove will not be readily distinguished until the vessel is within about 2 miles of the N.E. part Tong-ho. Steering for the entrance, take care to give a berth to a rock lying off the N.E. point of the island, and to a sunken rock lying about $1\frac{1}{2}$ cable N.E. of the fort point; when the head of the cove bears S.W. by W., the vessel will be S.E. of the rock. Having brought the cove fairly open on the above bearing, steer for the point on the N.E. side of entrance, and pass it within the distance of half a cable; for the N.W. point, where the fort is built, is bordered by rocks.

Bouncer Rocks are two rocks close together, lying N.E. by N., two-thirds of a cable from the S.E. entrance point of the cove; the outer rock is awash at low water.

Good water may be obtained at Boddam Cove, also beef, fish, poultry and some fruit.

CHUK-WAN ISLANDS.—These two islands lie about E. by N. $1\frac{1}{2}$ mile from Pak-leak, and the larger island, the eastern one, has a high rocky islet, named *Sharp Island*, lying off its S.E. point, and a small bay on its North side. There are 14 fathoms water between *Hoa-ock* and the western island, and 11 and 12 fathoms northward of the group.

RALEIGH ROCK, on which H.M.S. *Raleigh* struck, 14th April, 1857, is a small pinnacle, which breaks, when there is a moderate sea, at low water springs, with 9 and 10 fathoms close to. Its position is lat. $22^{\circ} 2' N.$, long. $113^{\circ} 47' E.$, nearly in mid-channel between Pak-leak and South White Rock, distant $2\frac{1}{2}$ miles from the latter. When on the rock the gap in the centre of South White Rock is in line with the right extreme of a small wedge-shaped island off the eastern side of Lafsami Island bearing N.E. by N.; the highest part of Ai-chau Island E. $\frac{1}{2}$ N.; and the peak of the Great Ladrone is over the western slope of Pak-leak S.S.W. $\frac{1}{2}$ W.

North and South White Rocks are two high white rocks half a mile apart, lying North about $3\frac{1}{2}$ miles from the western or small Chuk-wan island. From the southern rock the N.E. point of the eastern Chuk-wan bears S.S.W. $\frac{1}{2}$ W., distant $4\frac{1}{2}$ miles. About a mile S.E. of the southern rock is a small black rock, visible only at low springs, having 9 fathoms water close around.

The White Rocks may be seen in fine weather in time to avoid them, and the depth is about 9 fathoms near their eastern side, 8 fathoms on the western and northern sides, and 9 fathoms in the channel, between them and Chuk-wan; but since the loss of the *Raleigh* by striking on the Raleigh Rock, it will be prudent not to use this channel until it has been more accurately examined.

AI-CHAU ISLANDS lie N.E. by E. $\frac{1}{2}$ E., 4 miles from the eastern Chuk-wan, and the eastern or larger island is separated from the smaller one on its

West side by a very narrow channel with 4 and 5 fathoms in it at low water. *Hill Islet*, lying N.E. $1\frac{1}{2}$ mile from the northern part of the eastern *Ai-chau*, has 11 and 12 fathoms water at a short distance from the rocks around it.

The **SAMOUN**, or Three Gates, form a group of three small islands $2\frac{1}{2}$ miles eastward of *Ai-chau*, and extend about $3\frac{1}{2}$ miles in a N.W. and S.E. direction, with narrow passages between them. Near the N.W. part of the N.W. island, called *Hak-chau*, there are two peaked islets; and on the northern side of the group, between the eastern and middle islands, there is another high rocky islet, named *Gauze* with a bed of rocks lying southward of it; the South end of the eastern island is the highest part of the group, and forms a round mount. There is a small harbour on the S.W. side of the largest island, which would afford shelter to two or three vessels during a N.E. gale. The anchorage is in 6 to 10 fathoms, muddy bottom.

LINGTING ISLAND, bearing W. $\frac{3}{4}$ N., distant 15 miles from the N.E. head of the Lema Islands, is of rugged appearance, about $1\frac{3}{4}$ mile long, East and West, and rises to a peak near its centre. Two rocks, one awash and the other above water, bearing N. by E. and S. by W. of each other, lie eastward of the North point of the island; the outer one, awash, is distant nearly a mile E.N.E. from the North point, and the other S. by W. about half a mile from the North point, and the other S. by W. about half a mile from the outer one, with depths near them of 13 fathoms, but foul ground between.

The Needle Rocks, on which H.M.S. *Doris* struck in 1813, are two heads lying within a few yards of each other, about $1\frac{1}{2}$ cable's length S.W. of the low rocky N.W. extreme of Lingting, and they are so sharp that it is difficult to keep the lead fixed on their points; at low springs they have about 6 ft. water on them, at which time, with a swell, they may probably show either breakers or a rippling. From the outer rock the S.W. extreme of the Lema Islands is just shut in with the S.W. point of Lingting, and the highest part of Lamma Island is a little way over the low N.W. point. A vessel will avoid them when passing round the N.W. end of Lingting by not approaching it within half a mile, or by keeping the S.W. extreme of the Lema Islands a little open S.W. of Lingting.

The depths close to the North point of Lingting are 18 or 19 fathoms, decreasing to 14 and 15 about a mile distant; to the southward and westward of the island there are 10, 11, and 12 fathoms over soft bottom.

When passing northward of Lingting at night, give its North side a berth of $1\frac{1}{2}$ mile to avoid the rocks of its N.E. side.

TY-LO ISLAND is the southern of the range of small islands bounding the East side of Macao Road. It is high near the western part, sloping a little to the eastward, and lies N. $\frac{1}{2}$ E. from the North end of *Liungnib*, from which it is separated by a good channel $2\frac{3}{4}$ miles wide, but in using it take

care to avoid the rocks off the northern point of the latter. *Ty-lock*, about half a mile northward of *Ty-lo*, is a small rocky islet, with a large rock on its summit.

Sam-Cock Island, or the *Pyramid*, the largest of the above range, and lying $1\frac{1}{2}$ mile N.N.E. from *Ty-lock*, is of moderate height, rugged in appearance, and in the form of a pyramid. Between it and *Ty-lock* there is a small islet named *Sy-lock*, and two rocks above water; but the channels between these are so narrow, that they should not be attempted on account of the strong eddies, which frequently render vessels unmanageable. On the northern part of *Sam-cock* there is a small bay or cove for boats, and the island affords fresh water.

Chung-chau-si, *West Water Island*, the northernmost of this range, lies N.N.E. about $1\frac{1}{2}$ mile from *Sam-cock*, and there is 7 fathoms water near it to the eastward, and 5 and 6 fathoms to the northward and westward.

Four-feet Rock.—This small dangerous needle rock, with only 4 ft. on it and 10 fathoms close around, lies E.S.E. 3 miles from *Chung-chau-si*, and from it the summit of *Ty-lo* bears S.W. by W., the centre of *Sam-cock* W. $\frac{1}{2}$ S., and the small islet lying off the N.W. end of *Chung-chau* N.N.E. $\frac{1}{4}$ E. When *Chuck-tu-aan Island* (3 miles S.E. by S. from *Chung-chau-si*) and the small islet off the N.W. end of *Chung-chau* are on the same bearing, about N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W., the rock will be between the two, but nearest the former; therefore if a vessel has occasion to enter *Macao Road* by this channel, and keeps about three-quarters of a mile off *Lafsami* and the South side of *Chung-chau*, she will pass in mid-channel, and have 10 or 12 fathoms water, decreasing to 7 fathoms as she nears *Chung-chau-si*.

CHUNG-CHAU, or *Water Island*, which with the islands southward of it bound the S.W. side of *Lantao Channel*, lies about S.W. by W. $2\frac{1}{2}$ miles from the S.W. point of *Lantao*, is high, and near its North point there is a peaked hill. It is $1\frac{1}{2}$ mile long, N.W. and S.E., and there are no hidden dangers near its northern side.

Nau-tau-mun, or *Bullock's Head Gate*, the next island to the S.E. is small but high, and is separated from *Chung-chau* by a narrow channel through which H.M.S. *Doris* ran, and found shoal water near *Chung-chau*.

LAF-SA-MI ISLAND, separated from *Nau-tau-mun* by a narrow channel, is larger than either *Chung-chau* or *Nau-tau-mun*. It is inhabited on the south-western side, where fresh water is to be had in a small bay. This island from some views forms a peak; and at a short distance eastward of its South point there is a rocky islet, on which the fishermen have huts, and a winch for heaving up their nets.

CHI-CHAU ISLAND, the largest of two islands lying $2\frac{1}{2}$ miles E.S.E. of *Laf-sa-mi*, forms the South side of the East entrance of *Lantao Channel*. The island is high, of round appearance, inhabited on the West side, and separated by a narrow channel from the smaller and lower island,

on its western side; a sunken rock lies off its N.E. point, and a patch of 4 fathoms about a quarter of a mile off its North point.

SOKO ISLANDS.—*A-chau*, the southern of the two Soko Islands, is distant nearly 4 miles S.E. $\frac{3}{4}$ E. from the South point of Lantao, and forms the North side of the eastern entrance of Lantao Channel. The South point of *A-chau* is high, and rises very steep, having 7 fathoms water close to; the depths between it and *Chi-chau* are 11 to 13 fathoms, deepening suddenly to 25 or 30 fathoms in a hole or swatch close to *Chi-chau*.

The other island, lying a short distance northward of *A-chau*, is about a mile long, East and West, and very narrow in the middle. A sand spit extends nearly West upwards of $1\frac{1}{4}$ mile from its West side, and on the West extreme of the spit there are $2\frac{3}{4}$ fathoms at low water, decreasing quickly to 2 and $1\frac{1}{4}$ fathoms towards the island. A rocky islet and two rocks above water lie between the two Soko Islands; there is also at nearly a mile eastward of *A-chau*, a high rocky islet.

KYPONG ISLANDS are the southernmost group of the Archipelago fronting the estuary of Canton River. *Pak-tsim*, the largest and north-eastern island, bearing E. by S. 16 miles from the Great Ladrone, has near its western extreme two high remarkable peaks, called the *Asses Ears*, which make it easily known, as they rise from the same base almost perpendicularly from the sea to the height of 980 ft., and sloping suddenly down on the N.E. side, are united to a piece of moderately elevated land, which terminates that part of the island. *Tsi-mi-wan*, the next island to the S.W. is of considerable size, and separated from the S.W. point of *Pak-tsim* by a channel about half a mile wide.

A range of islets extends $4\frac{1}{2}$ miles in a south-westerly direction from *Tsi-mi-wan*; the south-westernmost islet (90 feet high) called *Gap Rock*, but *Man-mi-chau* by the Chinese, has a small gap in it. Between the South end of *Tsi-mi-wan* and *Peaked Rock* (180 feet high), the easternmost islet of the range, there is a passage $1\frac{1}{4}$ mile wide, with 18 fathoms least water in it. A rugged rock, 50 ft. high, lies about $1\frac{1}{2}$ mile N.W. $\frac{1}{2}$ W. from the South end of *Tsi-mi-wan*. The passage, about half a mile wide, between *Nut Island* and the islet nearest to it to the southward, has 10 to 26 fathoms water. There is also, between *Gap Rock* and the other islets to the eastward, an opening a mile wide, with 16 to 18 fathoms water, and safe to pass through with a steady wind.

Kwe-tau, or *Tortoise Head*, lying about three-quarters of a mile from the East point of *Pak-tsim*, is a white rocky islet, having other rocks between it and the point, neither of which ought to be approached. *Gay-une* is another islet, rather more than a mile northward of the North end of *Pak-tsim*: there is a passage between it and the latter, which, however, ought not to be attempted unless from necessity; for there is said to exist some straggling rocks on which the sea breaks at times.

Cambridge Rock, on which a vessel of this name struck, August 30, 1820, requires the greatest care to avoid when vessels are passing through the Tai-ta-mi Channel between the westernmost of the Lema Islands and the above rocks. The rock is of a spiral form with only 17 ft. water on it, and sometimes breaks. It lies N. by W. $\frac{1}{4}$ W. $2\frac{1}{4}$ miles from Kwei-tau, N.N.E. $\frac{1}{2}$ E. $1\frac{3}{4}$ mile from the North point of Pak-tsim, and from it the highest part of Chi-chau Island is in line with Hill Islet N.W., and the S.E. side of Gay-une Islet is on with N.W. extreme of Rugged Rock, S.W. $\frac{1}{2}$ W. There are 4 and 5 fathoms on the rocks surrounding the spiral rock; from thence the depths increase to 23 fathoms in the Tai-ta-mi Channel, which is $2\frac{3}{4}$ miles wide, and safe by borrowing towards the Lema Islands when passing through.

LEMA ISLANDS consist of three large and one small island, extending in an E.N.E. and W.S.W. direction $12\frac{1}{2}$ miles. The easternmost and largest island, named Tamkan, is 6 miles long and a mile broad, of moderate height and undulating, and separated from Ye-chau, the middle island, by the narrow Yat-moun Channel.

The Yat-moun Channel, by Capt. Bate's survey of 1850, is free of danger, and carries a depth of 12 to 19 fathoms, but it is said that there is a sunken rock in mid-channel, and that this passage should not be attempted unless from necessity.

Ye-chau is the middle and highest of the Lema Islands, and when viewed from most positions it appears flat on the top. Close to its N.E. part is a small rocky islet, named Round Island, visible when the Yat-moun Channel is open.

Poun-tin, the third or southern of the large islands, is separated from Ye-chau by the narrow Ye-chau Channel, with 19 to 30 fathoms water in it. This island (1,210 ft. high) forms more in a peak than either of the other two, and has a point projecting westward with a hummock on it, named *E-chau Head*. To the southward of this head lies *Tai-ta-mi*, a small but high island, with a narrow channel between it and Pountin. *Tai-ta-mi* forms the N.E. boundary of the Tai-ta-mi Channel, which has Cambridge Rock, Pak-tsim Island, and the Kwei-tau Rocks bounding its S.W. side.

Directions.—The Lema Islands on their southern side are all steep and rocky, not affording even a single bay for a boat to shelter in, and the soundings are 22 or 23 fathoms about $1\frac{1}{4}$ mile from their coasts; on their northern sides the depths are generally 15 or 16 fathoms close to the shore. Vessels in the N.E. monsoon should endeavour to pass between the North end of Tam-kan and Putoy, which lies 6 miles northward, and its North end, when viewed from the E.N.E., forms a small peaked hummock.

Notwithstanding the Lema Islands appear barren, there are a few men residing on them, preparing charcoal from small quantities of brushwood found between the rocks, which they send to Macao for sale. Fresh water

may be obtained along the North side of Tam-kan at several places; and close to the westward of its N.E. point, in a little cove, called Joss House Bay, there is a Chinese place of worship, and about this part the Compradore's boats await vessels after the end of August, when the easterly winds set in. The Yat-moun and Ye-chau Channels should not be used unless in a case of emergency, or when the wind blows directly through, as they are narrow, with deep water, and have generally a strong current sweeping through them. Yat-moun is the widest, and of moderate depth, but if the *Cordelia Rock* is in existence, it is very dangerous.

LAMMA ISLAND lies off the S.W. side of Hong Kong, and its S.W. point bears N.W. by W. $\frac{1}{2}$ W. 13 miles from the N.E. head of the Lema Islands, and N.E. $5\frac{1}{2}$ miles from the North point of Lingting. The island is of rocky appearance, about 4 miles long, North and South, and 2 miles wide. The North end of the island is about a mile distant from the S.W. part of Hong Kong, and over it Green Island light shows of a green colour.

From the North point of the long bay, on the West side of the island, the shore trends N. $\frac{1}{2}$ E. a mile to another point, off which, at half a mile from the shore, are some sunken rocks. The S.E. point of the island is remarkable from its being a small round hummock of bright green appearance on the top, and rocky near the water's edge; this part of the island, as far as the eastern point, is rocky close to the shore, with 13 or 14 fathoms water half a mile off.

The cove on the East side of the island, to the northward of its eastern point, is about $1\frac{1}{4}$ mile deep and two-thirds of a mile wide. It carries a depth of 8 to $3\frac{1}{2}$ fathoms, and a vessel may anchor in 6 or 7 fathoms water, over rocky bottom, about half a mile within the entrance, and ride in security, being land-locked. *George Island*, 234 ft. high, lies close to the northward of the North point of the cove.

A rock awash at low water, with deep water around it, lies N. by W. $\frac{1}{4}$ W. about one cable from the rock which is above water near the N.W. point of Lamma Island. The S.W. point of Lamma Island open of the West point, bearing S. by E. $\frac{1}{2}$ E., leads to the westward of this danger, and Tree Island open of the North point of Lamma Island, bearing E. $\frac{3}{4}$ N., leads to the northward.

LAMMA CHANNELS.—East Lamma Channel, between Lamma Island and Hong Kong, is about a mile wide, and has general depths in it of from 17 to 23 fathoms; but a vessel will find a good and sheltered anchorage between George Island and the North point of Lamma in 7 or 8 fathoms. There appear to be no dangers in this channel, but a rock (doubtful) is said to lie off the S.E. point of Mas-kong or Round Island, on the Hong Kong shore.

The West Lamma Channel, between the western side of Lamma and the

islands lying off the East side Lantao, has general depths of 5 and 6 fathoms on a mud bottom. Entering it from the East Lamma Channel, the soundings will decrease rapidly to 7 and 6 fathoms after rounding the North point of Lamma, off which, at one-third of a mile to the N.N.E., is a rocky patch of 8 fathoms, surrounded by depths of 14 to 21 fathoms.

Water.—About a mile N.E. of the North point of Lamma Island, and near the western point of a deep cove, named *Aberdeen* or *Shekpywan Harbour*, on the Hong Kong shore, there is a cascade of good water conveniently obtained.

CHUNG ISLAND is near the S.E. side of Lantao, N. $\frac{1}{2}$ W. 5 miles from Lingting. Its North and South parts are high, but it is narrowed near the middle, which is low, by two bays, one on the East, the other on the West side of the island. A vessel of moderate draught will find good shelter during an easterly gale, in the western bay, in $3\frac{1}{2}$ fathoms. There is no danger in passing the South end of the island, the depths being 7 and 8 fathoms close-to, and 5 and 6 fathoms near the south-western part; but East, about 3 cables from the eastern point of the island, is a small rock, which dries at low water, and has 6 and 7 fathoms close-to. Capsingmoon Passage, between Chung Island and Lantao, with the dangerous Passage Rock, is described hereafter.

To the northward of Chung, and at a short distance from Lantao, there are several small islands and rocks above water; but the channels between them and the Lantao shore are narrow, shoal, and unfit for large vessels. Fresh water can be procured in the bay on the western side of Chung.

The **PU-TOY GROUP**, lying off the South end of Hong Kong, bounds the northern side of the Lema Channel. *Pu-toy*, the southern island of the group, bears N.N.W. $\frac{1}{4}$ W. 6 miles from the N.E. head of the Lema Islands. It is of moderate height, the appearance in general barren, there being only a small quantity of brushwood in the valleys. On its western side there is a cove for boats, and a small rocky islet.*

Lo-chau or *Beaufort Island*, lying northward of Pu-toy, and separated from it by a narrow channel, is high, flattened at the top, and steep all around; about its north-western brow there is a small peak, with a few large and remarkable rocks on it. At half a mile off its S.W. side are some large rocks above water, having no hidden dangers near them. *Sun-kong*, about $1\frac{1}{2}$ mile East of Lo-chau, is a small but high island, rising in a peak, 466 feet high, towards the centre; near its north-western part there are some

* Com. C. M. Buckle, R.N., who cruised for some days about the islands southward of Hong Kong in H.M.S. *Cormorant*, 1865, remarks that there are a number of small rocks amongst them, some above and some below low-water mark, which, owing to the smallness of the scale of the chart do not appear.

rocks considerably above water. *Wag-lan*, about three-quarters of a mile East of Sun-kong, is a small barren rocky islet, the easternmost of this group, having 16 and 17 fathoms water at a short distance to the eastward.

HONG KONG.

HONG KONG ISLAND (*Heang Keang*, the Island of Fragrant Streams), so called from the numerous water courses on its sides, is about 9 miles long, N.W. by W. and S.E. by E., 2 to 5½ miles broad, and with an area of about 29 square miles. It lies between Lamma Island and the main, from which it is separated by a narrow channel a quarter of a mile wide, named Lyemun Pass. The appearance of the island is somewhat picturesque, but on the whole it is generally barren and unprepossessing. Victoria Peak, 1,825 feet high, in the N.W. part of the island, serves as a *signal station*.

Three important lighthouses have been recently established. The two on the eastern end of Hong Kong Island are described hereafter.

Green Island Lighthouse, first illuminated in July, 1875, is a round white tower, 20 ft. high, and stands on an island lying off the N.W. end of Hong Kong Island. The light is *fixed*, elevated 95 ft. above the level of the sea, and visible 14 miles off. It shows *red* to the westward between N. by W. ½ W. and S. by W. ½ W., *green* to the northward between N. by W. ½ W. (indicating the western edge of Kellet Bank) and N.N.E. ¼ E., and also *green* to the south-eastward between S. by W. ½ W. and S.E. To the eastward the light is obscured by the island.

HONG KONG, 3 miles in extent, is on the North side of Hong Kong Island. For some years, owing to the excessive heat of the city, a site was occupied as a sanatorium at *Kowloon*, on the northern shore of Victoria Harbour. By the treaty of Tientsin this was ceded to Britain, and the tract, about 5 square miles, has been laid out for villa residences.

In the year 1841, when the island became a British possession by the treaty of Canton, the population numbered only 5,000; in 1876 it was estimated at 122,000. In 1865, of the 125,504 inhabitants, 2,034 were European and American, and the remainder all or nearly all Chinese.

Hong Kong being a free port, it is impossible to give any statistics of its trade. It may be looked upon chiefly as a depot, only a small quantity of the goods imported being consumed upon the island, the greater portion being re-exported to other ports. Amongst the articles principally dealt in, may be enumerated—opium, sugar, flour, cotton, rice, tea, cotton and woollen goods, silks, oil, salt, provisions, &c., besides which there is an export of granite, almost the only article produced in the colony.

The trade with the Australasian colonies has much improved since the

steamers of the Eastern and Australian Mail Steamship Company have regularly established their line, and these have been largely supplemented by occasional vessels leaving this for Cooktown in the northern extreme of Queensland. Of the 3,562,774 tons of shipping entered during the year 1875, 45.2 per cent. arrived in junks, 43.7 per cent. in steamers, and 11.1 per cent. in European and American-built sailing vessels.

Climate, &c.—Hong Kong lies just within the tropic, and is subject to an excessively hot and a somewhat cool season, coinciding with the S.W. and N.E. monsoons; it has also a dry and a rainy season. July and August are the hottest months, the temperature ranging from 80° to 94°, with a difference of 10° between day and night. The city being situate on the North side of the island under the peak, is completely sheltered from the influence of the S.W. monsoon, which, on the southern side of the island, agreeably tempers the violent heat. November to January is the coolest period, and the air is often bracing; the temperature occasionally falls below 40°, and ice has been known on the peak, but this is rare; sudden changes frequently take place, a day of almost tropical heat being followed by a cutting northerly wind, for when calms and variables prevail, it is hot even in winter, and it requires the N.E. wind and overcast sky to reduce the temperature, and gales from the latter quarter are common in the autumn and spring months, blowing for two or three days. March and April are rainy and foggy, and the damp is so penetrating that the greatest care is required to prevent clothes, books, instruments, stores, &c., from being destroyed or injured by mildew. Typhoons seldom occur before June or July, for they advance northward as the season progresses, and may be expected most severe at Hong Kong about the autumnal equinox.

The *wet season* commences in May, and continues until the beginning of August, and during this period the rain falls almost without intermission, frequently causing floods which do great damage.

Although visited by sickness caused by malaria, it has been shown by statistics that for salubrity Hong Kong may compare favourably with most of the ports of the East, and its healthiness has been greatly increased of late years by its sanitary arrangements and excellent water supply. The annual rate of mortality amongst the foreign residents between 1858 and 1865 was about 5½ per cent., ranging in various years between 2 and 8 per cent. The most unhealthy years have been those most deficient in rainfall. Dysentery and intermittent fever are not uncommon, and the bilious remittent fever, sometimes so nearly allied to yellow fever, occurs in the summer season, small-pox prevailing in January, February, and March. Neglect of the usual conditions of health, such as exercise, diet, proper clothing, and the like, conduce to, and exposure to the rays of the sun, even in winter, almost invariably results in, sickness.

The Harbour consists of the space enclosed between the northern shore of

the island and the mainland immediately opposite. It is only exposed to the force of strong westerly gales, and their effect is mitigated by the large number of outlying islands, so that altogether it may be deemed one of the safest in the world. Eastward of the harbour the peninsula of Kowloon forms an inner harbour which is nearly landlocked, and which affords protection to vessels in all weathers, but the situation is not a convenient one. On the approach of a typhoon the native craft almost invariably seek shelter over towards the northern side of the harbour. The anchorage is most commodious, and is entered from the sea by fine deep-water channels both from the eastward and westward. The depth of water varies from 3 to 8 fathoms, deepening to 11 fathoms off Kowloon Point.

There are port regulations for the berthing of vessels under the superintendence of the harbour-master. The anchorage for the merchant shipping is abreast the centre and lower parts of the city, on either side a fairway channel, marked by buoys; that for the men-of-war lies eastward, between the Government establishments and Kowloon, the Cathedral roughly indicating the dividing limit.

Supplies of every kind can be obtained in abundance, and there is a well-regulated market. Excellent water from the well-constructed water-works is efficiently supplied to the city and shipping. Every appliance necessary for refit and for the repairs of ships, and steam machinery will be found at the dock establishments, stores, &c.; and there is a good hospital for seamen, and a well-conducted sailors' home.

Docks.—There are two large granite docks at Aberdeen or Shekpywan Harbour, a narrow inlet formed between the S.W. shore of Hong Kong, and a small island off it named Aberdeen or Taplichau. They lie on the Hong Kong shore of the harbour, and one of them is capable of receiving the largest class of vessels drawing 24 ft. There is also a dock at Kowloon, and a patent slip at East point. The dock charges are very high, owing to want of competition, and therefore many prefer to have their vessels docked at Whampoa in the Canton River, where the charges are more moderate.*

The dimensions of the *Aberdeen Docks*, belonging to the Hong Kong and Whampoa Dock Company, are as follows:—

Dock No. 1.—Length over all, 330 ft.; length on blocks, 308 ft.; breadth over all, 80 ft.; breadth at bottom, 42 ft.; width of caisson gate, 60 ft.; depth over sill at spring tides, 18½ ft.; depth over sill at neap tides, 16 ft.

Dock No. 2.—Length over all, 400 ft.; breadth over all, 90 ft.; width of caisson gate, 70 ft.; depth over sill at spring tides, 24 ft.; depth over sill at neap tides, 21½ ft.

* A rock breaks at low water about 50 yards to the westward of the North point of Aberdeen Bay. There is also another rock a little more than half that distance off a point to the South of it, on which a vessel was lost.

The above are the extreme depths for which credit is claimed, but the level is much influenced by the wind at all times, and from October to January inclusive, the average height is about $1\frac{1}{2}$ ft. greater at springs than during the remainder of the year.

A *steam-tug*, of 100 horse-power nominal, is always in readiness to tow sailing vessels round from Hong Kong free of charge, and will take them back or to sea at reduced rates. The work-shops on the premises possess every appliance necessary for the repairs of ships and steam machinery. There are also powerful lifting-shears on the jetty, alongside which vessels can lie in 24 ft. water, and take in or out boilers, masts, &c.

The Union Dock Company has also a dock at Kowloon, which, being within the harbour is of immense advantage to vessels which may reach port in such a state as to require instant docking. Its dimensions are :—Length over all, 300 ft. ; breadth of entrance, 80 ft. ; and depth over sill at ordinary spring tides, 21 ft.

The *patent slip* at East Point, on the northern shore of Hong Kong, is said to be capable of taking vessels of 1,000 tons.

Tides.—It is high water, full and change, in Hong Kong Road, at $10^h 15^m$, and springs rise about $4\frac{3}{4}$ ft. Around the island the tides are irregular, flowing and ebbing without any apparent change of direction at the surface, and at neaps there sometimes appears to be only one tide in 24 hours. In the harbour the tidal streams are regular.

At Hong Kong, during the summer months, the highest tide is three days after, in winter three days before the full and change. In September, October, and November, and the three corresponding spring months, March, April, and May, the highest water is at the latter end of the quarter. In March the tide is very low. At all seasons of the year the tides are most irregular off the mouth of the Canton River. It so occurs that the night tides are the higher, and consequently stronger, during the N.E. monsoon, and similarly the day tides in the S.W. monsoon. The rise from low water at Hong Kong is $7\frac{1}{2}$ ft., except in strong East and S.E. winds. A tide of 10-ft. rise at Canton or Whampoa is generally owing to a freshet or a strong southerly wind.

Directions.—Hong Kong Road is generally approached by sailing vessels from the westward, which side is protected by Green Island and Kellett Bank, the latter extending nearly $1\frac{1}{2}$ mile northward from the island, with an even depth of $3\frac{1}{2}$ fathoms. It may also be approached from the eastward through the Lyemun Pass during the N.E. monsoon, but the winds are generally baffling under the high land, for which reason it is not generally used by sailing vessels.

When abreast Green Island, if the vessel be of heavy draught, keep the peak of Lamma Island (Mount Senhouse, 1,140 ft. high) open westward of Green Island $S. \frac{3}{4} E.$ until Devil's Peak (on the mainland near Lyemun Pass)

is in line with the White Rock on the South point of Won-chu-chau or Stone-cutters Island, when a S.E. by E. course will lead northward of Kellett Bank, and direct for the anchorage.

Vessels of proper draught can proceed over Kellett Bank, on which the least water is 20 ft., or through the 4-fathom channel between Green Island and the South part of the bank, by passing about $1\frac{1}{2}$ cable northward of the island, and then steering for the road.

The narrow channel between Green Island and Hong Kong is sometimes used by steamers, also by sailing vessels when a fresh fair wind blows *right through*. It has depths of 10 to 12 fathoms in the middle, shoaling to 8, 6, and $4\frac{1}{2}$ fathoms after passing the small islet eastward of Green Island.

TYTAM BAY.—There are several small bays on the southern shore of Hong Kong, all of which are safe for small vessels; but at the S.E. part of the island is a deep inlet, named Tytam Bay, $2\frac{1}{2}$ miles deep, $1\frac{1}{4}$ mile wide at entrance, free from danger, and carries a depth of 10 to 6 fathoms. Tytam Head, the western point of entrance, is a high bluff, with 13 and 14 fathoms near it; from thence the western shore of the bay trends about N. by E. three-quarters of a mile to a small sandy bay, with a rocky islet fronting the beach. About half a mile northward of the islet the land forms a round projecting point, and northward of this point is a larger bay, with a sandy beach, in which is Tytam village.

Tylong Head, or *Cape d' Aguilar*, off which are two green islets, forms the eastern point of entrance to Tytam Bay, and from thence the eastern shore of the bay bends round to the northward for 2 miles, and terminates in a small inlet, called *Tytam Harbour*, carrying 4 to 6 fathoms, but its head, to the N.W., is shoal and rocky. This bay would be useful to a vessel, with the probability of a dark and tempestuous night, for by running in she will at any rate be snug, even if there should be a typhoon during the night. Water may be obtained at Tytam village on the western side of the bay.

There is very little tide in Tytam Bay, but the rise and fall is about 7 or 8 feet at springs, and about 3 or 4 ft. at neaps. The ebb sets to the eastward between Lo-chau and Hong Kong.

Directions.—If bound to Tytam Bay from the eastward, the route may either be taken to the northward of Wag-lan, Sun-kong, and Lo-chau, through the Shingshimun Pass, or to the southward of these islands through the Lema Channel; then round Castle Rock to the westward of Lo-chau. but the northern passage is preferable, for after opening the bay a vessel may haul to the northward in any convenient berth; whereas, by taking the southern route, if the wind be northerly, she will have to turn in.

Cape d' Aguilar Lighthouse is described hereafter.

LANTAO, or **Ty-ho**, the large high island lying westward of Hong Kong, is 14 miles long, N.E. by E. and S.W. by W., and its greatest breadth is

5½ miles. About the centre of the island the land is very high, making in peaks, the highest and westernmost of which rises 3,050 ft. above the sea.

West Coast.—Close to the western shore of Lantao, at 1¼ mile from the South point, there is a peaked hill, which at high water is insulated. From this hill to the point a mud flat extends about a third of a mile off shore, with only 2 fathoms water on it.

About 1¼ mile N.N.W. of the peaked hill, and three-quarters of a mile from the nearest shore, there is a rock above water, having near it a depth of 15 fathoms, and between it and the shore 7 fathoms, decreasing quickly towards the latter. N.E. by N. 1¼ mile from this rock is a bluff point, and eastward of the latter a bay, in which is the village of Ty-ho.

North Coast.—On the northern side of Lantao are two projecting points, three-quarters of a mile apart, between which is the bay and village *Sah-lo-wung*; and directly fronting the eastern point of the bay and about a quarter of a mile distant is a small islet, having a rock awash off its N.W. side. Between this islet and Saw-chau, 2½ miles to the northward, the depth is too small for a vessel of large draught at low water. Immediately eastward of the above small islet, between it and Chu-lu-cock Island, is another bay in which is *Tung-chung* village. *Red Point*, the N.E. extreme of Chu-lu-cock, has a remarkable rocky appearance, and is frequented by a company of stone-cutters, who cut the granite rocks into slabs for building. The South point of this island is so near to the Lantao shore, that in passing it is difficult to distinguish it to be an island. In *Tung-chung Bay* the water is shoal.

About 1½ mile E.N.E. of *Red Point* lies a small green island 230 ft. high, and three-quarters of a mile further in the same direction another small island, 200 ft. high, which are the *Brothers* of Dalrymple, or *Motoe* of the Chinese. A rock, 30 ft. above water, lies about half a mile southward of the East Brother, and about 1½ mile off the Lantao shore. A small reef borders the western and northern ends of the West Brother. From the East Brother the N.E. part of Lantao bears E. by N. 4 miles.

South Coast.—The southern coast of Lantao forms two large but shoal bays. The larger and eastern bay, to the north-eastward of the *Soko Islands*, has in it a small islet and some rocks above water, and a populous village at its head. Here H.M.S. *Cormorant* rode out an easterly gale, in September, 1865, which lasted 48 hours. The anchorage was much exposed, but the holding ground was good, hard, stiff mud, mixed with sand and shells. The western bay is less capacious than the other, and carries a depth of 2 to 5 fathoms.

Off the East entrance point of the eastern of the above bays, and separated from it by a narrow channel, is a high green island named *Patung*, and close to its West side are some rocks above water. A small vessel will find good anchorage westward of these rocks, with them bearing about S. by E., three-quarters of a mile distant.

CAP-SING-MUN PASSAGE, or *Throat Gates*, formed between the North point of Lantao and the main, is separated into two channels by *Mah-wan Island*. The channel on the West side of Mah-wan is generally used by steam-vessels, but it is narrow with dangerous eddies; the channel southward of that island should be used by sailing vessels, as it is wider, with good anchorage, a regular tide, and the advantage in the N.E. monsoon of being to windward.

Bunsansiah or *Passage Rock*, in the southern entrance of the Capsingmun Passage, is a pinnacle rock awash at low water, having depths of 8 to 10 fathoms close around it. From its centre, Chunghue Rock is in line with the South extreme of Chunghue Island, bearing E. by N., and the East extreme of Cowechau Island is in line with the West extreme of Lamma Island, S. by E. $\frac{3}{4}$ E.

A sailing vessel proceeding through the Cap-sing-mun Passage from the westward, should keep close over to the mainland to avoid a reef, extending a third of a mile from the N.E. point of Mah-wan; then steer in mid-channel between that island and Chung-hue Island, which lies a mile to the eastward, and after rounding the South end of the latter, if bound for Hong Kong Road, steer for the West end of Won-chu-chau or Stone-cutters Islands.

SAW-CHAU, lying 3 miles northward of Lantao, and S.E. $4\frac{1}{2}$ miles from Lintin, is a small narrow island nearly a mile long, with a sharp hummock on its North end. About 1 mile northward of it is *Tong-ku Island*, higher and more rocky in appearance; and S.W. by S. from the South point of Tong-ku, and W. by N. from the North point of Saw-chau there are two rocks above water, about a mile distant from each island; the western is named *White Rock* from its white appearance.

URMSTON BAY, or Tong-ku Harbour, bounded by the islands Tong-ku and Saw-chau to the West, and Castle Peak land to the East, is a safe anchorage, and tolerably sheltered from all winds. The best berth is in about 8 or 9 fathoms, with Tong-ku Peak just open of the South end of Lintin, and nearer to the main land than to Tong-ku. This safe bay or harbour was named Urmston by the captains of the fleet, who anchored there in August and September, 1823, at the recommendation of Sir James Brabazon Urmston, President of the Company's factory at Canton during the discussion with the Chinese relative to the affair of the *Topaze* frigate in 1821—22, at Lintin; the anchorage was found secure, with smooth water when it blew a gale from the eastward. Fresh water was procured in abundance.

Directions.—The approach to Urmston Bay for vessels of large draught is between the East side of the spit extending from the South side of Lintin and the islands Saw-chau and Tong-ku, and then northward of Tong-ku, the

depth there being 7 and 8 fathoms. The passage southward of Saw-chau has only $3\frac{1}{4}$ fathoms, and that between Saw-chau and Tong-ku $2\frac{1}{2}$ fathoms.

The channel between White Rock and the East side of Lintin Spit is about 2 miles wide, with 7 and 8 fathoms, decreasing towards the spit to 5 fathoms. Working northward, do not stand so far West as to shoal to 5 fathoms, or to bring the East side of Lintin northward of N. by W. With the South end of Sau-chaw bearing E.N.E., and Lintin Peak North, a vessel will be on the southern edge of the spit in $4\frac{3}{4}$ or 5 fathoms, sand and mud.

LINTIN ISLAND, lying W.N.W. of Urmston Bay, is about 7 miles in circumference, and its summit terminates in a high conical peak. A spit of sand extends about $4\frac{1}{2}$ miles southward from the South side of the island, having $3\frac{1}{2}$ fathoms water on its outer part, but only 9 ft. within $2\frac{3}{4}$ miles of the island, and rather less in some places. The spit is steep-to on the West side, with 10 fathoms near it, 7 fathoms touching its edge, then 3 fathoms; and on the East side the water suddenly deepens from 3 to 7 or 8 fathoms. When within 5 miles of the island, if the vessel is of large draught, do not, when standing eastward towards the spit, bring the West end of Lintin, westward of N. $\frac{3}{4}$ W., or tack immediately after deepening to 9 or 10 fathoms; but in the night do not deepen to above 7 or at most 8 fathoms.

A sandbank also extends $13\frac{1}{2}$ miles in a N.N.W. direction from the North side of Lintin, and on its northern part is a narrow ridge called Lintin Bar, the southern end of which, in $2\frac{1}{2}$ fathoms, bears W. by N. $\frac{3}{4}$ N. from Fan-si-ak Islet, and N.N.W. $\frac{1}{4}$ W. about $6\frac{3}{4}$ miles from Lintin Peak. The least water on the bar is 12 ft., and its northern end, in $2\frac{3}{4}$ fathoms, lies N.W. by N. $10\frac{1}{2}$ miles from Fan-si-ak, with Sam-pan-chau just open westward of the West extreme of Anung-hoy Island.

The anchorage off Lintin is about $1\frac{1}{2}$ mile from the sandy beach on its S.W. side, in 10 or 12 fathoms; under 10 fathoms the water shoals quickly towards the island.

Water.—Fresh water may be obtained at the eastern extremity of the beach on the South side of Lintin; at times a few bullocks and vegetables may be procured from the inhabitants of the village.

Tides.—It is high water, full and change, at the anchorage off Lintin, at noon, and springs rise 7 or 8 feet. The streams run nearly North and South, and the ebb in the freshes sometimes $5\frac{1}{2}$ or 6 knots per hour. In the N.E. monsoon the neaps are very irregular, sometimes only one flood perceptible during 24 hours with a small rise when the other flood should prevail.

FAN-SI-AK ISLET.—Two rocky islets, the easternmost of which is the largest, and called Fan-si-ak, and the other White Rock, lie North $4\frac{3}{4}$ miles from the peak of Lintin. When these islets are in one, E. by S. $\frac{3}{4}$ S., the southern extremity of Lintin Bar is on the same bearing. The East side of

the channel between the South extremity of the bar and Lintin is bounded by sand-banks, with irregular soundings of $2\frac{1}{2}$ and $3\frac{1}{2}$ fathoms on them at low water.

LANKEET FLAT, extending from the North end of Lintin Bar, across the channel to the shoal mud bank on the West side, and N.W. towards Lankeet Island, consists of sand and mud, with hard bottom in some places. The depths on it are 3 and $3\frac{1}{4}$ fathoms at low water, and $4\frac{1}{2}$ to $4\frac{3}{4}$ fathoms at high water springs; a vessel therefore drawing more than 20 ft. should not pass over it until about half flood. Close to the northward of this flat there are generally some fishing stakes, and boats fastened to them, and there are others between Lintin and Lankeet. Care should be taken not to run over the boats, which generally show lights in the night.

LANKEET ISLAND, bearing N.N.W. $\frac{1}{2}$ W. 19 miles from Lintin Peak, is formed of two hills, sloping into a low point at the West end, where there is a well of fresh water by a small temple close to some trees; the island at this part is covered with earthen vessels containing human bones. A spit or flat extends S.E. by S. $2\frac{1}{2}$ miles from its South side, with only 2 and $2\frac{1}{4}$ fathoms over it at low water. Between this spit and a long narrow sand to the westward is the Lankeet entrance of the western channels.

To proceed up this entrance to an anchorage in Lankeet Road, keep the highest peak of Ty-cock-tau just open of the outermost of the rocks projecting off the West end of Lankeet N.W. $\frac{2}{3}$ N.; with this mark on, a vessel will have $4\frac{3}{4}$ or 5 fathoms at high water, about 4 miles from Lankeet; and will carry the same depth till nearly abreast the West end of the island, where she will have about 6 fathoms in Lankeet Road. This is a convenient place for a vessel to moor when circumstances require her stores or sick to be landed. All the space between Lankeet and Ty-cock-tau is shoal.

SAM-PAN-CHAU, or Boat Islet, bearing N. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile from the East end of Lankeet, is small, of middling height, resembling a boat turned bottom upwards, and is the best guide for crossing over Lankeet flat, between the northern part of Lintin Bar and Lankeet. An extensive rocky bank, partly above water, projects N.W. from it, and joins the shoal bank extending from Lankeet to Ty-cock-tau. There are regular depths of 7, 8, and 9 fathoms to the eastward of Sam-pan-chau.

DIRECTIONS to CANTON RIVER.—The Lema Channel, formed by the Lema Islands on the South, and the Pu-toy group on the North, is about 6 miles wide, and safe to navigate, with regular depths of 17 to 19 fathoms, and soft bottom. This channel should, if possible, be always adopted by sailing vessels bound to Kong or Canton River in the N.E. monsoon, to effect which they ought to make the N.E. head of the Lema Islands, bearing to the westward. If the weather be thick, and the wind blows strong at East or S.E., it may be prudent to heave-to, when land cannot be discerned above 3 or 4 miles. The depths are 19 to 21 fathoms, close to the head, and

about 18 fathoms at the entrance of the channel. If the weather will not permit the vessel to enter the channel, do not shoal under 25 or 26 fathoms, as in these depths she will drift clear outside all the islands.

If, however, the vessel should happen to be near the entrance of the Lema Channel in the evening, and a typhoon is expected, she should run immediately for Tytam Bay (on the South side of Hong Kong), or for the Tathong Channel, or the East Lamma Channel, as may be most convenient; in either of which she will be secured from the tempest, if an anchorage is gained before night.

During S.W. or westerly winds it will sometimes be found difficult to turn through the Lema Channel from the eastward, as there is generally a set from West to East, occasioned by the ebb coming from the westward out of the numerous channels, and the flood from the S.W.; with a strong S.W. wind the stream runs about $1\frac{1}{2}$ knot per hour to the eastward, only slacking a little when it ought to change its direction. Pu-toy Island may be approached with safety to a quarter of a mile, and the whole North side of the Lema Islands to half a mile.

Through **LANTAO CHANNEL**.—From about a mile southward of Pu-toy a West course for 19 miles will lead to the entrance of Lantao Channel, passing northward of Lingting and southward of Lamma, the depths decreasing from 17 fathoms off Pu-toy to 12 and 13 fathoms after passing Lingting, and to 7 and 8 fathoms as the channel is approached; there are 12 fathoms in the middle of the entrance, decreasing to 7 or 8 fathoms towards A-chau. Lingting, which is of considerable height, and terminates at the summit in a conical peak, may be passed on either side as the wind requires. If passing southward, give a wide berth to the sunken rocks off its N.W. point; and to those off its N.E. point if passing northward; but the channel northward of this island is preferable, for in daylight it has no hidden danger, and a vessel may work from side to side. In the night give the North side of the island a berth of $1\frac{1}{2}$ mile to avoid the two small rocks off its N.E. point.

Chi-chau, when seen from the eastward, has a remarkable appearance, and is a good guide; it makes like a high, round, detached island with distant rugged land westward of it, which are the islands of Lafsami and Chung-chau. Having entered the Lantao Channel, the course through is N.W. by W., and the depths will be variable, not under 8 or 9 fathoms, nor above 25 fathoms. The ebb tide runs through in strong eddies, particularly in July or August, when its rate is sometimes $4\frac{1}{2}$ knots per hour on the springs. With a light wind at times, it is difficult to manage a vessel hereabout. On some occasions two or three boats, assisted by the sails, have been baffled in their attempts to tow the vessel's head round. After passing between Chi-chau and A-chau, the water will deepen from 10 to 17 fathoms in mid-channel near the islands which front the S.W. point of Lantao, and

there are 7 fathoms close to the point. Having rounded the point at a moderate distance, steer to the northward for Lintin, or to the westward for Macao Road, as circumstances require; in the latter case the depths will gradually decrease to $5\frac{1}{2}$ or 5 fathoms.

In turning through the Lantao Channel, when standing northward, do not shoal under 7 fathoms in a vessel of large draught, nor pass the line of bearing between the South points of Lantao and A-chau. Between the northern Soko Island and the Lantao shore there is a good channel, 1 mile wide, which may be taken by a vessel when blowing fresh from the northward. In this case, after passing the South point of Patung, a small rocky islet will be seen in the bay on the southern shore of Lantao; steer to the north-westward until this islet is shut in behind the western point of the bay, when keep towards the South point of Lantao, and the depth will be $4\frac{1}{2}$ fathoms, muddy bottom, between the point of the sandy spit and the Lantao shore.

From the small islet off the North side of Chung-chau, Lintin Peak bears N. $\frac{1}{3}$ E. 13 miles; the sand spit extending off the South side of Lintin is on the latter bearing, therefore a vessel will clear it if this islet is kept S. by E. until Lintin Peak bears N. by E., then steer for the West point of Lintin. In a dark night a N.N.W. or N.W. by N. course (according to the tide) should be steered from the middle of the Lintao Channel until the water shoals to 6 fathoms, then steer North, keeping a good lookout for the fishing stakes. On this latter course, if the water deepens above 7 fathoms, keep a little westerly until the vessel is near or above Lintin, where she can anchor. By not deepening above 7 fathoms, she will not be too near Lintin sand spit, there being 9 and 10 fathoms close to. The ebb tide, from the West end of Lintin to the eastward, sets South; but over on the western shore its direction is S.E.

Through TAI-TA-MI CHANNEL.—Proceeding towards the river through the Tai-ta-mi Channel, between the Lema and Kypong Islands, after clearing Cambridge Rock, steer northward for Linting, passing between it and the Samoun group, and then proceed through the Lantao Channel; or pass between the Samoun group and Ai-chau, and then steer for the Lantao Channel or to the N.W. direct for Lafsami. Having approached Lafsami, keep within a mile of its western side, and of the South part of Chung-chau, to avoid the 4-ft. needle rock; after passing Chung-chau steer for Lintin or for Macao Road.

If the channel be taken between the Great Ladrone and Gap Rock, or the narrow passage between the latter and the Kypong Islands, steer to northward, and proceed along the West sides of Ai-chau and Lafsami. Or if bound for Macao Road, there is a more direct passage about a mile wide, with 13 fathoms water, between Pak-leak and Chuk-wan, then on the North sides of Tong-ho and Liungnib, and to the southward of Ty-lo, which tracks

lie nearly in a direct line towards the road. Although this channel is safe in the daytime, great care must be taken to avoid the Raleigh Rock. There is a safe passage between the Great Ladrone and Pak-leak, with 14 to 9 fathoms water, but recollect the sunken rock lying half a mile from the North side of the Little Ladrone, and also the Clio Rock; a vessel taking this route should pass southward of Potoe.

Through **GREAT WEST CHANNEL**.—This channel, on the West side of the Ladrone Islands, is generally used by vessels bound to Canton during the strength of the S.W. monsoon, and to do this they endeavour to fall in with the Great Ladrone bearing about North, or N. by E.; but late in the season when the winds incline to the eastward, or at any other time when they are expected to come from the northward or eastward, it will be prudent for a sailing vessel to make the N.E. head of the Lema Islands, and proceed towards the river by the Lama and Lantao channels. Here the risk of being horsed to the westward by the freshes setting out of the Great West Channel is avoided, and a northerly wind will lead to an anchorage in the river. When typhoons happen on the coast, they generally commence in a moderate gale from the northward, which is a leading wind for these channels, and as the wind commonly veers to the eastward before it blows hard, a vessel with the first of the gale may get well up the river above Lintin, where these storms are less violent than outside among the islands.

As the approach to the Canton estuary is probably more safe than that of any other large river in the world, there being no sandbanks at the entrance, and the channels amongst the islands outside being mostly all free from hidden danger, a stranger should not hesitate to push through the nearest convenient channel without a pilot, if the weather is tolerably clear. But the streams must be attended to, as they set in different directions amongst the islands to the south-eastward according to the prevailing winds; a strong easterly wind generally producing a westerly current or tide, which abates in strength when the ebb should be setting to the S.E. If an outside pilot can be obtained at a moderate rate he may be useful to run the vessel into some cove or place of shelter, if a storm should be approaching, or if she be in a disabled state. Macao Road should not be used if there is an appearance of bad weather, but run well up the river above Lintin.

About South 30 miles from the Great Ladrone, the depths increase to 27 or 28 fathoms; about 60 miles from it, to 42 and 44 fathoms; and soundings extend on the same meridian to about lat. 20° N.; from hence they continue westward towards Hainan Head; but converge towards the land, with deeper water eastward of the meridian of the Ladrone Islands. A vessel falling in with the land in thick weather may easily distinguish whether it be that of the islands eastward of the Great Ladrone; for the Kypong and Lema Islands have soundings of 23 and 24 fathoms close to; whereas the

islands between the Great Ladrone and St. John to the westward have only 10 and 11 fathoms at a considerable distance outside. These are also large and of regular appearance, resembling a coast more than islands; but those to the eastward are detached, high, and uneven, excepting Tam-kan, the largest of the Lema Islands, which is long and of an undulating form.

The freshes out of Canton River set almost constantly from the South end of Montanha, along the shores of the islands to the westward, at the rate of 1 to 2 knots an hour, particularly with strong easterly winds; and although at times there seems to be on the surface a flood tide setting eastward, or into the entrance of the river, the freshes underneath continue to run westward, by which sailing vessels are rendered ungovernable, even in fresh winds. Many vessels from this cause, after getting near Montanha, or between it and Potoe Island, have been drifted nearly to St. John Island whilst making every endeavour, with moderate winds, to keep their heads to the eastward. Steering, therefore, for the Great West Channel, never borrow near San-chau, or the other islands to the westward, unless it is blowing strong from the S.W. to avoid being drifted to the westward. The freshes abate at times, and then weak tides set to the eastward; but as these are not of long duration, a vessel should keep on the eastern side of the channel in deep water towards the Ladrone Islands and Potoe, and anchor instantly if she finds the current drifting her westward.

In the strength of the S.W. monsoon, as before stated, endeavour, if the wind be steady between S.E. and S.W., to make the Great Ladrone, bearing about North, and never fall in with the islands to the westward; this is the more necessary after the middle of August, when easterly winds are likely to prevail several days together, as they are, more or less, at all seasons. If a vessel falls to leeward about St. John, in September or October, she will generally make a tedious passage to Macao if she keeps close along the islands, where the current or freshes setting westward will oblige her frequently to anchor; as these freshes prevail only in shoal water, near the islands, the best plan to adopt is, to stand well off the land, and take every advantage of the favourable shifts of wind, to get to the eastward.

Having passed through the Great West Channel, or if the vessel has anchored in Macao Road, with a leading wind she may weigh with the ebb, if she can haul over north-eastward for Lintin; for the tide will then act upon her port bow, and keep her off the western shore; whereas, with an easterly wind, the flood is likely to drift the vessel into shoal water near that shore. With a fair wind, steer about N.N.E. $\frac{1}{2}$ E. from Macao Road for Lintin; if it be night, from $4\frac{1}{2}$ to 5 fathoms are good soundings; for at low-water springs greater depths ought not to be expected, until several miles north-eastward of the road.

Turning up against a northerly wind on the flood, tack from the West side of the channel in about 4 fathoms, according to the vessel's draught, the

lead being a safe guide along the western shore, where the bottom generally consists of mud. The islands eastward of Macao Road may be safely approached, having 5 fathoms near them, and when past Chung-chau-si the depths will increase to 9 and 10 fathoms towards Lantao. Working from hence to Lintin in the night, stand in to $4\frac{1}{2}$ fathoms in the West part of the channel, and do not deepen above 7 or $7\frac{1}{2}$ fathoms to the eastward. Here the tides become stronger as the vessel proceeds upwards.

In Macao Road, and between it and Lintin, the tides are frequently irregular, setting in a different direction at the surface to what they do underneath, by which vessels are rendered unmanageable in light winds. The ebb is stronger, and continues longer than the flood; the freshes often running out below, when a flood tide at the surface is setting into the river.

LINTIN to the BOCA TIGRIS.—When within 7 miles of Lintin steer for its West point, bearing about N. $\frac{1}{2}$ E., and when abreast the point run northward in soundings from 5 to $6\frac{1}{2}$ fathoms; with a westerly wind borrow on the West side of the channel; if it is easterly keep in 6 to $6\frac{1}{2}$ fathoms with the flood tide. It will be safe to proceed 9 or 12 miles above Lintin, even in the night, with a working wind, the lead being a certain guide, by tacking from the West side of the channel in $4\frac{1}{2}$ fathoms, and from the East side in $6\frac{1}{2}$ fathoms; but when about 6 or 7 miles northward of Lintin, tack in $5\frac{1}{2}$ fathoms from the East side of the channel, for the deepest water is near the edge of Lintin Sand, and if a large vessel begins to shoal on its edge to 5 fathoms, she will not have room to tack.

Lantao is frequently obscured by clouds or haze, but when its summit is visible the West peak of that island affords a good mark for running up this channel in the day. Steering N. by W. or N. by W. $\frac{1}{2}$ W. from the West end of Lintin, draw gradually the high West peak of Lantao on with the West end of Lintin, and continue to bring it more easterly until it is on with Lintin Peak, or a little open eastward of that peak, and keep it so, until the vessel is more than halfway from Lintin towards Lankeet. Then if the wind is contrary, Lantao West peak may be brought nearly to the East end of Lintin, in tacking from the East side of the channel, and well westward of Lintin Peak when tacking from the West side; but on a nearer approach to Lankeet, the West peak of Lantao must not be brought westward of Lintin Peak.

When within 5 miles of Lankeet, the West peak of Lantao must not be brought more westerly than touching the East end of Lintin, when in the West side of the channel; and to a considerable way open with the same when on the eastern side. Here the depths decrease, and there is only about a fathom more water on the East side than on the West side of the channel. A vessel will pass eastward, in 14 ft. water, of all the mud banks at the entrance of the western channels between Cum-sing-mun and Lankeet, by

keeping the northern and highest peak of Kee-ow Island West of S. by W. $\frac{1}{2}$ W., and the summit of Lankeet West of N. by W. $\frac{1}{2}$ W. The pilots sometimes get vessels on these banks in the night; but with those of large draught they are more inclined to borrow close over to the eastward, whereby they have frequently grounded upon Lintin Bar; it will therefore be prudent, when the pilot appears confused or uncertain of his position, to anchor before the vessel shoals her water.

From a position about half a mile off the West end of Lintin, a N. by W. $\frac{3}{4}$ W. course would lead fair through the channel to the East side of Sam-pan-chau, were the tides to run in that direction; but from Lintin they set N.N.W. and S.S.E. nearly as far as the North end of Lintin Bar, and from thence to Sam-pan-chau about N.W. by W. and S.E. by E.

Steering northward, with the West peak of Lantao open a little eastward of Lintin Peak, or keeping in between $4\frac{1}{2}$ and $5\frac{1}{2}$ fathoms, Lankeet Island will be seen making like a saddle, and shortly afterwards two small islets or rocks will appear close to its eastern end. These rocks will be nearly on with the middle of the opening of the Boca Tigris when first seen, and should not be brought more easterly; nor in working ought they to be brought to touch the point of Tiger Island, which forms the West side of the opening, until within $4\frac{1}{2}$ miles of Lankeet; being then northward of Lintin Bar, a vessel may edge over to the eastward. There is no good cross mark to know when clear of the bar; but a pagoda on the western shore bearing S.W. $\frac{3}{4}$ W., will lead northward of its extremity. From the northern end of the bar Sam-pan-chau is a little open with Anung-hoy Point N.N.W. $\frac{1}{2}$ W., and the little hill on the East end of Lankeet is N.W. $\frac{1}{2}$ N., distant about 5 miles.

Shortly after the rocks off the East end of Lankeet are on with the middle of the opening of Boca Tigris, or rather more westerly, if the vessel is within 6 or 7 miles of Lankeet, Sam-pan-chau will be recognized and will then appear under the land, a little eastward of the high round summit of Anung-hoy, a high round hill, sloping to a point on the West side, and forming the eastern boundary of the Boca Tigris. Anung-hoy Peak in line with Sam-pan-chau hummock, N. by W. $\frac{3}{4}$ W., leads westward of Lintin Bar, and eastward of Lankeet Spit. With a working wind keep Sam-pan-chau between the eastern shoulder of Anung-hoy hill and the West point of the same; but that islet must not be opened westward of Anung-hoy Point until clear of the North end of Lintin Bar.

With an easterly wind, to prevent being set by the tide towards Lankeet, keep on the East side of the channel, with Sam-pan-chau shut in a little eastward of Anung-hoy Point, or nearly on with it. When within 4 miles of Lankeet a vessel may stand well to the eastward in working, opening Sam-pan-chau considerably westward of the point, being then to the north-

ward of the extremity of Lintin Bar; do not, however, stand so far over as to bring Anung-hoi Point to touch Chuen-pee, but tack before they come on, for farther eastward the water is shoal. After opening Sam-pan-chau with Anung-hoy Point, which, with a westerly wind, need not be done until abreast of Lankeet, steer then direct for the land of Anung-hoy, giving Sam-pan-chau a berth to the westward of half a mile or more at discretion, in 9 or 8 fathoms; the depths from hence will be 9, 8, and 7 fathoms to the entrance of the Boca Tigris, increasing to 13 and 16 fathoms abreast South Wantong.

If in a vessel of moderate draught, a cast of $3\frac{1}{2}$ or 4 fathoms hard ground be got before Lankeet is seen, in a clear night, she may be certain of its being on Lintin Sand, and will deepen fast on hauling westward into the channel.

Through Fan-si-ak Channel.—If a vessel is drawing 23 feet water, it would be imprudent to attempt the channel on the East side of Lintin, it being very narrow just above and about Tree Island, with a considerable swell in it when blowing strong from the northward. The southern part of the channel between White Rock and the East side of Lintin South spit is about 2 miles wide, with 7 and 8 fathoms, decreasing towards the spit to 5 fathoms. In working northward, do not stand so far West as to shoal to 5 fathoms, or to bring the East side of Lintin to bear North of N. by W. When northward of Tong-ku, if the vessel is of 20 or 21 ft. draught, keep the eastern shore aboard, avoiding the spits of shoal water at the points of the islands, until off the North end of Mah-chau, the shoal off the South end of which will be avoided by not shutting Tree Island in with Mah-chau, or by not bringing the highest peak of Mah-chau westward of N. $\frac{1}{2}$ W., when White Rock is in one with the North end of Fan-si-ak, which is the mark for the South end of Mah-chau spit.

From hence to Tree Island, when standing towards Lintin Bar or Fan-si-ak Bank, keep the lead going, and tack in 4 fathoms or less, according to the vessel's draught; but the lead will be the best guide, as the bank is much curved in shape. Standing eastward, do not bring the North or highest peak of Mah-chau westward of South, and when the South point of Sui-chau bears N.E. do not bring the tree on Tree Island westward of N. by W. $\frac{1}{2}$ W., to avoid the shoal spit of 2 and 3 fathoms, which extends S.S.E. from that island nearly a mile. When thus far, endeavour to pass between Tree Island and the fishing stakes No. 1 (in the Admiralty chart) placed near it; this island is safe to approach close to the rocks, but on the Channel Banks, on the western side of these stakes, the water shoals suddenly to $2\frac{1}{4}$ fathoms, irregular soundings, sand and mud.

Being close to the West end of Tree Island, do not bring the tree to bear more southerly than S.E. $\frac{1}{2}$ E., this bearing being close on the edge of the shore bank. Standing westward, White Rock should not be brought east-

ward of the saddle on the East end of Lintin, or the East end of the fishing stakes No. 3 (in the chart to the northward of N.W. by N., the lead not being a sufficient guide for the Channel banks. If the fishing stakes be not removed, they appear to be a preferable guide to the land mark, being always discernible, but either may be used in clear weather. When within half a mile of the stakes No. 3, the passage becomes wider, extending from the shore bank to Lintin Bar, with 4, $4\frac{1}{4}$ and $4\frac{1}{2}$ fathoms in it at low water, shoaling gradually on either side, so as to render the lead a guide in tacking, the bottom being very soft mud.

If close to Tree Island with a leading wind, steer direct for the centre of the fishing stakes No. 3, and pass them on either side, as circumstances require.

There is another range of fishing stakes (numbered 4), bearing S.W. $\frac{1}{2}$ W. of No. 3, which will, when near them and bearing South, warn a vessel of her proximity to Lintin Bar.

If the vessel is under 20 feet draught a wider range may be taken, but she ought, if possible, to follow the above directions, and at any rate pass between Tree Island and the fishing stakes No. 1, or close to their western end, and avoid the Channel banks. If drawing 17 feet or under she may pass up or down any part of the channel, keeping to the eastward of Fansiak well over towards Mah-chau, avoiding the shoal spits which project from the ends of the islands.

Tides.—In the Fansiak Channel it is high water, full and change, $1^h 0^m$, but the rise is irregular, especially at neaps, the rise and fall being then only $2\frac{1}{2}$ to 3 ft., and from 6 to $8\frac{1}{2}$ ft at springs; velocity from 3 to 4 knots, and from 2 to $2\frac{1}{2}$ knots at neaps.

A vessel proceeding up with a working wind should weigh instantly the tide slackens sufficiently for her to make any progress, in whatever part of the channel she may have anchored. The passage between Lintin and Fansiak should not be attempted in vessels of large draught, having only $2\frac{1}{2}$ to $2\frac{3}{4}$ fathoms in it at low water.

The **CHU KIANG** or **PEARL RIVER**, commonly called **CANTON RIVER**, rises about 30 miles North of Canton (or 100 miles from the sea) in two streams, which unite at 10 miles above that city; at this junction a long narrow stream connects it with the North river by two branches, one at Sam-chui, the other 10 miles North of that place. The *Tung Kiang* or East river, formed between the islands Chuen-pee and Ty-cock-tau, or perhaps more strictly between Ty-cock-tau and the island of Anung-hoy, is divided by the Wan-tong Islands into two channels, the eastern of which is generally used by vessels of large draught, and is named Boca Tigris, and the western is called Bremmer Channel.

CHUEN-PEE POINT, the South extreme of Chuen-pee Island, is close to a small peak called Chuen-pee Hill, and N.N.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ miles from Sam-pan-chau. On the N.W. point of the island is a small watch-turret, with a fort under it; and midway between this point and Chuen-pee Point is a ledge, named *Pratt Rock*, lying a quarter of a mile off shore, with 6 to 9 fathoms close outside.

Anchorage.—There is a small bay with sandy beach on either side of Chuen-pee Point, and fresh water may be obtained in that on the eastern side; but vessels of large draught cannot anchor near it, the soundings being shoal on a sandy flat, extending eastward and south-eastward from the point. The anchorage is in 6 to 7 fathoms, about one-third of a mile from the beach on the western side of the point. At this anchorage it is high water, full and change, at about 2^h 0^m, and springs rise 7 to 8 $\frac{1}{2}$ feet.

Anson Bay, between Chuen-pee and Anung-hoy Islands, is very shoal, affording only a harbour for boats in Junk Creek.

Bower Point, the S.E. extreme of Ty-cock-tau, form the western point of entrance to Canton River. From this point to Sam-pan-chau, the West side of Chuen-pee Channel is bordered by a shoal flat, over which boats can only pass to *East* and *West Ow-chau*, the two small islets lying southward of the point.

Anung-hoy Point, the S.W. point of Anung-hoy Island, forms with Keshen Point, half a mile to the N.W., the eastern side of the Boca Tigris. The principal fortifications for defending the strait are built on this face of Anung-hoy, and Anung-hoy Peak rises immediately behind them to the height of 1,500 ft. These are the first to attract attention, and consist of a long range of white granite masonry pierced with embrasures at the water level, with a wall running up the steep in a semicircle, as a protection from attack in rear.

Wantong Islands.—North and South Wantong are two small islands lying nearly in mid-channel abreast Anung-hoy Point, and form the western side of the Boca Tigris. They bear N.N.W. and S.S.E. from each other, distant a third of a mile apart, and are surrounded by a bank which extends $1\frac{1}{2}$ mile in a S.E. by S. direction from the southernmost island, at which distance the depth is only 4 fathoms. These islands are completely encircled with white granite batteries.

Directions.—From mid-channel abreast San-pan-chau with a leading wind a N.W. by N. course for $4\frac{1}{2}$ miles will lead to the entrance of the Boca Tigris; but with a turning wind be careful, when standing towards Chuen-pee, not to borrow too close to Pratt Bock. When standing westward towards the shoal flat extending south-eastward of South Wantong, tack before the eastern extreme of Tiger Island touches the eastern part of the fort in North Wantong.

The **BOCA TIGRIS** has deep water and uneven bottom, and is much con-

tracted by the *Chain Rock*, above water, lying E.S.E. a quarter of a mile from the East point of North Wantong; and although the passage between it and Anung-hoy Point is too narrow for working a large vessel, she can always back and fill through with the tide. The tides runs strong through in eddies, and vessels generally keep nearest the eastern shore in passing. If detained here by the Chinese authorities, the best position to anchor is in 7 or 8 fathoms, abreast of and about a quarter of a mile northward of the fort and turret on North Wantong, taking care to avoid the Wantong Rock, lying North nearly a cable's length from its eastern point.

The *Bremer Channel*, westward of the Wantong Islands, carries a depth of 10 to $5\frac{1}{2}$ fathoms, and was frequently taken by Her Majesty's ships during the operations in Canton River in 1841. If intending to use this channel, the first village seen to the northward of Bower Point open South of the first bluff point above *Ty-cock-tau* Fort (this latter point has the appearance of an island), will lead southward of the South extreme of the shoal flat off South Wantong; and the East extreme of Tiger Island just open westward of the West end of South Wantong will lead along its western edge in 5 fathoms. When abreast of North Wantong, about $1\frac{1}{2}$ cable from its West point, steer about North to avoid the shoal flat on the western shore.

Duff Rock.—This dangerous pointed rock, with only 18 ft. water over it, and 7 to 9 fathoms around it at low water, lies N.N.W. $\frac{2}{3}$ W. nearly a mile from the eastern end of North Wantong, with the small round hummock on the western part of South Wantong seen over the western slope of North Wantong (between the small redoubt with a tree on it and the point), and the high land of Geefou Island touching the western brow of Tiger Island. A vessel will pass eastward of the rock by not bringing Sam-pan-chau to touch the East end of North Wantong, until she has approached Tiger Island so near as not to see the high land of Geefou to the westward of it.

TIGER ISLAND.—N.W. $\frac{1}{2}$ N. $1\frac{3}{4}$ mile from the East end of North Wantong is the Tiger's Claw, the S.E. extreme of a remarkable high island, called by the Chinese *Ty-fu* and by Europeans *Tiger Island*, the summit of which appears cleft. A shoal extends S.E. from the Claw, and at the distance of a quarter of a mile the depth is only $3\frac{1}{4}$ fathoms. There is a fort on the N.E. side of the island. This island, the upper end of which is a remarkable mass of rounded granite with precipitous sides, rises to the height of about 400 feet. On its eastern face stands a battery similar to that of Anunghoy, which completes the defence of the river entrance.

Bate Rock, discovered by the late Captain W. T. Bate, R.N., in 1857. lies 2 cables northward of the North side of Tiger Island, with the fort on that island bearing S.E. $\frac{1}{4}$ S.; the highest part of the island (eastern summit) S. $\frac{2}{3}$ E.; and the N.W. extreme of the island nearly in line with a small granite boulder on the summit of the hill on the western shore of the river

S.W. $\frac{1}{2}$ W. It has only 14 ft. on it, is steep-to, there being 10 fathoms mud close to the eastward, and 7 fathoms between it and the island. To pass outside or N.E. of the rock, keep the East extreme of North Wantong open of Tiger Island Fort.

Towling Flat.—About a third of a mile eastward of the fort on Tiger Island, is a projecting elbow of Towling Flat, which, together with Towling Sand, are much increased, and have extended considerably to the westward since the survey of this river in 1840. The sand is now an island covered with vegetation, and never wholly under water even at the highest tides, Tomb Point (the next point N.W. of Chuen-pee Point) must be kept *well* open of Keshen Point.

Vessels turning to windward from the Boca Tigris towards Tiger Island may stand to the eastward and shut in the high land of Chuen-pee with Anung-hoy until abreast the S.E. point of Tiger Island. If of large draught they had better back and fill, between the island and the flat, as the tides are strong.

The Small Bar is the name given, in the chart of this river, by Lieut. D. Ross, I.N., 1815, to a small bank of hard ground lying nearly in mid-channel, about $4\frac{3}{4}$ miles northward of Tiger Island. It is now more than a mile in extent, North and South, and near its centre, West, two-thirds of a mile from Blake Point, a patch was found with only 10 ft. on it; the depths on the other parts of the bank were 2 to 3 fathoms.

Second Bar.—The channel for vessels of large draught becomes very narrow abreast of Second Bar Creek, on the eastern shore of the river, and the services of a pilot are requisite. The Second Bar is a large collection of shoals, 3 miles in length in a N. by W. $\frac{1}{2}$ W. direction, lying between Second Bar Creek and Second Bar Pagoda. There are two channels over it, on either side of the central banks or middle grounds, which have varying depths of 13 to 17 ft. on them, and several shoal patches of 9 to 11 ft. The western channel is about 2 cables broad, and carries 18 to 26 ft. at low water; but there are two patches in it of 14 ft. water, lying respectively W. $\frac{3}{4}$ N. and W. by S. of the opening of Second Bar Creek. The West point of Tiger Island in line with Grassy Tongue, S. by E. easterly, leads through in not less than 14 ft. at low water, touching on the banks.

The eastern channel is always taken by the pilots, as it is easier, more direct, and along the shore. Its southern part is entered at 7 cables above Amherst Point, but a shelf steep-to, extending 2 cables off the intervening shore, must be avoided. Having passed this shelf stand in North a little easterly towards Second Bar Creek to get the leading mark on, which is Wantong Tower on with the grassy edge of the land at Amherst Point, S. by E. $\frac{1}{2}$ E., when abreast of Second Bar Creek. From hence the channel is only about a cable wide for a mile, and this mark will lead through in not less than 17 to 20 feet at low water, provided the vessel be sheered to the

eastward about half a cable to avoid a 14-ft. patch on passing the first little creek, about half a mile above Second Bar Creek; after which the leading mark may be regained or the tower kept a little shut in with the point. The banks are cleared when Second Bar Pagoda bears W. by S.

The Town of Tung-kuan, about 10 miles eastward of Second Bar, may be reached by two principal creeks, each of which has several outlets.

Blenheim and Whampoa Passages.—At 3 miles above Escape Creek, and $5\frac{1}{2}$ miles above Second Bar, the river divides into two main branches, the Whampoa and Blenheim Passages, which meet again at Honam Point, just above the city of Canton, and opposite the foreign settlement. By the Blenheim, or southern passage, the distance to Honam Point from the junction is $16\frac{1}{2}$ miles, and by the Whampoa, or northern passage, 14 miles. Canton lies on the latter below Honam Point, and 8 miles below the city is Whampoa, the anchorage for foreign vessels. Above Whampoa the river in some parts is not navigable, even at springs, by vessels drawing more than 13 ft., so that those of heavy draught have to proceed to Canton by Blenheim Passage.

WHAMPOA.—At 2 miles above Escape Creek, and near the East bank of the River, is First Bar Island, low and flat, westward of which are the four flat islands, smaller but similar, and then the larger Danes Island, the western part of which is covered with hilly ground which marks the position of Whampoa. The navigable pass into the Whampoa Passage is that which is next westward of First Bar Island, carrying from 20 to 30 ft. water.

Whampoa is known to foreigners as Bamboo Town. Above the town lie the premises of the Union Dock Company, next the hill with a chapel embosomed in foliage at its foot forming the Parsee burial ground, and the British Vice-Consulate perched on the brow of a hill, behind which lie the basins and workshops of the Hong Kong and Whampoa Dock Company. Fronting these is English Reach, and above it, south-westward, American Reach. Opposite is Sulphur Point, formed by the confluence of Elliot Passage (of which American Reach is a part), and the direct channel to Hong Kong. Whampoa New Town extends from Sulphur Point along the left bank of American Reach.

The Anchorage is in English and American Reaches, the best position being between the North sides of Danes and French Islands, and Whampoa New Town opposite. It is a safe anchorage with a moderate tide, in from 5 to 6 fathoms, soft mud bottom; there is, however, scarcely room for two large ships to moor abreast, which occasions the lower part of the shipping, when there are many arrivals, to lie moored in English Reach, abreast the entrance of Junk Creek.

Tides.—At Whampoa, it is high water, full and change, in the month of March, at 1^h 40^m, in April, at 1^h 15^m, and in May and June, at 0^h 30^m; and the rise at springs is 7 to 8 ft. In March the day and night tides rise to the

same level. From April to October the day tides are the higher; and from November to February the lower. In May and June the level of spring tides is 4 ft. higher, and that of neaps 2 ft. higher than in March.

Docks.—There are nine docks of various classes. The Hong Kong and Whampoa Dock Company have four, of which two are of granite, one of wood, and two mud docks available for small vessels at low charges. The Union Dock Company possess four other docks. *Dock A*, the principal dock at Whampoa, is on the N.W. side of Danes Island, under the cemetery hill, and was formerly called Couper's Dock. Its length over all is 550 ft., breadth 80 ft., depth over sill at springs $16\frac{1}{2}$ to 17 ft., and at neap tides $13\frac{1}{2}$ to 15 ft. It can be used as either one or two docks, being fitted with two caissons, and can be pumped out in about 4 hours. There is a pair of shears, capable of lifting 50 tons, on the jetty alongside which vessels can lie at all times of tide. Both A and B, the other granite dock, are, as regards capacity but not depth over sill, the largest docks in China, and are fitted with every appliance in the way of caissons, powerful steam-pumps, &c., to ensure safety and despatch in the work.

Directions.—Having entered Canton River by the Boca Tigris, be careful when approaching Duff Rock not to bring Sam-pan-chau to touch the East end of North Wantong, until the high land of Geefu Island is shut in with the western part of Tiger Island. In passing through the channel between the latter island and Towling Flat, observe that Tomb Point, on Chuen-pee Island, kept well open of Anung-hoy North Fort, will lead westward of the western edge of the flat; and the eastern end of North Wantong kept open of Tiger Island Fort will lead N.E. of Bate Rock. With a working wind, a vessel of large draught had better back and fill through this channel, as the tides in it are strong.

After passing Tiger Island, keep the watch tower on Chuen-pee Fort open of Anung-hoy North Fort, until Bower Point, the East extreme of Ty-cock-tau, is in line with the eastern side of Tiger Island; then steer up the river with this latter mark on, and it will lead in the deepest part of the channel, but nearest to Towling Island, in 7 or 8 fathoms water. When the remarkable high part of Geefu is on with the highest land to the westward, or bearing S.W., keep more eastward, and open Bower Point again. Thence steer to the northward, pass on either side of the small Bar, and attend to the soundings on the chart.

The two Fairway marks for crossing the Second Bar are given in page 982; but the services of a pilot are here indispensable to a vessel of 20 ft. draught, unless the channel be previously buoyed; for the knolls or shoal patches being formed of sand and gravel mixed with mud, are subject to alter in position by the freshes of the river and the spring tides, which also render the navigable channel changeable. A pilot can be obtained from amongst the fishermen on the spot, who then buoy the channel with their

sampan, but sufficient time should be given them to sound with their bamboos and to take their stations properly, or else a vessel is likely to take the ground. Vessels often ground and lie in a dangerous state for a tide; and this often proceeds from two or three pushing over together, as there is no time to be lost after the water has risen sufficiently for a vessel drawing 23 or 24 ft. to pass over.

Vessels of large draught proceeding up the river from an anchorage below the Second Bar in the N.E. monsoon, or with a weather tide, should be under weigh by the last quarter flood, to save the tide across the bar; for the channel between the knolls being very narrow, they must back and fill through; if of moderate draught they may weigh much earlier. The difficulty in crossing the bar is in ascertaining correctly the shoal patches on either side the channel, and it will be best to place the boats on them at the first of the flood. When the Second Bar Pagoda bears W. by S., the bar is crossed, and the bottom will be soft and loose, unlike that on the bar, which is in parts hard and stony.

After passing the Second Bar, keep between a third and half a mile from the eastern shore until First Bar Island is approached, when the river begins to be contracted and its navigation requires great caution. When Whampoa Pagoda is observed just on with the northernmost clump or hill on Danes Island, haul out more into the middle of the river to avoid the shoal ground off the South side of First Bar Island.

As no safe marks can be given for leading between First Bar Island and the easternmost of the Flat Islands, towards the First Bar, it will be prudent for a stranger, if without a pilot, to buoy the S.E. extreme of the spit extending off the eastern Flat Island, and also the Brunswick Patches. The best route appears to be when the South Chop-house on the southern shore of the river bears S.S.W., to haul over to First Bar Island to avoid the spit, and then steer in about N.W. $\frac{1}{2}$ N., passing along the western face of the island at about a cable. The open pile beacon on the S.E. end of No. 1 Flat Island marks the extremity of a mud bank. When Whampoa Pagoda is seen clear to the northward of the Flat Islands, steer for the northern shore, which must be skirted at about half a cable, passing through the narrow 4-fathom channel northward of the Brunswick Patches.

As the northern patch is approached, or when the large house inland bears about N. by W., be careful in preserving the distance of half a cable from the shore, and when the house bears eastward of N. by E. the danger will be passed. Thence steer towards Whampoa through Cambridge Reach, borrowing towards the northern shore. Entering English Reach, the southern or Danes Island shore is generally preferred to avoid the shoal flat off Junk and Watson Islands, taking care to give a berth to the cluster of rocks, covered at half-flood, near Jardine Point, the East

point of entrance to French River. The anchorage off Whampoa is in 5 to 6 fathoms, over soft mud bottom; but there is scarcely room for two large ships to moor abreast, which occasions the lower part of the shipping, when there are many arrivals, to be moored in English Reach.

Whampoa to Canton.—The lower part of the City of Canton is 8 miles, and the Shamien or Foreign Concession 10 miles above Whampoa. If proceeding by the Whampoa Channel, as this passage is called, it is better to take a pilot for the first time, although for gun-boats the Admiralty charts are a sufficient guide if no radical changes in the channels of recent occurrence have been reported. Some caution may be required in passing the Whampoa barrier if the tide be strong, in which case it is preferable to hug the South bank at the mouth of Fiddler's Reach. Another part where care is required is just below Canton, where the city is first fully opened out clear of Napier and Kuper Islands, for a reef extends nearly a cable into the river from the South bank. When, therefore, the small Suburbs Pagoda on the S.E. or nearest angle of the city wall comes in line with Gough's Hill, which is a little to the right of the tall, square, conspicuous red pagoda of five stories, N.N.W. $\frac{1}{2}$ W., sheer out from the South bank into mid-stream. The rocky ground above the Dutch Folly, as the small island abreast the centre of the city is called, has been recently buoyed and lighted, and now therefore presents no difficulty to navigation.

Close to the Dutch Folly are two wooden buoys to mark the fairway between some rocks. One is in 8 ft. water, painted in red and black vertical stripes, to mark the starboard side of the channel; the other is in 4 ft., with green and black vertical stripes, to mark the port side entering.

Lights and Beacons.—On the sunken rocks above the Dutch Folly are three square stone beacons, from which, at night, *fixed* lights are exhibited. Two *red* lights are on Nos. 1 and 2 red beacons on the starboard hand entering, and one *green* light is on the port hand on No. 3, a green beacon.

To Canton through Blenheim Passage.—In the Blenheim Passage leading to Canton the only two parts where difficulty is experienced are the passage of the Barrier and Parker Point Bar. From Escape Creek above Second Bar, a mid-channel course is pursued until nearing the southern shores of the Flat Islands. Close these, keeping very near to island No. 3, and also the south-eastern face of Danes Island, but sheer well off as soon as French Creek westward of Danes Island opens out, and steer well over towards Terrace Head in Kellett Reach, a hill 147 ft. high, on which the ground is cultivated in terraces from base to summit. At the head of Kellett Reach is Larkins Point, an earth cliff 40 ft. high, and $1\frac{3}{4}$ cable below it is Junk Rock, under water, 120 yards from the eastern shore. Above Larkins Point fishing stakes extend halfway across the river from the South bank, but they present no obstruction as the channel is now along the northern shore for some distance.

Bremer Point, having a group of hills with cliffs at their base, is next closely rounded to avoid a shallow middle ground tailing from High Island half a mile down stream. High Island, of 88 ft elevation, lies in the centre of the river, narrowing the northern or navigable channel to 1 cable. The *Comus sunken rock*, 60 yards from the North bank, further narrows this channel; it lies S.W. of the highest of the hills of Bremer Point, and $1\frac{1}{4}$ cable East of the North point of High Island, which is very steep-to. Above High Island is Brown Reach, which has a depth of 24 to 25 ft., and where H.M.S. *Blenheim* anchored. Above Galbraith Hill Point, on the South bank of Brown Reach, the river splits round the low flat island of Changshan. Senhouse Reach, the channel South of Changshan, is seldom used, the deepest water at its western part being only 11 ft. The northern channel is Maitland Passage, which carries deep water as far as the short cut which connects it with Elliot Passage on the North; then the depth decreases to 13 ft. (20 to 21 ft. at high water springs), on either side a narrow middle ground of 10 ft. Keep along the North shore past Changshan, above which more fishing stakes are seen southward of the fairway. Above the next hilly ground on the South bank, and between it and Hamilton Creek, the river is broad and deep, and without obstruction, and therefore affords excellent anchorage. Above this, vessels drawing 13 ft. cannot go.

If proceeding to Canton the deep water must be quitted for a narrow gully along the North bank, carrying 10 to 12 ft., which leads up to the Barrier Passage. Caution is required here, for the channel is irregular both in its conformation and depth, and the middle ground of 7 to 9 ft., which bounds it on the South, is of the same character; this shoal, which extends from the Barrier to fully half a mile below it, being entirely northward of the centre of the river.

The Barrier is an artificial obstruction of stones and piling, constructed to prevent the approach of large ships to Canton, during the first China war. Recently, however, the passage through it by the northern bank has been widened to 100 ft., and deepened to 11 ft., besides being rendered more practicable by the establishment of improved beacons and lights.

Two wooden beacons, painted *white*, and surmounted by a *black* disc 2 ft. in diameter, have been recently erected on the North side of the Barrier. A scale to show the depth of water is affixed to each beacon, and lights will be shown at night to indicate the passage.

The course for the first half mile above the Barrier lies along the North bank, and there are shoals of 7 to 9 ft. in the centre of the river, caused by this obstruction to the current, which are probably of a shifting character.

Parker Point Bar is situate at a crossing from this branch of the river into that from Canton, of which Elliot Passage, leading to Whampoa, is a continuation. It is shoal in consequence of being out of the scour of the tides of either branch. Its shoalest part, 8 to 9 ft., is between Parker and 49th

Points. Vessels of 17 ft. draught have passed over after examination and buoys of the best channel.

Macao Fort Passage is a reach of $3\frac{1}{4}$ miles, leading straight up from Parker Point Bar to the Foreign Concession at Canton. Macao Fort, a picturesque object on an islet in the reach, may be passed closely on the East side, but N.N.E. of the northern extremity of the fort lies a sunken rock exactly in mid-channel, between the fort and the shore. After passing this, keep in the centre of the river, for there are rocks below water on either side, close to the bank; and abreast Birds' Nest Fort, just below the Honam suburb, on the East bank, two other sunken rocks lie close together, 130 yards from the shore.

The ebb stream in Macao Fort Passage, at springs, runs from 3 to 4 knots an hour.

Elliot Passage is an intermediate branch of the river leading to Whampoa from Canton, and is indeed the direct continuation of the Macao Fort Passage. It was originally a fine, deep-water channel, but the large Barrier 6 miles above Whampoa, of similar construction to those in the other passages, has caused the bed of the river, for 1 mile on either side the Barrier, to silt up, and not more than 8 ft. can with certainty be carried through the Barrier Channel, which is close along the South Bank. At Whampoa, Elliot Passage is entered from American Reach. Both this and other intersecting creeks in the vicinity may be navigated with the aid of the Admiralty chart, having been surveyed in 1857.

CANTON, the capital of the province of Kwang-tung, stands on the North bank of the river, about 31 miles above Boca Tigris, 70 miles from Macao, and 74 miles from Hong Kong. It is surrounded by a strong wall 5 miles in circumference, the foundation of which is of red feldspar rock, and the upper part brick. The wall varies from 25 to 40 ft. in height, and is 20 ft. thick, having an esplanade on the inside, and is accessible on three sides of the city.

To the West of the city a concession was obtained after the bombardment and destruction of Canton on December 28-9, 1856, and an area of 24 acres was levelled and planted, and a quay wall built. Of this area, four-fifths have been appropriated to the British Government, and one-fifth to the French, the latter portion occupying the eastern part. Besides the consular offices and the residence of the Vice-Consul, there is a church, library, reading-rooms, &c., and there are two cemeteries within a moderate distance of the concessions. The Consul, for political purposes, resides within the city at an official yamun.

Off Shamien the river is broad, forming a commodious anchorage for large steamers, the deepest water, 18 to 22 ft., and good holding ground, being within 150 yards of the river wall of Shamien, but sailing vessels are restricted to the anchorage of Whampoa.

Supplies.—The markets of Canton are well supplied with provisions at moderate prices; beef, poultry, and fish, fruit and vegetables at all times, to which are added, in winter, mutton and game in plenty.

War and rebellion, the opening of Hankow as a shipping port for tea, and the facility with which smuggling can be carried on, have robbed Canton of the pre-eminence it so long enjoyed in commercial prosperity; of late years foreign trade has declined about one-half, and the native traders are rapidly absorbing in their own hands the dealings which before were the means of enriching foreign houses of business. Tea and silk are the principal exports, the imports are cotton goods, rice, opium, &c.

Climate.—Canton enjoys a much more temperate and salubrious climate than most places situated within the tropics, and neither epidemics nor malaria prevail there. In ordinary years the temperature ranges from 42° in winter to 96° in summer; the extreme range is from 38° to 100°, but these are rarely reached. The seasons correspond with the period of the monsoons, the hot season being from May to October, and the cool season from the middle of October to the latter part of April. The S.W. winds set in early in April, but do not gain force until May, when rain becomes abundant, and the thermometer rises to 85°, and even higher. June is a dry and sultry month, whilst in July and August frequent showers are of almost daily occurrence, which, with the strong monsoon, temper the extreme heat, which averages 80° to 88°. September is again sultry, but the nights begin to grow cool, and October, though warm, is usually not an unpleasant month. The first steady blast of the N.E. monsoon, in the early part of November, sending down the temperature to 55., brings a sensation of bitter cold to the constitutions of Europeans, relaxed by the preceding heats; but the weather of the ensuing months, in which constant sunshine, a moderately cold, but agreeable temperature, and clear skies, prevail almost uninterruptedly, is not to be surpassed in any quarter of the globe. Ice sometimes forms in January, and the thermometer has been registered at 29°. A fall of snow, 2 inches deep, occurred in February, 1835. Fogs are common in February and March. Great precaution must as a necessity be observed, even by long residents, to avoid exposure to the sun and chills, and this with temperance in diet will ordinarily ensure immunity from sudden disease. Fever and ague, and sunstroke, are brought on by very slight exposures, and bowel complaints are the natural consequences of imprudent indulgence in fruits, cold beverages, &c., and much attention should be paid to suitable clothing. Chlorodyne, Lamplough's saline mixture, and quinine will always be found useful in this and similar climates.

Tides.—It is high water, full and change, in the river off Canton, in March, at 2^h 40^m, in May and June at 1^h 40^m, in September and October at 2^h 12^m; the springs rise about 5½ ft., neaps, 4½ ft. During the N.E. mon-

soon the tides rise 2 to 3 ft. higher in the night than in the day ; but in the S.W. monsoon the day tides are the higher.

The **SI KIANG** or **WEST RIVER**, also called the *Blue River*, is 500 miles in length from its source to its mouth, which is 9 miles S.S.W. of Macao, and receiving in its course some large tributaries, drains with them the entire province of Kwang-si. At Sam-shui, 75 miles from the sea, where its course turns from South to East, it receives the waters of the *Peh-kiang*, or *North River*, which rises in the northern part of the province of Kwang-tung. From the North River and from the West River, below Sam-shui, are several communications with Fat-shan, Canton, and other parts of the Canton River.

DELTA of the SI KIANG and ADJACENT RIVERS.—Between Macao, Sam-shui, and Canton, on the western side of the estuary of Canton River, is a large tract of alluvial land, the delta of these rivers. A network of streams and canals intersect this space, which, from the greater elevation of land on the Si kiang, discharge themselves into Canton River, and thus, together with the Tung kiang or East River, which drains a large central portion of the Kwang-tung Province, flowing into Canton River at its eastern side, cause the great volume of water in its estuary so disproportionate to its size. The greater portion of the delta has been reclaimed in times long past, by embankments, and the process is going on at the present day.

The principal channels traversing this delta fall into the Canton estuary, between Cum-sing-mun and the second bar ; some small upper branches in the vicinity of Fat-shan, falling into Canton River between Canton and the upper part of Blenheim Passage. The principal of these streams, the Tam-chau Channel, traverses the entire length from Sam-shui (at the junction of the Si kiang with North River) in a S.E. direction, with branches to all the principal towns and districts in the delta. In the central district of Shun-tuk nearly all the channels are connected, and one, which passes South of the town of Tai-lung, joins them to the Si kiang 2 miles South of Kum-chuk. Besides these there is the narrow channel used by the *Nemesis*, which, entering from the Broadway 5 miles above Moto Fort, runs through Liau-si-wan, and joins the Wang-mun or the first channel North of Cum-sing-mun.

Between Cum-sing-mun and Lankeet are the Wang-mun, Tam-chau, and Ty-cock-tau Channels. They enter the West side of the estuary through extensive mud banks, their course running through level lands dotted with many island-like hills. The waters are kept in their channels by artificial embankments, without which almost the whole of the rice fields would be flooded at high water. The rice lands are principally East of Tai-lung ; West of that town the land, although having the same features (level with island-like hills), is more elevated (above high water level), and cultivated with mulberry plants.

The embankments are wide, but being planted with fruit trees, with here and there houses of labourers, leave but a paved path, about 6 ft. wide, for foot passengers. The rivers and numerous canals are the ordinary mode of transport, as every field is approachable by a canal. The towns are also entered by water, the channels being staked across; in some cases an entrance is left wide enough to admit a large junk, the opening being closed by rude gates, as at Tam-chau; in others these barriers consist of rows of stakes, with their heads above high water, closely driven across the whole breadth of the river, leaving but a narrow and circuitous channel near one bank, through which the current runs with great strength, and often the stakes are level with low water.

The general course of the Tam-chau Channel is from the N.W., as is also that of the Ty-cock-tau Channel, which falls out of the Saiwan Channel below the town of Saiwan. The Saiwan Channel is entered from Canton River, North of Whitcomb Island; the course up it is more westerly, and it joins the Tam-chau Channel N.E. of Tai-lung. Money penny Creek leads from the latter into the Fatshan branch above Haycock Island.

The Tai-lung, which is South of the town of that name, runs West from the Tam-chau Channel, and by a winding course joins the Si kiang by the Junction Channel. The Wang-mun receives three branches, the Nemesis from the S.W., and the Sailam and Kerr Channels from the N.W.; the latter also joins the Si kiang through the Junction Channel. Besides these main channels there are smaller channels at right angles to them, forming connections at different points of their course. The principal of these have been explored, and all found to have more than 6 ft. in them at low water springs.

To describe this network of streams, which have been well examined by our officers, would be a hopeless task without the elaborate plans they have drawn up of their courses and connections; and these charts, moreover, are the best guides. We therefore omit the details which have been given, the principal of which are those by Commander C. J. Bullock, the late Captain Bate, Captain Nolloth, &c.

Tides.—In the month of February it was high water, full and change, in Cum-sing-mun Harbour, at 12^h 6^m, and at Lankeet Island at 11^h 20^m. In March it was high water in the Tai-lun Channel (Kerr Point) at 1^h 30^m, in the Wang-mun at 11^h 50^m, and in the Junction Channel at about 2^h. At all these places springs rose 6½ ft., neaps 5½ ft., and neaps ranged 3¼ ft.

In the Saiwan, Tam-chau, Tai-lung, and Junction Channels the flood sets to the westward, and the ebb to the eastward towards Canton River. In the summer, when the day tides are the higher, it appears to be high water nearly all day at springs in some of these channels, owing to the day tide only falling about 2 ft.

CHAPTER XXI.

EAST COAST OF CHINA, BETWEEN HONG KONG AND THE RIVER MIN.

TATHONG CHANNEL is formed between the West side of Tamtu Island and the East side of Hong Kong; close to the latter, about $1\frac{1}{4}$ mile northward of Tylong Head, lie two small rocky islets, and between these islets and the South extreme of Tamtu is the *Tathong East Rock*, above water.

Cape D'Aguilar Lighthouse, sometimes called Tylong Head lighthouse, is situated at the S.E. extreme of Hong Kong Island. It is a stone tower, 57 ft. high, which, together with the necessary buildings, is painted white. The light is fixed, elevated 198 ft. above the sea, and visible 23 miles off as follows:—visible to the eastward between N.E. and S.E. $\frac{3}{4}$ E., excepting where the Ninepin and Waglan Islands intervene; *obscured* between S.E. $\frac{3}{4}$ E. and S.E. $\frac{1}{4}$ S. by Soon Kong Island; *visible* between S.E. $\frac{1}{4}$ S. and S.S.E.; *obscured* from S.S.E. to S.W. by S. by Lochow, Pootoy, and Lema Islands; *visible* from S.W. by S. to W. by S. $\frac{3}{4}$ S., except to vessels when S.W. of the Samoun group; and *visible* over Tathong Channel, with the exception of a small portion obscured by Shicko Head. Position lat. $22^{\circ} 12' 15''$, long. $114^{\circ} 15' 45''$ E.

Cape Collinson Lighthouse, on the eastern side of Hong Kong Island, was illuminated on the 1st of March, 1876, and shows a *fixed* light, at an elevation of 200 ft., visible 8 miles off. This light appears *bright* in the Tathong Channel between N.N.W. and S.S.E., and shows *red* to the westward of those bearings. The red light covers the Tathong and Bokhara Rocks to the southward, and the dangers extending out from Sywan Bay to the northward, so that vessels approaching Victoria Harbour from the southward and eastward will clear all the dangers on the western side of Tathong Channel by keeping in the bright light.

Bokhara Rocks are two rocky heads, with nine fathoms between them. The *S.W. rock* (on which the S.S. *Bokhara* struck) is a pinnacle rock with 3

fathoms on it at low water, from which Tathong Rock bears N. by W. $\frac{1}{4}$ W., and Cape D'Aguilar lighthouse W.S.W. A *black and white chequered* buoy has been moored in 9 fathoms close to the western edge of S.W. Bokhara Rock, with Tathong Rock bearing N. by W. $\frac{1}{4}$ W., and Cape D'Aguilar W.S.W.

N.E. Rock is a pinnacle rock with 18 ft. water over it, situated about $1\frac{1}{2}$ cable N.N.E. $\frac{1}{3}$ E. from S.W. rock.

From the centre of N.E. rock, Tathong Rock is in line with the extreme of Cape Collinson, bearing N. by W. $\frac{3}{4}$ W.; the N.W. point of Beaufort Island is just shut in behind the rocky islet to the southward of Cape D'Aguilar, S.W. southerly; and Cape D'Aguilar lighthouse bears S.W. by W. $\frac{3}{4}$ W. distant $8\frac{1}{2}$ cables.

Directions.—Vessels bound to the southward through Tathong Channel, and wishing to pass between Bokhara Rocks and Hong Kong Island, should, after passing to the eastward of Tathong Rock, bring the summit of Beaufort Island in line with Cape D'Aguilar bearing S.S.W., and steer with that mark on, until Tathong Rock is in line with the left extreme of Taitoo Island N. $\frac{1}{3}$ W., which mark should be kept on, until abreast of Cape D'Aguilar. If passing to the westward of Tathong Rock, the latter mark should be brought on as soon as convenient after passing that rock.

Vessels passing to the eastward of Bokhara Rocks should not open Tathong Rock to the northward of Pottinger Peak, until the southern extreme of Tytam peninsula is open South of Cape D'Aguilar.

The most direct route for steam vessels leaving Hong Kong by Lyemun Pass and through Tathong Channel is to pass West of Tathong and Bokhara Rocks, and, after passing Cape D'Aguilar steer so as to pass midway between Putoy and Sunkong Islands, where there is a good channel with 15 to 20 fathoms, mud.

Vessels having run out from Hong Kong Road through the Lyemun Pass, and wishing for anchorage either for the night or in consequence of bad weather, will find a good berth in the bay on the North side of Tamtu in 6 fathoms; but bear in mind that the water shoals to $2\frac{3}{4}$ fathoms at 3 cables' lengths from the Joss House on the North side of the bay.

Tamtu or *Tunglung Island*, 820 feet above the sea and 3 miles in circumference, is separated from the mainland by a channel called *Fotaumun Pass*, of 3 fathoms water, which is only $1\frac{1}{2}$ cable wide between the rocks which lie off both points in the channel. S.E. $\frac{1}{3}$ E. distant 4 cables from the North point of Tamtu lies a sunken rock, from which the West end of Steep Island (the first small islet to the north-eastward) just shows clear of a remarkable headland, *Yih Bluff*, bearing N.N.E. $\frac{1}{2}$ E.

Steep Islet is $1\frac{1}{4}$ mile northward of the eastern entrance of the Fotaumun Pass, and 4 cables from the shore; at $1\frac{1}{2}$ mile further North are the *Trio*

Islets. There is an indentation in the coast, with 8 fathoms water, between Trio and Steep, but it is exposed to easterly winds and swell.

NINEPIN GROUP lies 4 miles eastward of the Fotaumun Pass. The two largest islets bear North and South of each other, and the channel between is 2 cables wide. The southern face of the South Ninepin is a precipitous cliff, 330 ft. high; off its S.W. side is a smaller islet, with a peaked rock off its North point. The surface of the North Ninepin is nearly of the same elevation. An islet lies off its S.W. extreme.

Ninepin Rock, or East Ninepin, 222 ft. high, is nearly a mile eastward of the North Ninepin, and assumes the appearance that its name indicates only when seen in a N.W. or S.E. direction; otherwise the name is liable to mislead.

One-foot Rock, lying S. $\frac{3}{4}$ W., not quite 7 cables from the Ninepin, has only a foot over it at low water. The South end of South Ninepin on with Fotaumun Pass, W. $\frac{3}{4}$ N., leads South of it.

North Rock, lying N.W. $\frac{1}{4}$ N., distant 9 cables from the Ninepin, is nearly awash. There is a *reef*, which breaks at low water, nearly a cable's length S.E. of it.

At the Ninepin group it is high water, full and change, at 10^h 0^m, and the rise is 5 ft.

PORT SHELTER.—To the northward of the Ninepin group the mainland forms a deep bay, containing Port Shelter and Rocky Harbour. The western of the two, Port Shelter, runs back 5 $\frac{1}{2}$ miles to the northward, and its head is separated from the S.W. portion of Mirs Bay by an isthmus 1 $\frac{1}{2}$ mile wide, overlooked by the *Hunchback Hills*, 2,315 feet above the sea, which with *Sharp Peak*, 1,540 feet high, on the West side of the entrance to Mirs Bay, form conspicuous marks by which this portion of the coast may be recognized.

When steering for Port Shelter, pass eastward of Trio and Table Islets, as rocks extend 3 cables from the point to the westward of them. Nearly a mile northward of Table Islet is the southern point of Jin Island, with a peaked rock lying 2 cables southward of it; and E. $\frac{3}{4}$ N. rather more than a cable's length from Peaked Rock, is a rock awash at high water.

Shelter Island, 1 $\frac{1}{4}$ mile N.W. of Table Islet, should likewise be left to the westward when steering for Port Shelter, as the ground is foul between it and the main. There is good anchorage on the N.W. side of Shelter Island in 3 fathoms, but give the North point of the island a berth of a cable and avoid the 9-ft. patch, lying 6 cables to the northward in the centre of the bay. Southerly, distant 1 cable from the West point of Shelter, is a rock awash at low water; and there is a patch of 2 $\frac{3}{4}$ fathoms lying half a mile westward of it.

ROCKY HARBOUR is formed by Keui and Jin Islands on the West, and by High, Basalt, and Bluff Islands to the East and S.E. Anchorage will be

found in the N.E. monsoon on its eastern side, in the neighbourhood of a small cove northward of Green Islet, where there is a mandarin station and a village. Inside the cove the depth is 6 fathoms, but the space is confined, owing to sunken rocks. In the S.W. monsoon vessels will be better sheltered by anchoring to the N.W. of Day Islet.

Three-feet Patch.—Midway between Day Islet and the North end of Bluff Island is a rocky 3-ft. patch, from which the West point of Bluff Island is on with the summit of North Ninepin, S. $\frac{1}{4}$ E., and the southern summit of Day Islet bears W.N.W. The North Ninepin and Bluff Islands touching leads westward of it; and the West end of the islet lying off the S.W. end of North Ninepin, in one with the West point of Bluff Island, leads eastward; also, a vessel will be northward of it when Pyramid Rock opens clear of the N.E. extreme of Bluff Island, S.E. by E. $\frac{3}{4}$ E.

Three-fathoms Patch lies 6 cables northward of the 3-ft. patch, with the summit of Day Islet W.S.W., Pyramid Rock S.E. $\frac{1}{4}$ S., and Green Islet, the small islet on the eastern shore, E. $\frac{3}{4}$ N., and distant 3 cables.

The channel between Basalt Island and Bluff Island is 4 cables wide, and has 5 fathoms in it at low water. The former island is 8 cables long, North and South, and 572 ft. above the sea; the southern faces of both islands are very precipitous.

The channel between Town Island and Basalt Island is also 4 cables wide, but it should not be used without a leading wind, or in a handy vessel, as the chow-chow water, or whirling eddies, might lead them into difficulty. These rippings, occasioned by the meeting of adverse currents, are frequently so violent as to render a vessel unmanageable when within their influence.

High Island, $7\frac{1}{2}$ miles in circumference and 910 ft. above the sea, is separated from Town Island by a channel of $3\frac{1}{4}$ fathoms water, but in some places it is barely a cable wide. At $1\frac{1}{2}$ cable eastward of the latter is *Hole Island*, so called from its being perforated.

FUNG BAY.—*Conic Isle*, lying not quite a cable from the shore, N.N.E. $2\frac{1}{4}$ miles from Hole Island, has immediately westward of it a small bay $3\frac{1}{2}$ cables wide and three-quarters of a mile deep, which might be used in the N.E. monsoon. Fung Bay, the next inlet to the northward, is $1\frac{3}{4}$ mile wide, and has two islets and a rock in the middle of it; but it is too much exposed to the eastward to be of any use.

MIRS BAY is a deep inlet 15 miles to the N.E. of Hong Kong, and its entrance, between Fung Head on the West and Mirs Point on the East, is $5\frac{1}{2}$ miles wide; its extent northerly is 11 miles, and in an East and West direction 18 miles. *Gau-tau*, a rocky islet, 90 ft. high, lies about 2 miles within the entrance, and S.W. by W. about half a mile from it is a rocky ledge, part of which is always uncovered.

The hills near Mirs Point rise to the height of 1,200 ft., and just off its

South extreme is a small islet, named *Griffin Rock*. To the eastward of the islet are some rocks, at a cable's length from the shore; the first point to the northward of them is perforated.

Grass Island.—The point on the West side of entrance of Mirs Bay, $1\frac{1}{4}$ mile N. by W. of Fung Head, has two islets off it, and from thence the western coast of the bay trends suddenly to the westward, then northerly $1\frac{1}{2}$ mile, where there is an opening 3 cables wide leading into Long Harbour; the navigable channel, however, has only 2 fathoms in it, and is barely a cable wide, with shoal water extending from both shores.

On the North side of the opening lies Grass Island, 420 ft. high; and at $3\frac{1}{2}$ cables eastward of this island is a large black rock, named North Gau, with a *reef, awash* at high water, lying N.W. $\frac{1}{2}$ N. 4 cables from it. There is also a very dangerous 6-ft. rock, on which the German war ship *Cyclop* struck between Grass and North Gow Islets. It lies about a cable westward of the islet which lies near the West side of North Gow.

Port Island, 420 ft. high, is nearly 6 cables northward of Grass Island, and its N.E. point, which is narrow, projects 3 cables from the body of the island. There is a convenient *watering place* on the northern side of this island.

LONG HARBOUR runs $3\frac{1}{2}$ miles in a southerly direction from its entrance, 6 cables wide, which is a mile S.S.W. of Port Island. Both shores are steep-to, with the exception of the S.W. end of Grass Island, where there is a cove with a rock off its North point; to the northward of this rock, and half a cable from the shore is a rocky patch of $3\frac{1}{4}$ fathoms; some rocks also, which show at low tide, extend nearly a cable's length from high-water mark at the S.W. end of the island.

Jones Cove, the next inlet westward of Long Harbour, is a mile deep, N.N.E. and S.S.W., and 3 cables wide; but it, as well as Long Harbour, is open to a considerable swell from the N.N.E.

Tolo Channel, leading into Tolo Harbour, is the next inlet westward of Jones Cove. Its entrance, between Port Island and Bluff Head, is nearly $1\frac{1}{4}$ mile wide, and from thence the channel trends S.W. by W. 7 miles to White Head, forming a sound, with shores steep-to, the depth varying from 6 to 14 fathoms on the North shore.

Withing the channel, at $3\frac{3}{4}$ miles from Bluff Head, is *Knob Reef*, with a flat reef 2 cables to the S.W. of it; and $2\frac{1}{4}$ miles farther in lies *Bush Reef*, North of which, $3\frac{1}{2}$ cables, is Harbour Island. Although there is a navigable channel on either side of these reefs, the one northward of them is preferred.

At *White Head* (which is a peninsula with the Hunchback Hills, 2,315 ft. high, with very precipitous face, rising immediately behind it), the Tolo Channel separates into three arms, *Tide Cove* to the S.W., *Tolo Harbour* to the N.W., and *Plover Cove* to the N.E. Plover Cove would in all proba-

bility be found the most eligible place to ride out a typhoon ; it runs back $2\frac{1}{4}$ miles to the eastward beyond Harbour Island, and carries a depth of 6 to 4 fathoms.

Round Island is N.W. by N. $2\frac{3}{4}$ miles from Port Island, and is the easternmost of an extensive group lying in the N.W. part of Mirs Bay ; the largest of the group are *Double*, *Crescent*, and *Crooked Islands*. Double Island, the southernmost, lies N.W. 6 cables from Bluff Head, and the channel, which separates its S.W. point from the main, is only large enough for boats.

On the N.W. side of Crooked Island is a large village, and on the East end a remarkable peaked head, between which and the mainland to the northward, the depths are 9 to 4 fathoms, muddy bottom. On the West side of the island is a good anchorage named Crooked Harbour ; and to the southward, formed by Crescent and Double Island, is a secure basin, named Double Haven, the northern entrance into which is 3 cables wide ; within it the depth is 7 fathoms.

PENG-CHAU ISLAND, 3 miles in circumference and 148 ft. high, is in the N.E. corner of Mirs Bay, N. $\frac{1}{4}$ E. $4\frac{1}{2}$ miles from Gau-tau. The geological formation of this island is totally different from the adjacent land, being alluvial, shale stones forming its beaches. The distance between it and the main land to the eastward is rather more than a mile, forming a convenient anchorage, sheltered from all winds. E.N.E. from the island is the remarkable peak, *East Cone*, 750 ft. high, overlooking Typung Bay, the distance across being $1\frac{1}{4}$ mile, and the land but little elevated. Under the peak is the village of *Namoa*, and in the bay South of it is a peaked rock and a sunken reef.

Anchorage.—The N.W. part of Mirs Bay, northward of Crooked Island, gradually shoals to the westward, and affords good anchorage. The northern portion of the shores of the bay are steep-to. Anchorage in the N.E. monsoon will be found all along the eastern shore of the bay to the southward of Peng-chau ; but the number of fishing platforms on stakes in 8 and 9 fathoms water render the navigation awkward in the dark. There is anchorage in south-west winds to the westward of the South Gau, in 8 or 9 fathoms.

Tides.—In Tide Cove, in the S.W. part of Mirs Bay, it is high water, full and change, at 10^h 0^m, and springs rise about $6\frac{1}{2}$ ft. ; but during neaps the water remains nearly at the same level. With the flood, there is a great indraught into Mirs Bay and Rocky Harbour, which must be guarded against in shaping a course from the Tuni-ang Group to pass outside the Ninepin Group.

Directions.—As the ebb stream runs to the southward along the western shore at the entrance of Mirs Bay, a vessel working to windward with a S.W. wind will get to the westward speedily by keeping near the land passing

between the Ninepin Group and Tamtu; but as soon as the Lema Channel opens out she will meet with a set to the eastward.

During August and part of September, if a vessel is eastward of the Lema Island, she will find it difficult to proceed along shore to the westward if the wind is from that quarter; she ought therefore either to stand off to the southward for two or three days (if near full and change of moon, when bad weather may be apprehended), or anchor in Mirs or Harlem Bay for an easterly wind, which in these months usually happens every few days, close in with the coast.

TUNI-ANG GROUP.—From Mirs Point, the South coast of the peninsula separating Mirs and Bias Bays trends N.E. by E. 8 miles to Teyih Point, and between are two sandy bays, off the westernmost of which, at 4 cables from the shore, is Coast Islet, having 4 fathoms water between it and the land. At 6 miles eastward of Mirs Point, fronting the peninsula, is the Tuni-ang group, consisting of eight islets, including Single Island and Acong Rock. The largest island, the northernmost, is 5 miles in circumference, and its summit rises like a cone to the height of 960 feet; off its western end are two islets.

Peak Rock, lying a quarter of a mile westward of Net Island, with 4 and 5 fathoms water between, appears like two islets with a shingle beach connecting them. N.W. $\frac{1}{4}$ W., 4 cables from Peak Rock, is a ledge of rocks, the northern edge of which is always visible; and between them is a reef which breaks at low water.

Immediately southward of Tuni-ang Island are three islets, called by the Chinese Saman (or three passages), which form a good harbour, named *Samun Road*, sheltered from all winds, except those from W.N.W., round by the West to S.W. by S. *Samun*, the southern islet, is 3 miles in circumference, and distant 1 mile from Tuni-ang; the channel between it and Cone Islet to the northward has 9 and 10 fathoms water. The passage between Cone and Tuni-ang is crooked, and has only $2\frac{1}{2}$ fathoms water.

The *Acong* is a remarkable pyramid rock lying 6 cables N.E. of Single Island, with 15 fathoms water between them. There is a rock with 16 feet over it lying N.N.E. $\frac{3}{4}$ E. about a mile from the Acong, on which bearing it is on with the S.E. point of Single Island. When on this rock, which rises so abruptly that there was great difficulty in finding it, Cone Islet bore N.W. by W. $\frac{3}{4}$ W., and was in one with a remarkable gap in Tuni-ang.

Anchorage.—In the N.E. monsoon the trading junks anchor in 9 fathoms southward of Net Island and Peaked Rock, and abreast a fort on Tuni-ang; but the ground is foul within 2 cables' lengths of the fort point.

Middle Rocks.—N.E. $\frac{1}{3}$ E. from the summit of Tuni-ang is the Middle Rock just awash at high water. From it the Acong Rock bears S. $\frac{3}{4}$ W.; Bate Island, off the East point of Bias Bay, N.N.E.; and Lokaup Island N.W. by N. 4 miles. At 3 cables S.W. of this rock is a reef which breaks only at

low water, and from which the East end of Cake Islet (on the East side of Lokaup) is in line with the Pillars, N. by W. $\frac{3}{4}$ W.

The channel between Tuni-ang Island and Teyih Point, the West point of the entrance to Bias Bay, is $1\frac{1}{2}$ mile wide; both shores are steep-to, with the exception of the reef, already mentioned, lying off Peak Rock near the N.W. point of Tuni-ang, and a rocky ledge extending south-westerly from the first point East of a remarkable white rock on the North shore. The hills on this side attain an elevation of 2,600 and 2,800 feet.

BIAS BAY, a capacious and deep inlet similar to Mirs Bay, has a chain of islands fronting its western shore, which is indented by two large bays, at the head of the principal of which is *Typung Harbour*. This harbour, so named from the walled town of *Typung* on its northern shore, although contracted is capable of affording good shelter for moderate-sized vessels, except with easterly winds, when the anchorage under Lokaup Island should be preferred. On the northern side of the harbour there is a smooth conical hill, off which a shoal commences extending half a mile from the shore; the southern side, which is bold-to, must therefore be kept aboard. Vessels drawing more than 15 ft. should not proceed farther westerly than the third point on the South side, as the bottom of the harbour is shoal.

Dumbell Bay, the next inlet northward of *Typung Harbour*, runs back westerly 6 miles from Big Island, and carries a general depth of about 3 fathoms.

Fan-lo-kong Harbour, in the north-eastern part of Bias Bay, has an entrance $1\frac{1}{2}$ mile wide, with a depth in mid-channel of 4 fathoms. The village of *Fan-lo-kong* is on the northern shore. This will probably be found the best anchorage in Bias Bay in a typhoon.

Pagoda Island bears from Tsang-chau N.W. by W. $\frac{3}{4}$ W. 4 miles. The water shoals towards Pagoda; to the W.S.W., 3 cables off, are some rocks.

Lokaup Island, the southern of the chain of islands in Bias Bay, has on its South end some pyramidal rocks. It bears N. by E. 6 miles from Tuni-ang, and the channel between it and the West point of the entrance of the bay is 3 miles wide, with a depth of 9 fathoms. The island is about 2 miles long, and nearly separated in two places; the highest part, 330 ft. above the sea, is near the South end. There is anchorage on either side of it, according to the prevailing winds.

There are six islets around Lokaup, three on the West, two on the North, and one on the East side. The North islet, named the *Pillars*, is remarkable from the two square pillars on its South side; there is a reef off the West end of the islet South of the Pillars.

Middle Group.—About a mile northward of the Pillars is Middle Group, consisting of six islets. *Green Island*, 254 feet high, the southernmost, has an islet off its West end; and at three-quarters of a mile northward of it is Reef Islet, to the S.E. of which is a reef that breaks at low water. There is

also another rock awash at low water, lying North 3 cables from Reef Islet, and there is another N. $\frac{1}{3}$ W. $1\frac{1}{4}$ miles from Reef Islet, and N.W. $\frac{1}{2}$ N. from Red Islet.

Harbour Group, consisting of nine islets, is not quite a mile northward of Middle Group. The southernmost are two small islets named the *Twins*, to the N.E. of which, at 2 cables, is *Shoal Island*, having rocky ground extending north-westerly 3 cables from it. At a quarter of a mile westward of the Twins is *Tree-a-top Islet*, and westward of it, at half a mile, is a sugar-loaf shaped island. *Narrow Island* is three-quarters of a mile long, North and South. *Round Island* lies rather more than 2 cables northward of Narrow Island, with a depth of 5 and 6 fathoms between them; to the northward of it at 2 cables lies a flat rock nearly a-wash and steep-to. N. by W. 6 cables from Round Island is *Cone Islet*, a conical rock surrounded by reefs; vessels wishing to anchor to the westward of Narrow Island will find this channel or that between Tree-a-top Islet and Sugar Loaf Island the best to enter by.

To the westward of Sugar Loaf is *Big Island*, off the North face of which is a small islet, and further North a flat rock, with a reef, which shows only at low water; when upon this reef the highest part of Narrow Island bears S.E. by E., and Nobby Reef N.E. by E. To the N.W. of Big Island, 4 cables, is Sand Patch, a low rock surrounded by sand; between it and the island there are $3\frac{1}{2}$ fathoms water. There is also a *rock awash* at high water on the South side of Big Island.

BIAS POINT, the eastern point of the entrance of Bias Bay, is fronted to nearly a mile by rocks, between which and the land the channel is unsafe, but the passage between them and the rock lying off the S.E. end of Bate Island may be used, being 8 cables wide, with a depth inside of $4\frac{1}{2}$ and 5 fathoms.

Bate Island is 8 cables long, North and South, and half a mile wide; besides the rock off its S.E. end, there is another awash at high water, lying N.N.E. 6 cables from its North end, with the South point of Lokaup S.W. by W. $\frac{1}{2}$ W., and the rock off the S.E. end of Bate Island E. by S.

From Bias Point the eastern coast of the bay trends northerly $8\frac{1}{2}$ miles to *Tsang-chau Island*. There is anchorage in the N.E. monsoon between Bate and Triple Island, lying $2\frac{1}{4}$ miles to the northward. Tsang-chau is a low flat islet with a smaller one S.E. of it, lying 6 miles northward of Triple.

MENDOZA ISLAND, 480 feet high, and $2\frac{3}{4}$ miles in circumference, bears S.E. by E. $\frac{1}{4}$ E. $7\frac{1}{2}$ miles from Bate Island, and a vessel will find shelter from a S.W. wind on its northern side. Off its western side is a small islet separated from it by a channel a cable wide, and of 9 feet water. *Tsincoe Island*, 167 feet high, lies 6 cables northward of Mendoza, with 11 fathoms water between; near its centre is a remarkable cleft.

FOKAI POINT, bearing N.E. by E. $3\frac{3}{4}$ miles from Mendoza, is the South

extreme of a promontory connected to the main by a low sandy isthmus; the land near the point is high, and has the appearance of an island when viewed from eastward or westward. On the summit of the Fokai Hills is an artificial mound 670 ft. above the sea, and on the hill over the S.W. point is a large fort. On the East side of the isthmus are three rocky islets; and E. by N., 8 cables from the northernmost islet, is a reef showing at low water, from which the East extreme of Fokai Point bears S. by W. $\frac{1}{2}$ W., and the Pauk Piah Rock E.S.E.

HARLEM BAY, formed on the West side of the Fokai promontory, affords secure anchorage in the N.E. monsoon; but it cannot be considered safe during a typhoon, when the winds are liable to shift suddenly to different points of the compass. A good berth will be found northward of *Hebe Islet* in any convenient depth of water. This islet is flat-topped, and 70 ft. high, and a ledge of rocks, which covers at high water, extends 3 cables north-eastward of it. The natives here are not so shy of intercourse as at other places along the coast; they will supply fish and vegetables.

At 6 cables westward of the West extreme of Fokai Point, and 10 or 12 feet above the sea, is *Middle Rock*, which may be passed on either side. On the western foot of the Fokai Hills is a fort, with a tall chimney on the hill behind it. S.W. by W. 3 cables from Hebe Islet lies a rocky patch, of $3\frac{1}{2}$ fathoms water, bearing North from Middle Rock, and N.W. $\frac{1}{3}$ N. from the West extreme of Fokai Point.

Tides.—It is high water, full and change, at Tuni-ang Island (page 998), at 8^h 0^m; at Tsang-chau Island in Bias Bay at 8^h 30^m; and at Hebe Islet in Harlem Bay (two days before full moon) at 10^h 0^m. In the month of April the current in this neighbourhood sets constantly to the westward, its rate increasing upon the flood, but did not exceed a knot. When, however, the monsoon drift current recedes from the coast, the tidal influences prevail, and it is commonly reported that the flood stream sets westward and ebb eastward, or directly the reverse of their set North of Breaker Point.

Directions.—Bound to Bias Bay from the eastward, pass about a mile westward of Mendoza Island, and then steer N.W. by W. for the opening between Lokaup and Bate Islands, shoaling from 13 to 10 fathoms water over muddy bottom. From thence either proceed up the bay to an anchorage in 5 fathoms, about $1\frac{1}{2}$ miles from the eastern shore, 3 miles northward of Triple Island, or to the southward of Lokaup to an anchorage in the bay, or in Typung Harbour. There are several populous villages on the eastern shore where no doubt refreshments could be obtained.

If bound to Harlem Bay, round Fokai Point about half a mile off in 13 fathoms water, and either haul up between the shore and Middle Rock, or pass between that rock and Tsincoc Island.

SAM-CHAU INLET.—From Fokai Point the coast trends N.E. by N. 12

miles to *Ross Head*, and at the distance of 9 miles is *Coast Islet*, lying 4 cables off shore. Shoal water, over rocky bottom, extends 6 cables southward of this islet, and here, close to a flat rocky head, is an opening a cable wide into the extensive inlet of *Sam-chau*, the channel, carrying 5 and 6 fathoms, being close to a narrow cliff on the southern shore; but in strong easterly winds the sea breaks across it. The entrance bears W. by N. $\frac{1}{2}$ N. from *Siting Islet*, and E. $\frac{1}{2}$ N. from *Harlem Peak*, which, being 2,070 ft. above the sea, forms a conspicuous landmark. S.S.W. $\frac{1}{4}$ W. nearly $2\frac{1}{2}$ miles from *Coast Islet* is a *sunken rock*, from which *Si-ting* bears East nearly 6 miles, and *Harlem Peak* N.W. $\frac{1}{2}$ W.

Commander P. Cracroft, of H.M.S. *Reynard*, who visited this inlet in chase of pirates, says, "The mouth of the inlet is but little wider than the breadth of a ship; there is also an inner bar with an equally narrow passage; and across both these bars the tide runs 5 knots. The depth in the channel varies from 6 to 8 fathoms, and deepens to 10 fathoms above the upper bar, where there is ample room for a vessel to swing; but such is the intricacy of the navigation, that a personal examination should be made, and the state of the tide carefully ascertained before attempting the entrance."

PEDRO BLANCO ROCK (*Ty-sing-cham* of the Chinese), in lat. $22^{\circ} 19\frac{1}{2}'$ N., long. $115^{\circ} 7'$ E., when bearing North appears as two rocks; the summit is of a white colour. It is bold to approach, having 20 fathoms close to the southward, and 18 fathoms to the northward, decreasing gradually to 13 fathoms in the neighbourhood of the *Pauk Piah Rock*, which bears from it N.N.W., distant 15 miles.

The *Pauk Piah* is a flat rock, 4 feet (Capt. Morant, R.N., says 24 feet) above high water, from which the summit of the *Fokai Hills* bears W. $\frac{1}{3}$ N. 7 miles.

WHALE ROCKS.—S. by W. $2\frac{1}{2}$ miles from the *Pauk Piah* are the two *Whale Rocks*, rising abruptly from the depth of 12 fathoms, and upon which the sea sometimes breaks. From them, the West extreme of *Fokai Point* is on with the summit of *Bate Island*, W. by N. $\frac{1}{4}$ N., the summit of *Fakai* bears N.W. by W. $\frac{1}{2}$ W., 7 miles, and the summit of *Mendoza West* a little northerly.

Tung-Ting and *Si-Ting* are two rocky islets about 50 ft. above the sea, lying S.E. $\frac{1}{2}$ S. and N.W. $\frac{1}{2}$ N. from each other, distant $1\frac{1}{2}$ mile apart; there are sunken and detached rocks around them both.

N.W. by W. $1\frac{1}{2}$ mile from *Si-ting* is a rocky patch which sometimes breaks. There is also the *Single Rock* which breaks only at low water, or when there is a heavy sea, and from which *Si-tang* bears S.W. by W. $\frac{1}{2}$ W.; *Tung-ting* S.W. by S.; *Hat Islet* N. by E., and *Harlem Peak*, W., northerly.

HONG-HAI BAY, about 15 miles N.E. of *Fokai Point*, is extensive, but in the upper part the water shoals to 6 and 4 fathoms, and it is open to

S.W. and South winds. There are several islands in the bay, the largest of which, Hong-hai, is in the middle of it.

Vessels are recommended not to pass to the westward of Tung-ting and Si-ting, nor into the N.W. part of this Bay, as they will find a heavier sea there than outside; there is, also, usually a long ground swell near Inside Island, rendering it advisable not to stand farther in than Hong-hai Island.

In Hong-hai Bay is an inlet, not identified, but probably that which is 9 miles N.E. of Fokai Point, which was visited by Captain P. Cracroft, R.N., in H.M.S. *Reynard*, 1849. Its bar extends nearly across the entrance, leaving an opening, on the South side, of very little more than a ship's breadth. There is an inner bar also on the South side, with an equally narrow passage, hugging a point which resembles "Devil Point," at the entrance of Hamoaze; and over these bars the tide sets, at springs, with the great velocity of 5 or 6 knots.

The depths in the channel vary from 4 to 8 fathoms, deepening to 10 fathoms above the inner bar, where there is ample room for a ship to swing, but the navigation is so intricate that a careful examination should be made before attempting the entrance, and the state of the tide correctly ascertained.

Hong-hai Island, bearing N.E. $\frac{1}{2}$ E. 8 miles from Si-ting, is half a mile long, East and West, 3 cables wide, 240 feet high, and has shelter on its northern side from southerly winds. Two rocks, visible at low water, lie 3 cables from the shore, S. by E. $\frac{3}{4}$ E. from its summit. *Hat Islet* is a peaked rock $2\frac{3}{4}$ miles westward of Hong-hai. It is called by the Chinese *Ke-sin-she* (fowl's heart), which it more resembles than a hat; there are detached rocks about it. *Inside Island*, 5 miles N.W. of Hong-hai, is 460 ft. high, a mile long North and South, and but little more than a cable wide. At 3 cables off its S.W. end are some detached rocks.

Shoal Bay is formed at the head of Hong-hai Bay, 3 miles N.N.E. of Hong-hai Island. Its entrance is 2 miles wide, and within the water shoals to less than 3 fathoms. At three-quarters of a mile eastward of *Club Point*, the East point of the entrance to Shoal Bay, there is a rocky ledge, part of which is always above water.

TY-SAMI INLET, bearing E. $\frac{3}{4}$ N. 9 miles from Hong-hai Island, has an entrance channel half a mile wide, with $2\frac{1}{2}$ fathoms in it at low water. The northern shore of the channel is shoal-to, and rather more than half a mile off the beach are some rocks, which show at low tide. Ty-sami Mound, 970 feet above the sea, is an artificial cone on the highest part of the hills near the eastern point of Hong-hai Bay.

In Hong-hai Bay it is high water, full and change, at 10^h 0^m, and the rise is $6\frac{1}{2}$ ft.

Goat Island, lying S.E. 3 miles from Tsiech Point, the eastern outer entrance point of Hong-hai Bay, is the southernmost and largest of a nume-

rous group, amongst which there are no navigable channels. S.W. $\frac{1}{2}$ W. from its summit, and S.S.E. $\frac{1}{2}$ E. from Tysami Mound, there is a dangerous rock, which shows only when the tide is low and the wind high. At rather more than a mile inland from the beach northward of Goat Island, is the walled town of *Tsieching*. There is good anchorage in the N.E. monsoon on the N.W. side of Goat Island, which, with the group of islets northward of it, shelters well from the heavy sea. This roadstead is much used by opium vessels, which approach as close to the shelving beach as the depth of water will allow.

Reef Islets lie S.E. by E. 3 miles from Goat Island. The southern or largest islet has reefs extending a cable's length in a southerly direction from its East end. In using the channel between Goat Island and these islets, take care to avoid a *sunken rock* on which the sea breaks at low water, bearing E. $\frac{1}{4}$ N. $1\frac{1}{3}$ mile from the summit of the island, and N.W. $\frac{3}{4}$ W. 2 miles from the North end of the islets.

Vessels may pass between the Reef Islets and some rocks awash named *Middle Reef*, lying $1\frac{3}{4}$ mile to the northward, the depth being 7 and 8 fathoms, but bear in mind that reefs extend rather more than 2 cables northerly from the islets, the northern danger bearing W. $\frac{1}{2}$ S. from Chelang Point. It will not be prudent to pass in-shore of Middle Reef.

CHELANG POINT, 5 miles E. by N. $\frac{1}{4}$ N. from the Reef Islets, is very remarkable, of moderate height, composed of red sand, with many ragged rocks scattered over it. The point has two islets and a reef close off it, and the depth is 13 fathoms within a mile of the outer islet, which is 80 feet high.

On the western extremity of this headland is a fort, and westward of the fort a small bay, which will afford shelter in the N.E. monsoon; but a sunken rock, with only a foot water over it, lies N.W. by W. $5\frac{1}{2}$ cables from the fort. *Flat Rock* is $1\frac{3}{4}$ mile W. by N. from Chelang Point, and there is a small sunken rock lying N.W. from it, and West from the fort. The land on either side of Chelang Point for some distance is of a remarkable red colour with black mounds.

Kin-yu or *Kemsue* is a rocky islet, half a mile long N.E. and S.W., lying N.E. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Chelang Point, and under its highest or N.E. part there is a high rock. Its shores are bold-to, but the islet is too small to afford shelter.

HIE-CHE-CHIN BAY, formed between *Paukshao Point* on the West, and *Tongmi Point* on the East, has 7 to $5\frac{1}{2}$ fathoms water at entrance, shoaling to 3 or $3\frac{1}{2}$ fathoms within a mile of its head, over soft muddy bottom. It affords shelter from westerly and northerly winds, and from the N.E. monsoon, but is quite exposed to the southward and S.E.; the eastern side of the bay is high and mountainous. The village of *Kinsiang* stands in the N.E. bight of

the bay, immediately under Round Hill. Two rivers empty themselves at the head of the bay.

Near Tongmi Point is *Chino Peak*, a remarkable conical hill, 455 ft. high, which, with the islets of Tung-ki and Si-ki, render this side of the bay easy to recognise when well within it. But when in the offing some have, in approaching Chino Bay, mistaken at first for Chino Peak, Round Hill, on the northern shore of the bay, which is also a remarkable conical hill, 1,456 feet high. When first seen, Round Hill rises like an island, and is a good mark when approaching from the south-westward. The land about Chino Bay, when first made from the same direction, appears of a somewhat uniform height.

Tung-ki.—Chino Peak bears N.W. $\frac{3}{4}$ N. nearly $2\frac{1}{2}$ miles from Tung-ki, which is 18 ft. above the sea, having some detached rocks on its eastern side, and three rocks awash at low water, half a cable from its N.W. side.

Suwonada Rock, upon which a steamer of that name struck, August, 1969, lies in nearly mid-channel between Tongmi Point and the Tung-ki Rocks. It consists of two or three pinnacle rocks, with 11 ft. on them at low water springs, and 8 or 9 fathoms close to. This dangerous patch lies N. by W. $\frac{3}{4}$ W., $4\frac{1}{2}$ cables from the West extreme of the Tung-ki Rocks; Tongmi Point bearing N.W. by W. $\frac{1}{4}$ W., and Si-ki Rock S.W. by W.

No indication of these rocks is afforded by discoloured water, and it is recommended that the passage between Tung-ki Rocks and the mainland should not be used for the purposes of navigation. A mile North of Tung-ki, and East three-quarters of a mile from Tongmi Point, is a cluster of rocks nearly awash.

Si-ki Islet, 80 ft. high, rises abruptly, and is cleft at the summit; Tung-ki bears from it E.N.E. 3 miles, and Chino Peak N.N.E. $\frac{1}{3}$ E. Between the two islets the soundings are 11 and 12 fathoms.

Paukshao Bay, on the western side of Hie-che-chin Bay, affords good shelter, unless the wind comes eastward of South, there being 5 fathoms water with Paukshao Point bearing westward of South. Paukshao Point is of moderate height, with numerous rocks scattered over its surface. The other point to the westward has a high battery on it. There is said to be a sunken rock lying N.E. about half a cable's length from Paukshao Point.

Chino Bay is on the eastern side of Hie-che-chin Bay, to the northward of Chino Peak, and on its shore there is a fort and small village, abreast which the water is shoal, the 2-fathoms line of soundings being half a mile off the land. West from Chino Peak is the *Chino Reef*, extending 4 cables from the shore; the outer rock does not show at high tide unless there is a considerable swell.

A dangerous coral rock, on which the *Sarah Lucy* struck, lies $8\frac{1}{2}$ cables S.E. of the Yellow Stone. There are only 7 ft. water on it, $4\frac{1}{2}$ fathoms, mud,

close-to. To pass westward of the rock, keep the East White Stone open westward of the Yellow Stone.

The best anchorage in Chino Bay is in $3\frac{3}{4}$ fathoms farther northward about East of the Yellow Stone, which is the southernmost of all the rocks, with the exception of the Sarah Lucy, in the N.E. part of the bay. The walled town of *Keishi-wei*, bearing E. by N. 3 miles from the Yellow Stone, will be seen over the low land from this anchorage; there is a creek leading up to it which will admit junks at low water.

Between the Yellow Stone and the rocks three-quarters of a mile N.N.W. of it, there is a channel of $4\frac{1}{2}$ fathoms water: but vessels are recommended not to approach that part of the bay northward of the Yellow Stone, as there are several sunken rocks. Vessels drawing less than 18 ft. may stand into the bay to the northward of the West White Stone, where the depth is $3\frac{1}{2}$ to $2\frac{1}{4}$ fathoms, the water shoaling gradually towards the beach.

HUTUNG POINT.—From Tongmi Point the coast takes an E by N. $\frac{1}{2}$ N. direction about $15\frac{1}{2}$ miles to *Cupchi Point*, and at the distance of $4\frac{1}{2}$ miles is *Black Rock Point*, with black rocks off it, and a square white rock on its S.W. side. N.W. $1\frac{1}{2}$ cable from the White Rock is a sunken rock.

About $2\frac{3}{4}$ miles eastward of Black Rock Point is the mouth of the River Hutung, which falls into the sea on the West side of Hutung Point, but it has only 6 ft. water over the bar. On its South bank is a fort, and close to the fort a remarkable dome-shaped building, apparently intended for a fire beacon; this is a good mark in hazy weather, being so easily recognized, indeed there is nothing resembling it on this part of the coast. S.S.E. $1\frac{1}{4}$ mile from the fort is a small islet, surrounded by reefs and detached rocks, one of which, to the eastward, is of a curious shape, and is named *Figure Rock*.

At 3 miles eastward of Hutung Point the hills come down to the beach, and on one of their peaks is a conspicuous knob. At a mile off the beach is a flat rock with sunken dangers between it and the shore; there is also a rock awash to the S.E. of it.

CUPCHI POINT has a rugged summit, 210 ft. high, and near the sea there is a dilapidated fort. South $1\frac{1}{2}$ mile from the point is Turtle Rock, 14 feet above high water, and inside of it are two islets and four patches of rock. The junks pass between Turtle Rock and the rock next to the northward, though sunken rocks lie westward of both, and much discoloured water, which, however, helps to detect them. The U.S.S. *Palos* discovered off Turtle Rock a shoal, with only 2 fathoms of water. From the shoal Cupchi Point bore N. $\frac{3}{4}$ E. 3 miles, and the hill marked on the chart as 726 ft. high, N.W. $\frac{3}{4}$ W. As this danger lies in the track of navigation, vessels should be cautious to give it a wide berth, when passing the Turtle Rock.

Between the islets and the point the channel is 2 cables wide, but the bottom is rocky and uneven, and a rock on which the steamer *Five Brothers*

was wrecked, February 28th, 1859, lies 60 fathoms South of the point. The least water on this rock is 12 ft., and as many sunken dangers are in its vicinity, it would be imprudent for a stranger to attempt the passage. A ledge of rocks extends 2 cables from the point westward of the fort, its outer end breaking at low water.

A remarkable little black conical hill, named *Black Mount*, rises 230 ft. above the sea from a red sand down, at $4\frac{1}{2}$ miles N.E. of Cupchi Point, and half a mile from the beach. Reefs extend half a mile from the shore along this part of the coast.

Anchorage.—There is good anchorage during the N.E. monsoon to the southward of the Shag Rock, which lies half a mile off shore N.N.W. of Cupchi Point; it is 3 ft. above high water, and has $2\frac{1}{2}$ fathoms around it, except on its S.E. side, where there is a projecting reef. On the main, abreast this rock, is a fort standing on the East side of entrance to a river leading to the walled town of *Kiahtsz*. The town is $1\frac{3}{4}$ mile from the fort, and southward of it is a pagoda two stories high. There are 9 ft. at low water on the bar of the river.

Nearer the entrance there is a second fort over a point, and a martello tower on the sandy point opposite, to the southward of which, sand-banks extend more than half a mile. Situated exactly in mid-channel between these sand-banks and the inner fort point is a dangerous rock, steep-to, which uncovers at low water, and may be passed on either side.

TUNGAO ROAD.—The village of Tungao stands in a bight of the coast N.E. by E. 15 miles from Cupchi Point, the intervening shore being low and sandy. On the bar of the river, West of the village, the sea breaks heavily at low water, and outside the bar the water shoals suddenly; so that vessels approaching the anchorage in Tungao Road should not bring the fort at the village to bear eastward of N.E. $\frac{1}{2}$ N., when within $1\frac{1}{2}$ mile of it; this will be found a good roadstead in the N.E. monsoon, well sheltered and with good holding ground. There are two pagodas in the neighbourhood, one on the low land at the East side of the river's mouth; the other on the hills 2 miles to the northward.

S.E. $2\frac{1}{2}$ miles from the village is *White Rock*, which forms a good mark by which this part of the coast may be recognized; halfway between White Rock and the village is a creek with a fort upon the hills East of it. The land near the coast is low, with several fishing villages in the sandy bays, the boats belonging to which are numerous, and being of different shape and smaller than those of Hai-mun and Cupchi, will enable a vessel to identify her position in a fog.

Hai-Loong Rock is directly in the track of vessels proceeding from the anchorage in Tungao Road round Breaker Point when keeping in-shore to avoid the N.E. monsoon, and lies S. by W. $\frac{2}{3}$ W. 1 mile from the White Rock, with pinnacles 11 ft. below the surface of the water slipping off into

6 fathoms on either side. The islet inside Breaker Point bears from it E. by N. northerly, and the North pagoda N.N.W. $\frac{1}{4}$ W.

BREAKER POINT, lying 7 miles eastward of White Rock, and E. by N. $\frac{3}{4}$ N. 23 miles from Cupchi Point, may be known by a black dome-shaped hill, rising 280 ft. from a red sand drift on the point, whence the hills trend northward and westward, dipping suddenly at their extremity. The shore should not be approached within half a mile. A *lighthouse* is proposed at Breaker Point. At 2 miles westward of Breaker Point is a small islet, having *Flat Reef*, two conspicuous masses 12 ft. above high water, to the south-eastward of it, distant 9 cables. A quarter of a mile W. by N. $\frac{1}{2}$ N. from Flat Reef is *Black Rock*, 15 ft. ; and N.N.W., half a cable, another, 12 feet above high water. *Corea Rock*, having 14 ft. water over it, lies two-thirds of a mile S.W. $\frac{1}{2}$ S. from Flat Reef. One and a half cables westward of the Corea Rock is a *rocky patch*, with 3 to 5 fathoms water over it, and 7 fathoms around.

Sunk Rock has but 7 ft. water over it. From it the apex of the islet westward of Flat Reef bears N. $\frac{1}{2}$ E., distant half a mile. When on Sunk Rock, Black Rock and the rock (12 ft. high) respectively to the West and N.W. of Flat Reef are in line. Another rock was reported in 1874, by the British steam-ship *Ningpo*, South, 3 miles from Flat Island, and S.W. $\frac{1}{2}$ S. from Breaker Point. The steam-ship *Ulysses*, also, is reported to have struck on a rock $1\frac{1}{2}$ mile East of this position. The dark hills seen over the high sandy coast is very deceptive at night, and Dome Hill can then very seldom indeed be recognised; strangers cannot do so readily by daylight, and at night are very liable to mistake for it a round-shaped hill at the extremity of the back range. For these reasons soundings only can be relied upon to enable vessels to pass the above dangers safely at night; when by keeping in depths of 11 or 12 fathoms, not less than 11 fathoms, they will pass from 1 to 2 miles to the southward of Corea Rock.

Tides.—From observations on the tidal streams, from January to May, between Hong Kong and Breaker Point, the ebb ran to the eastward. To the eastward of Breaker Point, however, the flood set to the eastward, which is its direction throughout the N.E. coast of China. It appears that the tidal wave from the Pacific Ocean strikes first upon Breaker Point.

Tong-lae Point is $4\frac{1}{2}$ miles N.E. $\frac{1}{2}$ N. from Breaker Point, and about a mile westward of it is the entrance to a creek leading to the walled town of Tong-lae. On the eastern side near the entrance is a fort, under which indifferent shelter might be found in the N.E. monsoon by a vessel of not more than 12 ft. draught, but she would be in an awkward position should the wind veer southward of East. Sunken rocks abound along this portion of the coast, one of which lies 6 cables off the land, with the fort bearing N.W. by N., and Rocky Point N. by E. $\frac{3}{4}$ E. Rocky Point is the low extreme of the land N.E. $1\frac{1}{4}$ mile from Tong-lae Point; hence the coast trends

northerly, and at the distance of $4\frac{1}{2}$ miles is a headland with reefs extending a quarter of a mile S.E. of it.

HAI-MUN BAY.—N.E. $\frac{1}{2}$ E. 7 miles from the above headland is Hai-mun Point, and between them Hai-mun Bay. The town is built on the left bank, 1 mile within the entrance of the river, which has 10 ft. over its bar. There are three pagodas on the land to the northward of the bay, two of which are on the hills, and can be seen in clear weather from Namoa Island.

At 9 cables southward of Hai-mun Point are two rocks, on which the sea breaks. From the southern, *Parkyns Rock*, Rocky Head Point, on the East side of entrance of Hai-mun River, bears N.W. A *rocky ledge*, with only $2\frac{1}{2}$ fathoms on its South end, extends 6 cables from the fort on the East point of a sandy bay, $1\frac{1}{3}$ mile E.S.E. of Rocky Head Point, and near the anchorage of Hai-mun River is another rock showing at low water, from which the South extreme of Hai-mun Point bears E. by S., Rocky Head Point N.E. $\frac{1}{4}$ N., and the West peak of Pagoda Range N.W. by N.

CAUTION.—On many occasions vessels have nearly been lost by mistaking Hai-mun Point for the Cape of Good Hope in thick weather, when the Island of Namoa was not visible. These points bear a marked resemblance to each other, both having three distinct high points with sandy beaches between. In such weather, the low white sandy shore of Hope Bay is often not visible.

Hope Bay is between Hai-mun Point and the South extreme of the Cape of Good Hope, which bears E. by N. $\frac{3}{4}$ N. distant about $8\frac{1}{2}$ miles. For $3\frac{1}{2}$ miles N.E. of Hai-mun Point vessels should not close this part of the shore nearer than three-quarters of a mile; beyond that distance the sandy beach is steep-to. There is a secure anchorage in the N.E. monsoon on the southern side of the cape, to the N.W. of Tide Point. Sunken rocks extend a cable from the fort point; otherwise this bay is clear. At the western extreme of this sandy bay is Peaked Rock, S.W. by S. of which, distant 4 cables, is a small sunken pinnacle rock, on which H.M. gunboat *Cockchafer* struck in 1868. It has 4 ft. on it at low water, with 5 fathoms close-to on either side. At $1\frac{1}{2}$ mile N.W. of Peaked Rock is the entrance to a creek which communicates with the River Han, 3 miles above Swatow.

The **CAPE of GOOD HOPE** is the eastern, and Pagoda Hill the northern boundary of the entrance to the River Han. The cape, 163 ft. high, is the N.E. extreme of a hilly peninsula, the highest part of which, High Cape summit, is elevated 433 ft. Vincent Range lies to the N.W. of the cape, and North $1\frac{1}{4}$ mile from the highest part of Vincent Range is *Signal Hill*, on the summit of which, 377 ft. high, is a rudely constructed semaphore.

Dove Rock has only 7 ft. on it. From it the South summit of Double Island bears W. by N. $\frac{1}{4}$ N., distant 5 miles, and Green Islet S.S.W. $\frac{1}{2}$ W.

4½ miles. Its position may easily be recognized in calm weather by the tide setting over it.

The northern face of the Cape of Good Hope is half a mile long, and terminates to the westward in a bold point, on which is an old fort. N. ½ E., half a mile from the fort, is *Green Islet*, 72 ft. high, from the N.E. side of which rocks extend a cable. *Bill Islet*, 50 ft. high, bears N.N.W. 2¾ miles from the cape, and is nearly 1 mile off shore. At a third of a mile S. by E. ¾ E. from this islet is *Squat Rock*, about 15 ft. high; and a quarter of a mile S.W. by W. from *Squat Rock* is a reef awash.

Sugarloaf Channel.—*Peaked Rock*, bearing N.W. ¾ N., 2½ miles from *Bill Islet*, lies off the South point of entrance to *Sugarloaf Channel*, which is formed between the West side of *Sugarloaf Island* and the coast abreast it. This channel, although only 2 cables wide, is excellent, either side being quite steep to a quarter of a cable, and is always used by steamers, and frequently by sailing vessels.

Peaked Rock, 25 ft. high, can only be seen when it is standing out clear of the land. *Sugarloaf Island*, which bears not the least resemblance to its name, is 200 ft. high; and *East*, distant 2 cables from its South extreme, are two rocks nearly awash at high water.

Double Island (the *pilot station*) bearing N.W. by N., 4 cables from the North extreme of *Sugarloaf*, only appears double when seen from the S.E. The white walls and tops of houses are the best guides to recognise it from seaward. At 3 cables S.S.E. ½ E. from the summit and 1½ cable off shore, are rocks which cover at 5 ft. rise of tide; the channel between them and *Sugarloaf* cannot be recommended. *Fisherman Island*, half a mile westward of *Double Island*, forms with it the continuation of *Sugarloaf Channel*.

Caution.—Between *Double Island* and the anchorage off *Swatow* are numerous rows of fishing stakes, some of which stretch across the fairway.

The RIVER HAN.—*Pagoda Hill*, the northern boundary of the entrance to the river, will be easily recognized by the pagoda on its summit, 257 feet above high water. *Kakchio Promontory*, 4 miles westward of *Double Island*, when seen from seaward has the appearance of one continuous hill, the southern part being 486 ft. high, and the northern 296 ft.; the numerous ravines by which it is cut up are only seen when close to. On its northern side is the English Consulate (in lat. 23° 20' 43" N., long. 116° 39' 3" E.) with a number of European houses, but they can only be seen when close up to the anchorage.

Off the North extreme of the promontory, and separated from it by a very narrow channel, is *Bottefurh Rock*, 50 ft. high; and at two-thirds of a cable farther to the N.N.W. is the *Wyoming Rock*, with only 4 ft. at low water, marked by a red buoy, in 4 fathoms, 20 ft. N.W. of the rock. *Madras Rock*, having 8 ft. on it at low water springs, was discovered by the P. and O. ship *Madras* striking on it when hauling off the adjacent beach. From the rock

Bottefurh Rock bears E. by N., the English Consulate flagstaff S.E. by E. $\frac{3}{4}$ E., and the extreme of the western pier S.E. by S., distant $1\frac{1}{2}$ cable.

Chen-to Rock, with 5 ft. water over it, is reported as a small cluster from which the British Consulate bears S. by W. $\frac{3}{4}$ W.; the Customs flagstaff N. by W. $\frac{1}{2}$ W., the Harbour Pilots' Pier S.E. by E. $\frac{1}{4}$ E., and the North extreme of Bottefurh Rock W. by N. $\frac{1}{2}$ N.

SWATOW stands on the northern bank of the river, nearly a mile distant from Kakchio, and the whole of the Hongs are on this side. The anchorage for foreign vessels is immediately fronting the town, where 6 to 7 fathoms are found, with good holding ground.

The Port of Swatow, opened to foreign trade by the Treaty of Tientsin in 1858, is the shipping port of Chau-chu fu, 35 miles inland, and since its establishment as a centre of foreign commerce, has been the means of creating a large emporium at San-ho-pa, at the confluence of two branches, 40 miles farther up the river Han. Jetties project into the stream to a distance of some 200 yards. They are, in most cases, built of rough blocks of granite. The military mandarin resides at the small, picturesque fort on the West of the town, in close proximity to the custom house.

The Han above Swatow is navigable 25 miles above where the Admiralty survey terminates, to a place called Tiaka, where a bridge crosses the river. Tiaka is about 12 miles from Chau-chu-fu, the capital of the province. Another branch of the river runs to Chau-chu-fu from Swatow, but it is so shallow that it is only available for flat-bottomed boats.

Supplies.—The markets are fairly supplied with beef, mutton, poultry, fish and fruit, and in winter with wild-fowl. Small repairs to ships, spars, &c., can be executed, and there is a hulk capable of heaving down vessels of 300 tons or more. There are no docks, the nearest being at Amoy, and the rise of the tide is insufficient for the examination of the bottoms of ships grounded on the soft mud. There is constant steam communication with Hong Kong, Amoy, and Foochow, from which places stores of all kinds, not procurable at the port, may be provided in a few days.

The foreign trade of Swatow has been very rapidly developed, but several causes have concurred towards confining it almost exclusively in the hands of native or Singapore Chinese.

The climate, and especially Double Island, shares with Amoy the well-merited repute due to its maritime situation. Double island affords sea-bathing, and attention has been drawn to this spot as a possible sanitarium for Hong Kong and the southern ports. The position of Swatow at a point opposite the Bashee Channel renders it peculiarly exposed to typhoons, the principal range of which is in this narrow seaway.

Tides.—Springs rise 9 ft., but the tides are much influenced by the prevailing winds. During the S.W. monsoon, for a number of days there may be only 2 or 3 ft. rise. Vessels drawing 17 ft. have been known to wait ten

days off Double Island, there not being sufficient rise of tide to enable them to stand out.

Directions.—A vessel of heavy draught running for the entrance of the River Han before the N.E. monsoon should pass outside or eastward of the Dove Rock. To do this, do not bring the East extreme of Fort Island to the eastward of N. $\frac{1}{2}$ E., until the clearing mark, the East extreme of Green Islet on with the North part of High Cape summit, S.W. $\frac{1}{2}$ S., is made out, when steer for it until Sugarloaf Channel is well open. Bill Islet and Squat Rock will then be easily recognized, and by steering in with Bill Islet on with the extreme of the Cape of Good Hope bearing S.S.E., it will lead between the Outer Flat and the spit extending eastward from Double Island in not less than 15 ft. at low-water spring tides. When nearing Double Island great attention must be paid to keep this mark exactly on, as the channel is only 2 cables wide. Vessels of light draught, 12 and 14 ft., can easily run in for the entrance North of Double Island.

Fort Island lies E.N.E. $1\frac{3}{4}$ mile from Pagoda Hill. *Brig Island*, so called from a rock at its South extreme, which appears like a brig when seen in an East or West direction, lies N.E. $\frac{3}{4}$ E. $4\frac{3}{4}$ miles from Fort Island.

NAMOA ISLAND, 12 miles long East and West, and $5\frac{1}{2}$ miles wide at its broadest or eastern part, is separated from the main by a channel about $3\frac{1}{2}$ miles wide, with depths varying from 3 to 6 fathoms. The three peaks of this island, West Peak, 1,830 ft., Namoa Peak 1,934 ft., and Saddle Peak 1,794 ft. above the level of the sea, form the most prominent landmarks in the neighbourhood. Notwithstanding its barrenness, the island is exceedingly populous, the fisheries affording a livelihood to the greater portion of the inhabitants.

Caution is required to avoid the large fishing stakes which almost surround this island in deep water, some of which are large enough to carry away a vessel's jib-boom. The anchorage in Clipper Road is in 6 to 7 fathoms, very good holding ground.

Local knowledge is necessary when approaching the anchorages on the westward of Namoa from the southward, as the knolls of the S.W. end of Namoa are said to shift. The eastern channel between North point of Namoa and Fort Head is much wider and has general depths of 7 to 4 fathoms.

Nangaou Bay, the next bight eastward of Shoal Bay, on the North coast Namoa, has at its head a walled town, the residence of the magistrate of the district. Vessels drawing less than 18 ft. may stand into this bay until Pagoda Island, on its eastern side, bears E. by N.; but during the N.E. monsoon there is a considerable swell in it. Rocks extend 3 cables from the north-eastern point of Namoa.

South Bay, on the South coast of Namoa, affords good shelter in the N.E. monsoon; rocks extend $1\frac{3}{4}$ cable southward from its eastern point. Vessels

drawing 18 ft. may run into this bay until the extreme of the point bears S.E. About half a mile S.E. of the point is *Crab Island*, a low flat islet.

Hart Rock, with $4\frac{1}{2}$ fathoms on it at low water, lies 7 cables off East Point of Namoa, with North point of Namoa N. 39° W. and West end of Ruff Rock just open of Dome Island.

LAMOOCK ISLANDS are a group of four islets, and two patches of rocks occupying an extent of $7\frac{1}{2}$ miles in a N.E. and S.W. direction. From the Boat Rocks at their S.W. end, the West point of Namoa bears N.W. $\frac{1}{2}$ W. 22 miles; and from North Rock at their N.E. end, the East point bears N.W. $13\frac{1}{2}$ miles, and the south-eastern Brother N.E. by E. $25\frac{1}{4}$ miles.

Boat Rocks are two square rocks, 15 ft. above high water, about the size of boats, with several reefs between them. *White Rock*, lying N.E. $1\frac{1}{2}$ mile from Boat Rocks, is sufficiently large to afford shelter to boats.

High Lamock, near the centre of the group, is covered with brushwood. The channel between it and White Rock is safe, the depths varying from 8 to 14 fathoms. The distance between High and East Lamock Islands is a mile, but about the middle of the channel is a rock, with a reef, which shows at low tide, extending southward $1\frac{1}{2}$ cable from it. The three northern islets lie close together; North Rock, the northern one, which has a pyramid on it, is without vegetation.

LIGHTS.—On High Lamock Island there are exhibited two fixed lights, viz. :—a high white light, and a low red light.

High Light is a *fixed bright* light, elevated 241 ft. above the sea, and in clear weather should be seen from a distance of 22 miles. The lantern is on a round tower of cast iron, 25 ft. in height (lantern vane 54 ft. above base), and painted black; the dwellings and boundary wall are white.

Low Light is a *fixed red* light, elevated 55 ft. above the level of the sea, and in clear weather should be seen from a distance of 7 miles. The light exhibited from a window in a white building erected on the southern slope of the island, is shown only between the bearings S.W. by S. and S.W. $\frac{1}{2}$ W., covering the White and Boat Rocks, and is intended as a guide for clearing these rocks.

Times Rock, on which several vessels have struck, is a dangerous coral pinnacle, with only 9 ft. at low water. From it the North Rock of the Lamock Islands bears S.W. $\frac{3}{4}$ S., distant nearly $1\frac{1}{4}$ mile, and Dome Island W. by N. $\frac{1}{2}$ N., 12 miles.

In passing inside the Lamock Islands, attention to the tide as well as to the vessel's course is necessary.

LAMON ROCKS.—Between Namoa and Lamock Islands are several islets, the northernmost of which is the highest, and from its appearance is called *Dome Island*. The two southern islets, *Ruff Rock* and *Oeste Rock*, lie East and West of each other; to the southward of the Ruff are the *Dot* and *Sul Rocks*.

A reef extends one-third of a mile southward of the Sul. *Plat Island* is flat topped, and is lower than the Ruff or the Oeste.

Mackinnon Rock has only 5 ft. water. From it the N.W. point of *Plat Island* bears W.S.W., distant three-quarters of a mile; the East extremity of *Oeste Rock*, S. by E. $\frac{1}{4}$ E. 2 miles; the summit of *Ruff Rock*, S.E. $\frac{1}{2}$ E. 2 miles; and the summit of *Dome Island*, N.E. by E. $\frac{3}{4}$ E.

Sinta Rock, with only 2 ft. over it, lies S.E. $\frac{3}{4}$ S., nearly 5 miles from *Dome Islet*, with the S.W. extreme of *Ruff Rock* in line with the summit of *Plat Island*, bearing W.N.W.; East point of *Namoa N.* by W.; and the highest part of *High Lamock E.* by S. $\frac{3}{4}$ S.

Yeng Rock, awash at low water, is 5 miles N. $\frac{2}{3}$ E. from *Sinta Rock*, with the North end of *Crab Islet* in one with the S.W. extreme of *Namoa*, bearing W. by N. northerly; *Dome Islet W.* by S. $\frac{1}{4}$ S.; *High Lamock S.E.* $\frac{2}{3}$ S., and East point of *Namoa N.N.W.* $\frac{1}{2}$ W. The North point of *Namoa* seen clear of East point, leads north-eastward.

Glengyle Rock, lying one-third of a mile off the S.E. point of *Namoa*, breaks and lies with *Namoa East point* bearing N. $\frac{1}{2}$ E.; *Oeste Rock S.S.W.* $\frac{1}{2}$ W., and *Three Chimneys W.S.W.* Its position was ascertained by H.M.S. *Nassau* in 1875.

Half-Tide Reef, between *Dome Islet* and *Namoa*, lies rather more than a mile from the *Namoa* shore, S.E. by S. from *Three Chimney Bluff*. The channel between these rocks and *Namoa* is obstructed by fishing stakes.

Chelsieu Rock appear as large boulders, and bear East nearly $6\frac{1}{2}$ miles from the North point of *Namoa*.

Diogyu Reef, just awash at high water, is rather more than 3 miles N.W. by N. from *Chelsieu Rocks*. The reef is horse-shoe shaped, 120 yards long, and appears to form a natural dock. It has apparently deep water close to.

CHALLUM BAY is fronted by the North side of *Namoa*; and its entrance affords better shelter during the N.E. monsoon than *Nangaou Bay*, and it is also a good anchorage when the wind blows strong from East or E.S.E.

Chauan Bay entrance is 10 miles N.E. $\frac{1}{3}$ E. from the North point of *Namoa*, may be useful during the southerly monsoon. A vessel should not attempt to cross the bar at less than half tide, when at the deepest part she would have 12 to 14 ft. In the N.E. monsoon it runs far enough back to the N.E. to allow an awkward sea to arise, and a vessel should then endeavour to reach *Owick Bay*, 2 miles eastward of *Chauan Head*, which has a sandy bottom, and is protected to the eastward by a narrow isthmus, having two rocks off its South extreme. The bay should not be entered during the typhoon months, as the anchorage is unsafe during S.W. winds. Immediately eastward of this bay is a remarkable sand patch, which will help to point out its position.

Jokako Peak, 880 ft. above the sea, and conical shaped, is the highest part of the land at the back of *Owick Bay*. *Bell Island*, 3 miles eastward of

Owick Point, is perforated at its South end, which will be seen on a S.E. or N.W. bearing. There is an islet between it and Jokako Point, having a reef off its North end. *Jokako Point* is an isolated hill 640 ft. above the sea: off it are two islets; the nearest, *Cliff Islet*, bearing S.E. by E. one mile, and the other, *Square Islet*, E.N.E. $1\frac{3}{4}$ mile. Square Islet is perforated. A reef extends a cable N.N.W. from Cliff Islet. *Cone Peak*, elevated 800 ft. above the sea, with a peaked rock off its eastern point, bears N.N.E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles from Jokako Point.

The Brothers are two islets lying S.E. by E. about 12 miles from Cone Peak, and N.E. $\frac{2}{3}$ E. $28\frac{1}{2}$ miles from Lamock Light. They are 180 and 120 ft. in height, and $1\frac{1}{2}$ mile apart in a S.E. $\frac{1}{2}$ E. and N.W. $\frac{1}{2}$ W. direction. The south-eastern islet, the larger and higher of the two, has a fine bluff at its South extreme, and a reef extending north-westward from it; the smaller islet has a remarkable square top.

TONGSANG HARBOUR is one of the best on this coast, and its position will be readily recognised by *Fall Peak*, a remarkable peak, 930 ft. above the sea, which rises on its eastern shore and makes something like a saddle, but with a deeper indentation; upon the island at the entrance is a pagoda which bears from the S.E. Brother, N.W. by N. $14\frac{1}{4}$ miles. A mud bank, of $3\frac{3}{4}$ fathoms, lies outside the entrance, with the pagoda bearing N.W. $\frac{1}{2}$ N. and Fall Peak N.E. $\frac{2}{4}$ N.; but by keeping the Sisters, two islets in the northern portion of the harbour, well open of the East end of Middle Island (the island N.E. of Pagoda Island) a vessel will pass eastward of the bank.

Junks anchoring for the tide bring up between Pagoda and Middle Islands, but in running for this anchorage take care to avoid the rocks which extend south-eastward 2 cables from the East point of the northern portion of Pagoda Island. The walled town of Tongyung stands on a peninsula on the western shore of the entrance abreast Pagoda Island. The inhabitants of and about Thunder Head will bring off supplies of bullocks, poultry, fish, and vegetables.

Caution.—When running into Tongsang Harbour, sail should be reduced in time, if the wind is fresh outside, for violent squalls come down from Thunder Head. The coast on the eastern side of Thunder Head must not be approached within a cable.

Rees Rock, covered at high water springs, lies S.E. by E. $\frac{2}{4}$ E. rather more than half a mile from Fall Peak, with the chimneys on Chimney Island, forming the eastern side of Rees Pass, bearing N.E. by N.; a rock, on which the sea breaks at low water, lies a cable eastward of it.

Pass Islets bear N. $\frac{2}{4}$ E. $1\frac{1}{2}$ mile from Rees Rock, the ground between them being foul.

Rees Pass is between the Pass Islets and Rees Islands, and on its eastern side, W. by S. from the chimneys, and 3 cables from the shore of Chimney

Island, is a shoal of only two fathoms water. The Rees Islands are barren, and only inhabited by fishermen. H.M. brig *Plover* rode out a heavy gale veering from N.E. to E. by N., in this pass. *Simplicia Wreck Rocks* are 6 cables N.E. of South-East Island, a reef, which shows at low water, lying a cable N.E. of the outer rock.

Caution.—In the neighbourhood of the Rees Islands the sea rises rapidly after the commencement of a breeze, and overtops, leading to the supposition that there must be some change in the soundings.

Dansborg Island, lying 2 miles N.E. of *Simplicia Wreck*, has three peaks of nearly equal heights. *Skead Islet* is $1\frac{1}{3}$ mile W.N.W. of this island, and between them, at the distance of 4 cables from the islet, is another small islet with a reef extending from its West point; a reef also projects from the East point of *Skead Islet*. *Ching Rock*, which covers at high tide, lies 14 cables from *Skead Islet*. The eastern *Simplicia*, open East of *Skead Islet*, leads eastward of the reef.

Goo Rock covers at a quarter flood. It lies 2 miles S.W. by W. $\frac{1}{3}$ W. of the *Ching*. *Awoota Rock* is close to the main, N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from the *Chimneys*.

Black Head, or Hu-tau-shan, $5\frac{1}{2}$ miles northward of *Dansborg Island*, comprises five separate hills, the southern of which, **Black Head**, is most remarkable. On the northern hill is a walled town. There is good anchorage south-westward of **Black Head**, but not much shelter unless the wind be well to the northward. Should the wind draw round to the eastward, the sooner this anchorage is quitted the better. Refuge will then be found by running through *Rees Pass* and anchoring close under *Chimney Island*, or in *Tongsang Harbour*.

The Coast from **Black Head** to *Red Bay*, 10 miles to the N.E., with the exception of one hill and two hillocks, is a sandy plain. *Knob Rock*, 150 ft. high and steep-to, bears S.E. by E. $\frac{2}{3}$ E. $3\frac{1}{2}$ miles from *Spire Islet*.

Red Bay will be found a fair roadstead in the N.E. monsoon, and may be readily recognized by two high black rocks off its eastern point. At the head of the bay is a village on the right bank of a creek.

In navigating this portion of the coast during the N.E. monsoon, the wind will be found to hang to the northward from 2 to 10 a.m., and in the eastern quarter the remaining period. Deeply laden vessels will find it more advantageous to seek shelter in one of the harbours or roadsteads above mentioned during a strong N.E. wind, than to keep underway, as ground can seldom be gained in consequence of the depth of water.

Mount Edmond (lat. $24^{\circ} 7' N.$, long. $117^{\circ} 50' E.$, is about 1,500 ft. high, and from its isolated position is a conspicuous and useful landmark. About 6 miles to the S.W. of **Mount Edmond** there is another conspicuous mountain about 1,200 ft. high.

Cork Point to China-ha Point.—The coast line from **Cork Point**, the

N.E. point of Red Bay, takes a N.E. $\frac{1}{3}$ N. direction $18\frac{1}{2}$ miles to Chin-ha Point. Halfway between Cork and Chin-ha Points is House Hill Point, the southern extremity of a small islet connected with House Hill at low water. *House Hill* is low, with the ruin of a house on its summit, and bears N.W. by W. $\frac{1}{2}$ W. from Lamtia Island. There are two small inlets here; both have bars across the entrance, and are frequented by pirates. *Lamtia Island* bearing N.E., distant 9 miles from Cork Point, is of basaltic formation, and its southern side rises abruptly from the sea; a reef extends N.W. by N. half a mile from it. *Notch Island*, of similar formation, lies N. by W. 3 miles from Lamtia, and has a rocky spur extending S. by E. a quarter of a mile from it, and also one N.W. by W. $1\frac{1}{2}$ cables.

CHAPEL ISLAND, in lat. $24^{\circ} 10' 18''$ N., long. $118^{\circ} 13\frac{1}{2}'$ E., is 47 miles N.E. $\frac{2}{3}$ N., from the S.E. Brother, and $11\frac{1}{2}$ miles S.S.E. from the Chauchat Rocks at the entrance of Amoy. It is of basaltic formation, with steep sides and grassy top, and perforated at its southern end; there is also a remarkable mound on either end. With this island bearing South, and when about midway between it and the entrance to Amoy, Captain Ross, of the Indian Navy, passed over a sand-bank of 6 fathoms water, but no less could be found.

LIGHT.—A *fixed and flashing* white light, the flashes being shown *every half minute*, is exhibited on Chapel Island. It is elevated 527 ft above the level of high water, visible all round, and in clear weather should be seen from a distance of 22 miles. The illuminating apparatus is dioptric, of the first order. The tower, 63 ft. high, is round and painted black; the keeper's dwelling and wall are painted white.

Merope Shoals are between Chapel Island and the coast. *South Merope* has only 5 ft. on its shoalest part, at its southern end, from which Chapel Island bears N.E. by E. $\frac{1}{2}$ E. $7\frac{3}{4}$ miles, and Lamtia Island N.W. by W. 5 miles; thence it extends, with depths of 3 and 4 fathoms, nearly 5 miles to the N.E. *North Merope* is formed of pinnacle rocks, the highest of which dries 8 ft. at low water; these rocks have deep water between them, and bear W. by N. $8\frac{1}{4}$ miles from Chapel Island; the eastern edge bears N.E. from Lamtia Island.

Tingtae Bay, 4 miles northward of North Merope, affords shelter for small vessels in the N.E. monsoon. The pagoda of *Nantai Wushan*, 1,720 feet above the sea, stands on the hills immediately at the back of this bay. The coast here continues in a north-easterly direction 3 miles farther to Chin-ha Point, when it takes a sudden turn to the N.W., forming Amoy Harbour.

Erl King Shoal, reported by the master of the English steamship *Erl King*, 1869, of 3 fathoms water, lies S. by E. $2\frac{1}{4}$ miles from Chin-ha Point, with Chapel Island bearing S.E. $\frac{1}{2}$ E., and Lamtia Island, S.W. $\frac{1}{2}$ W.

CAUTION.—Vessels bound to Amoy from the southward and passing be-

tween the off-lying dangers and the coast should use the utmost caution.

Chin-ha-Point has a dangerous rocky patch above water, about a quarter of a mile in diameter, N.E. by E. $6\frac{1}{2}$ cables from it. Vessels should pass well outside the reef. Notch Island, or Table Head, just open of Chin-ha Point leads to the S.E., and the eastern extreme of Wu-seu Island bearing N. $\frac{1}{2}$ W. leads to the eastward of it.

Wu-seu Island, 330 ft. high, is on the western side of entrance to Amoy Outer Harbour, and on its summit are or used to be three chimneys (the usual pirate signal on the coast of China. Its N.E. and S.E. faces are steep cliffs. It will be prudent not to pass westward of Wu-seu, as the channels inside are only partially surveyed. A rock, which is sometimes covered, lies between Wu-seu and Chin-ha Point, with that point bearing S. $\frac{1}{4}$ W., and Nantai Wushan Pagoda W.N.W.

The *Chauchat* are three flat rocks nearly awash at high tide, lying about half a mile eastward of Wu-seu. A rocky 8-ft. patch lies $4\frac{1}{2}$ cables E. by S. $\frac{1}{4}$ S. from Chauchat, with the extremes of Wu-seu bearing from S.W. by W. $\frac{1}{4}$ W. to W.N.W., and the eastern extreme of Tae-tan N. $\frac{1}{4}$ E. A vessel should pass eastward of the rocks by keeping Tae-pan Point open northward of Tsing-seu N.W. by W. Chow-chow water is found westward of them.

The *Chin-tseao* are two rocks, the eastern of which is 60 feet high, and the other covered at high water, lying N.W. by N. half a mile from the North end of Wu-seu; between them and the main are several islets and half-tide rocks.

TSING-SEU is a table-topped island lying three-quarters of a mile N.W. of the Chin-tseao; it rises precipitously from the sea, and forts are built upon its summit, which is 250 ft. above high water.

A LIGHTHOUSE, 33 ft. high, octagonal in shape, and painted in red and white vertical stripes, is established on the northern slope of Tsing-seu Island. The buildings surrounding it are painted white. From the lighthouse a *fixed light* was first shown in December, 1875. It shows *red* to the southward, over Chauchat Rocks and Woosiu Island, between South and S.E. by E.; *white* over the entrance and up the harbour, between S.E. by E. and N.W. $\frac{1}{2}$ W.; and *red* to the northward over the Tae-pan Shoal, between N.W. $\frac{1}{2}$ W. and West. The light is elevated 130 ft., the bright light being visible 15 miles off, and the red light 8 miles.

This lighthouse stands on the western side of the entrance to Amoy Outer Harbour, Chih-seu Island standing on its eastern side. The channel westward of Tsing-seu is not safe.

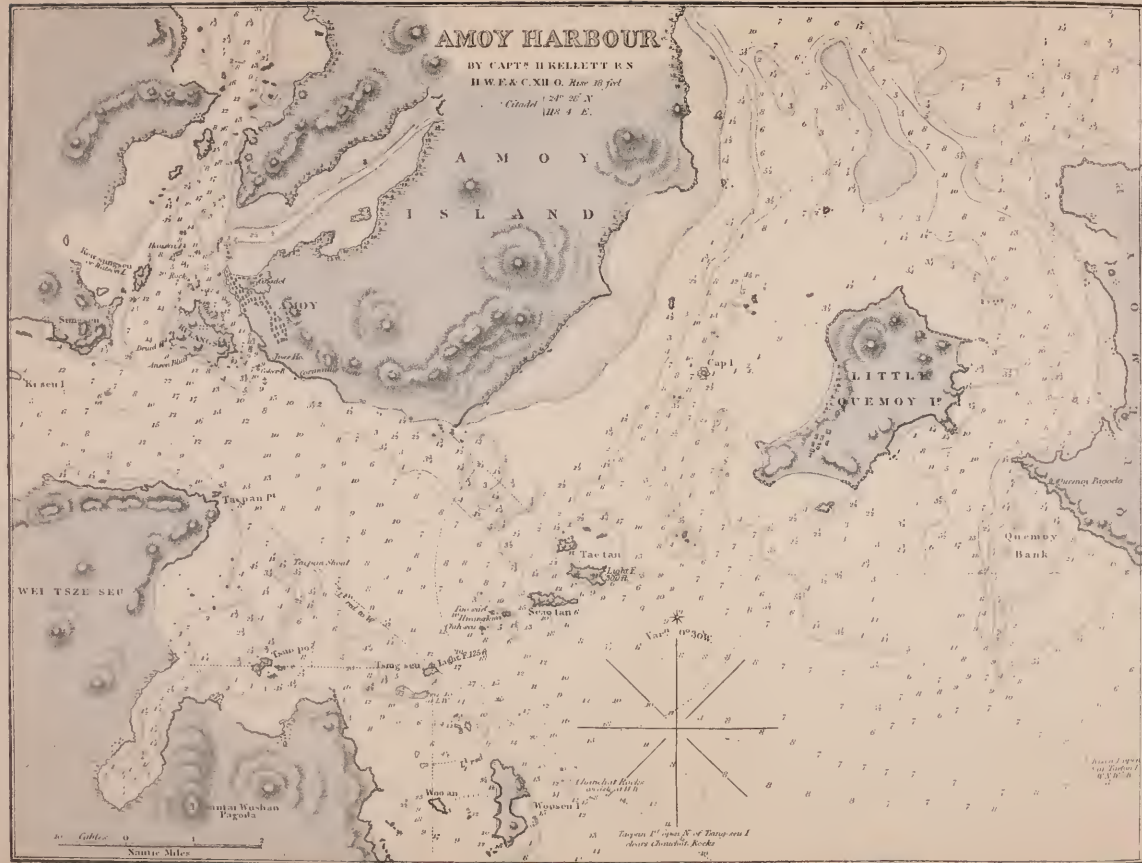
On the western side of Amoy Outer Harbour, between Tsing-seu and Tae-pan Point, is *Tae-pan Shoal*, which will be avoided when standing westward by keeping the pagoda on Ki-sue Island open N.E. of Tae-pan Point. To avoid the shoals on the N.E. side of the harbour, do not bring the East end of Seao-tan to the southward of S.E. by E.

AMOY HARBOUR

BY CAPT. H. BELLETT R.N.
H.W. & C. X.L.G. Row 10 feet
Chart 24 of 25
1864 E.

AMOY ISLAND

LITTLE QUEMOY I.



Scale: 0 1 2 Nautical Miles

Taywan I. 12° 15' N. of Taywan I. above Quemoi, Rocks

Scale of 1000 feet
1 inch = 1000 feet
1:1000

Chih-seu is a small islet 60 ft. high, lying N.E. $\frac{1}{3}$ E. 8 cables from Tsing-seu. This islet is connected to two other small islets, Hwangkwa and Tao-sao by a rocky bed which blocks the passage.

Seao-tan is an island $6\frac{1}{2}$ cables long, East and West, 200 ft. high, with three chimneys on it, and a sandy bay on its northern side. It lies E.N.E. of Hwangkwa, and the channel between, 3 cables wide, is frequently used. On Seao-tan is a *Signal Station*, which communicates with Amoy.

Tae-tan Island and Light.—Tae-tan, the highest island of this group, and lying N.E. of Seao-tan, is about 8 cables long, N.N.W. and S.S.E., with a low sandy isthmus in the centre; the highest part is at its East end. The channel between this island and Seao-tan is 2 cables wide, but as vessels are likely to have baffling winds, it would not be prudent for a stranger to use it.

There is a white, octagonal lighthouse, 16 ft. high and about 300 ft. above the sea, on Tae-tan Island, fitted with Argand lamps, and exhibiting a *fixed* light, seen 10 miles off in clear weather, but the light cannot be depended on. The light is shown to the northward between West and S.E.

It is said that since the survey of this locality in 1843, the soundings on the bank westward of Tae-tan have much decreased, and that a vessel drawing more than 12 ft. must wait for water to run through this channel.

AMOY HARBOUR.—Amoy Island, about 22 miles in circumference, occupies the northern portion of the great bight between Chin-ha and Hu-i-tau Points; in the eastern portion is the island of Quemoy and Hu-i-tau Bay. The City of Amoy stands on the S.W. part of the island, abreast the Island of Kulangseu, which affords protection to the inner harbour.

Amoy was captured by the British forces on August 26th, 1841, and by the treaty of Nanking, which followed, was thrown open to foreign trade. The harbour is one of the best and most easy of access on the Coast of China, so that the services of a pilot, either in entering or departing, are scarcely necessary. There is good holding ground in the outer harbour, and vessels can anchor in the inner harbour, within a short distance of the beach, in perfect security.

The Chinese City occupies the south-western corner of the island of Amoy, near the mouth of the Lung-kiang, which leads westerly to Chang-chau-fu. The population is estimated to exceed 200,000, and, unlike the turbulent Cantonese, is quiet and inoffensive. There is a seamen's hospital on this side, at which the charges are $1\frac{1}{2}$ dollar a day for seamen, and 3 dollars for officers.

The British Consul and staff, together with the medical officer and chaplain attached to the Consulate, reside on Kulang-seu, the chief consular building being situated on a cliff commanding an extensive view seaward and of the harbour, while the Vice-Consulate is built at its foot.

The docking accommodation is very good, and ably managed by the Amoy Dock Company. There are three docks. The chief establishment is situated on the Amoy side, nearly abreast Dock Islet. There is also a wharf, with 18 feet water alongside at springs, fitted with masting shears. The dock, which is capable of taking a vessel 300 ft. long, is 316 ft. in length at coping, and 304 ft. on floor; depth from coping to sill, 20 ft.; length of caisson on deck, 64 ft.; on floor, 54 ft.; width of dock at entrance gate, 60 ft.; on floor, 34 feet; there are 18½ ft. water at entrance at springs, and the rise and fall is 17 to 18 ft. The second dock is on the Kulangseu side, near the Lintau landing place; it is 240 ft. in length. The third and smallest, called the Bellamy Dock, is near the entrance of the inner harbour, abreast the Brown Rock; it is 186 ft. long.

A *sunken rock*, on which there are only 6 ft. at low water, lies N.W. $\frac{3}{4}$ N., 1½ cable* from the entrance of Amoy Dock.

The *Harbour* lies between Kulangseu Island and the S.W. shore of Amoy Island, and is from 2 to 3½ cables in breadth, and 1½ mile in length. *Kulangseu*, 302 ft. high, when viewed from the entrance of the outer harbour, appears as one huge boulder. The British Consulate, standing on its S.E. part, is very conspicuous. Over the consulate is the *Signal Station*.

Buoys.—*Coker Rock*, the outer danger at the entrance of the eastern channel into Amoy inner harbour, has 2 ft. water on it, and is marked by a *red* and *white vertical** striped buoy, from which Cornwallis Stone bears E. by S. $\frac{3}{4}$ S., and is distant a little more than half a mile; the West extreme of Thumb Rock is just touching the white staff on the point North of it, N.W. $\frac{1}{2}$ N., and this high water rock (6 ft. high) off Beveridge Point is just open South of two small rocks of the same height lying off the English Consulate, nearly West. *Coker Rock* lies in mid-channel.

Brown or *Ashme Rock*, of 13 ft., is marked by a buoy in *red* and *white horizontal* stripes, from which *Coker Rock* bears S. by E. $\frac{2}{3}$ E. one-third of a mile, and the South extreme of the easternmost house on Kulangseu is just on with the top of Thumb Rock W. by S., which latter is distant 1½ cable.

Harbour Rock lies in the anchorage, having only 9 ft. water at low tides, and 6 and 7 fathoms between it and the shore; from the rock the apex of Dock Island bears N.E. $\frac{1}{4}$ N., distant 1½ cable, and Monkey Island Pagoda, N.W. $\frac{1}{4}$ W., 7¼ cables. There is a buoy 36 ft East of this rock.

Kellett Spit is the extreme North of the foul ground extending in a northerly direction from the North point of Kulangseu. A *red* buoy is placed in 5 fathoms on its extreme end. It has been the scene of many accidents.

* In the Chinese official list, corrected to August, 1874, it is stated that there is a large iron buoy about 60 fathoms from the *Coker Rock*, and a small iron buoy 30 ft. S.W. of the pinnacle of the rock, but how coloured is not mentioned.

Anchorage.—The outer harbour of Amoy has extensive anchorage in 7 to 16 fathoms, good holding ground, and unless vessels are badly found it is not probable that any gale could hurt them. The usual anchorage is westward of Cornwallis Stone; a good berth is in about 6 fathoms, muddy bottom, with Cornwallis Stone bearing East, and Thumb Rock N.W. $\frac{1}{2}$ N. This is almost as near the town as a vessel can approach without the necessity of mooring. Moorings are laid down for H.M. gunboats.

There is also good and safe anchorage in 7 to 17 fathoms in the channel on the West side of Kulangseu.

Typhoons are scarcely known, but when experienced along the coast, Amoy is visited by heavy north-easterly gales, with hot winds, veering round East and South. Vessels then in the neighbourhood generally run for Amoy Harbour to repair damages.

Tides.—It is high water, full and change, in Amoy Inner Harbour, at 12^h 0^m, ordinary springs rise 18 $\frac{1}{2}$ ft., neaps 14 $\frac{1}{2}$ ft. During the N.E. monsoon the evening fall is only 15 ft., the previous rise having been 19 ft. This occurs from September till March, when for a short time the morning rise and evening fall may be said to be equal. During the S.W. monsoon this phenomenon is reversed, the evening tide having the greatest fall, the morning the least. The greatest velocity at springs is 4 knots.

Owing to a greater rise of tide from August till December than the other months of the year, a vessel may be taken into Amoy Dock, drawing 18 $\frac{1}{2}$ ft. In April there are only 16 ft. on the blocks, which is the lowest during the year. It gradually falls to this level from December, and again increases to the month of August.

DIRECTIONS.—When bound to Amoy from the southward, after rounding the Lamock Islands and the Brothers, steer about N.E. by N. for Chapel Island, keeping between 10 and 12 miles off the coast to avoid South Merope Shoal. The Nantai Wushan pagoda is a good landmark by which the entrance of Amoy may be recognised when in the neighbourhood of Chapel Island, which may be passed close-to on either side, thence a N. by W. $\frac{1}{2}$ W. course will lead towards the entrance of the harbour. As the 8-foot patch off the Chauchat Rocks is approached, keep Tae-pan Point well open North of Tsing-seu to pass eastward of it; thence steer between Tsing-seu and Chih-seu into Amoy outer harbour.

Approaching the harbour from the eastward, give Dodd Island a berth of a mile, and after passing Leeo-lu Head, which is steep-to, be careful not to shut in the island with the head until Ki-seu Island opens South of Tae-tan Island, W. by N. $\frac{3}{4}$ N., to clear Quemoy Spit. Thence steer for Tsing-seu, keeping Tae-tan Point well open North of Tsing-seu as before.

The entrance to Amoy in clear weather is easily distinguished by the high land on the South side, on the summit of which is the Nan-tai Pagoda, an excellent land-mark, but often covered with clouds, especially in the S.W.

monsoon. After Chapel Island is made the six islands forming the outer harbour soon come in sight.

The channel into the inner harbour, between Kulangseu and Amoy, is so narrow, and sunken rocks lie off both its shores, that a stranger should not attempt it without a pilot. The best anchorage is between Dock Islet off the city point and Hauseu Island. The inner harbour, however, may be reached without difficulty by passing through the channel westward of Kulangseu, taking care to give Druid Head, the S.W. point of the island, a berth of at least 1 cable's length, and recollecting that shoal water extends half a mile from the main land on the opposite shore. After passing Druid Head, keep well over towards Watson and Hauseu Islands, and in crossing over to the eastward for the city beware of Kellett Spit, extending from the North point of Kulangseu, especially if the ebb tide is running strong.

Pilots (Chinese) are generally to be met with inside Chapel Island who are licensed to pilot vessels (1869) as far as Cornwallis Stone, the limit of the inner harbour, whence European pilots take charge. Their boats may be recognized by their carrying a flag, and having "Licensed Pilot" painted on the bows.

Entering the harbour.—It is always advisable to enter the eastern or Blonde Channel into Amoy Harbour on the ebb. In entering, steer for Cornwallis Stone, and after passing it keep the Amoy shore aboard on the ebb and during the N.E. monsoon. The Coker and Brown Rock buoys watch well; leave them at half a cable on the port hand. The South Chalk Island just open northward of Hauseu Island, N.W. $\frac{3}{4}$ N., clears the Alibi Rock, the Isère Rocks, and all the dangers on the East side of Kulangseu.

The wider channel on the West side of Kulangseu may be used without difficulty, but a vessel of large draught in entering should keep Druid Head a little eastward of North to avoid a 3-fathom spit, which extends off Anson Bluff, on the eastern side of the channel. Cass Spit, extending from the S.E. point of Sung-seu Island, has only 8 ft. at low water on its extreme, which is one-third of a mile from the point; to clear it, do not shut in the white tower, which is on the low wooded point West of the Chalk Islands, with the N.E. point of Sung-seu, N. by W.

In working through this channel, standing westward towards Cass Spit, keep the white tower open of the N.E. point of Sung-seu. Standing eastward, Druid Head and the small joss house may be approached to three-quarters of a cable. If obliged to tack between the small joss house and Modeste Point, keep Druid Head well in sight. Kiu-sung-seu is fringed with low water rocks, and may be approached to about a cable. In making the eastern board towards the Isère Rocks, tack when the small joss house is midway between First Rock and Modeste Point. When northward of the buoy on Kellett Spit, or when the cathedral cross is in line with Dock Islet,

steer to the eastward for the anchorage off the city, keeping the South Chalk Island open North of Hauseu to clear the Isère Rocks.

On entering Amoy, if foggy, after passing between Tsing-seu and Chih-seu and unable to see Kulangseu, care should be taken to ascertain the direction of the tide as it runs here very strong, and vessels are often so drifted out of their course as to be compelled to anchor. As a rule, the ebb tide for the first three hours will be found setting strongest through the narrow channel North of Kulangseu and obliquely across the outer harbour, about S.E. ; and the last of the tide, making stronger through the broad channel South of Kulangseu, will generally be found setting more easterly and directly through the fairway.

In working out with the ebb tide it is not advisable to stand in close to Tsing-seu or Chih-seu on account of the eddies and chow-chow water ; the tides at springs run very swiftly between the islands and set obliquely, N.E. and S.W., across the outer harbour. A sailing vessel beating out of Amoy on the ebb should be careful not to be becalmed under Tsing-seu, as the tide runs strong towards it.

Vessels of large draught should pass northward of Kellett Spit buoy, as immediately inside it are only 18 ft. at low water. Many vessels have passed over the Isère Rocks with impunity, owing to the great rise of tide, but some in doing so have been greatly injured, and in the case of the *Isère* a total shipwreck was the consequence.

The formation of the bottom in Amoy Harbour appears as irregular as the sudden and abrupt falls on Kulangseu. The residents are of opinion that the patches are mushroom shaped, and consequently when cables wind round them they are irrecoverable.

When there is much shipping in the inner harbour, the easiest way often to get out is to go round to the westward of Kulangseu.

The channel around Amoy Island is so narrow and winding that directions would be useless ; the chart is the best guide. The Bay of Sungseu, on the North side of which the city of that name is built, runs back 7 miles to the westward from Kulangseu ; it is, however, shoal, and only navigable for small craft.

Coal is supplied from Hong Kong for H.M. ships, and stored, and is put on board by contractors at any hour of the day or night, weather permitting. Fresh beef, vegetables, and water are readily procured.

QUEMOY ISLAND is separated from Amoy by a channel 5 to 7 miles wide, in the middle of which is Little Quemoy Island. Between Tae-tan Island and Little Quemoy the channel is deep, but narrowed by reefs.

The channel between Little Quemoy and Quemoy is half a mile wide. To enter, bring the N.E. point of Little Quemoy on a N. $\frac{1}{2}$ E. bearing, and steer for it until the pagoda on Quemoy bears East, then haul to N.E. by N. for

a mile, and anchor in about 9 fathoms secure from all winds. Vessels drawing less than 15 ft. may borrow over on the Little Quemoy shore.

Quemoy Bank extends 3 miles southward from the West point of Quemoy. It is steep-to, and the lead will give no warning. *Leeo-lu Bay*, on the South coast of Quemoy Island, is said to afford good shelter from N.W., round northward, to East, but the tides are uncertain, and several dangers exist near the shores.

Hu-i-tau Bay, formed between the eastern side of Quemoy and the mainland, affords good shelter in the N.E. monsoon. Hu-i-tau Point, the eastern point of entrance, is 80 ft. high, and at $1\frac{1}{4}$ mile south-eastward of it is a sunken rock, on which $2\frac{3}{4}$ fathoms were found.

Vessels requiring shelter during the N.E. monsoon in this bay, will find good anchorage on its eastern side between Oyster Islet and Oyster Rock, taking care to avoid the latter, which only shows at low water springs. There is also anchorage westward of Oyster Islet in 5 fathoms, but the islet should not be brought to the southward of East, as a rocky ledge of only 6 feet water lies 6 cables W.N.W. of the islet.

Vessels seeking shelter in a southerly wind can run up the bay to the northward of White Rocks and Thalia Bank, and find anchorage in $5\frac{1}{2}$ fathoms at half a mile N.E. of Flak Islands. To avoid the northern edge of Thalia Bank, do not bring Flak Island to the northward of W. by N. $\frac{3}{4}$ N.; and by keeping Oyster Islet open northward of the fort, the bank will be avoided which extends from the North side of the bay.

The channel between Thalia Bank and Quemoy is foul with several reefs, and should not be attempted without some previous knowledge. To clear the South end of Thalia Bank, keep the chimney on the North end of Quemoy on a W. by N. $\frac{3}{4}$ N. bearing until White Rock bears North, then steer N.W. until the rock is N.E. by E., when shape a course to pass half a mile from the points of the bays on the Quemoy shore.

The channel North of Quemoy having 8 ft. in it at low water, might be used at high tide; but no vessels should attempt it without a pilot.

CHIMMO BAY is between Chimmo Point on the South, and Yungning Point on the North. The former of these points lies $8\frac{1}{2}$ miles N.E. of Hu-i-tau Head. This bay can only be termed a roadstead, and is dangerous in the southerly monsoon. *Yungning Islet* is steep-to, but the reef lying W. $\frac{3}{4}$ S. 3 cables from it, covers at high water. Within the bay the depths shoal gradually, but vessels drawing 15 ft. and upwards must not bring Yungning Islet to the southward of E. $\frac{3}{4}$ S. It is high water, full and change, in Chimmo Bay, at 10^h 20^m; springs rise 16 ft. The tide sets with considerable strength along the coast, between Hu-i-tau and Chimmo Bays; but both the period and the rate vary considerably with the monsoon. The state of the tide will be known by the numerous fishing nets moored off the coast.

CHIN-CHU HARBOUR.—The coast from Chimmo Bay trends N.E. by N. 8 miles to Chungchi Point, the southern point of entrance to Chin-chu Harbour. At $1\frac{1}{2}$ mile southward of Chungchi Point is *Bell Islet*, with a building on it something like a bell.

Pilots.—Chin-chu Harbour is the only place where pilots can be got for Hai-tan Strait or Hungwha Sound, and it is advisable that all vessels bound there should take one, as the navigation is very intricate.

Kusan Pagoda, 760 ft. above the sea, on the North side of Chimmo Bay, is an excellent mark for recognizing the locality of Chin-chu Harbour when approaching it from the southward. From a position about $1\frac{3}{4}$ mile eastward of Chungchi Point, steer North until Choho Pagoda opens northward of Seatoi Island, bearing W. $\frac{3}{4}$ S., when the pagoda should be steered for on that bearing, and it will lead along the northern edge of Seatoi Bank. The ship *Omega*, drawing 11 ft., struck on a bank $1\frac{1}{2}$ mile eastward of Seatoi, but not less than $2\frac{1}{2}$ fathoms were found upon the Seatoi Bank in March, 1844; the southerly monsoon may, however, cause the sand to accumulate at times.

If running for the harbour from the northward, and intending to anchor southward of the Boot Sand, after passing about three quarters of a mile South of Passage Island, steer in with Choho Pagoda W. $\frac{3}{4}$ S. until the peak on Tatoi Island bears N. by W. $\frac{1}{2}$ W., and the eastern end of Seatoi Island S.S.W. $\frac{1}{2}$ W., then haul to the southward, and pass a cable eastward of the East point of Seatoi. Round the South side of Seatoi at half a cable, and when its western summit is on with the highest part of Tatoi, the vessel will be in the narrowest part of the channel, which is here barely a cable across.

Having passed Seatoi, a W.N.W. course will lead to the anchorage above Pisai Island in mid-channel. By keeping this island westward of W. by N. $\frac{1}{2}$ N., the reef off Choho Pagoda will be avoided; and the southern edge of the Boot will be cleared by not bringing Seatoi to the southward of E. by S. $\frac{3}{4}$ S.; the outline of this bank, however, is generally visible. The opium vessels run in between the Lynx and Taheen Rocks, with the South extremes of Seatoi Island and Ota Rock in line with the North extreme of Pisai. The anchorage is North about $1\frac{1}{2}$ or 2 miles from Pisui, where the channel is 3 cables wide.

If wishing to anchor on the North side of the Boot, steer to pass northward of Tatoi Island, and if drawing less than 15 ft. a vessel may run up until Choho Pagoda bears S. by W. $\frac{1}{2}$ W., where she will have smooth water in any weather, as the Boot forms an excellent breakwater. The North edge of the Boot will be avoided by keeping the White Rocks southward of East. A sunken rock lies $1\frac{1}{2}$ cable from the northern shore, and N. by W. $\frac{1}{2}$ W. from the summit of Tatoi. There is good anchorage in N.E. or northerly

gales in $3\frac{1}{2}$ and 4 fathoms, with the summit of Tatoi S.E. by S. ; but in a S.W. gale the former anchorage is to be preferred. The Boot may be crossed by a vessel of light draught at high tide, but it should be sounded first, as the sands are liable to shift.

The entrance of the small river, leading to the town of Chin-chu, is 3 miles W. by N. $\frac{3}{4}$ N. from Pisai Island. On the left bank near the entrance is a circular fort, 4 or 5 miles above which is the town standing on the North bank of the river. The channels to it are shoal and intricate, and the large junks have to wait in the neighbourhood of Pisai for tide before they can cross the flats, which are covered with artificial oyster beds.

Tong-bu Bay.—About 10 miles N.E. by E. of Chung-chi Point is the town of Tong-bu, south-westward of which is a large open bay or roadstead, affording anchorage in 7 to 4 fathoms, with good shelter in the N.E. monsoon ; it cannot, however, be recommended, on account of the exceedingly rocky character of the coast.

Juno Rock is a cluster of rocky heads covered with coral, with 12 ft. at low water, and $5\frac{1}{2}$ to 6 fathoms around, from which the West corner of Tong-bu wall bears N.E. $1\frac{3}{4}$ mile.

Pyramid Point, at 3 miles eastward of Tong-bu, appears a bold, black face of land ; to the S.E. of it is a rock which never covers. To the eastward of the Pyramid are several reefs, from the outermost of which the Pyramid bears S.W. by W. $\frac{3}{4}$ W. 6 cables.

Port Matheson, called by the Chinese *Gulai*, is the next inlet to the N.E. of Chin-chu. It is only a roadstead, and that a bad one in the southerly monsoon. There are no dangers in it except a rock lying North 4 cables from the largest islet on the southern shore.

Meichen Sound, the next inlet North of Port Matheson, is 6 miles across at the entrance, which may be recognized by the *Ninepin Rock* lying nearly in the middle of it. A reef extends South from the Ninepin, and at the distance of a mile in that direction is *Square Rock*, one of a cluster of rocks, which does not cover at high tide ; thence the reef extends south-westward $1\frac{1}{2}$ cable, and its outer part dries at low water. A large spar is moored about $1\frac{1}{2}$ mile S.W. of square Rock.

East, 6 cables from the Ninepin, is a flat patch of rocks awash at high water, and between this patch and Rogues Point is good anchorage in the N.E. monsoon. In the southerly monsoon vessels will find a good harbour to the N.W. of Saddle Island, which bears N.W. by N. $3\frac{1}{4}$ miles from the Ninepin.

It is high water, full and change, in Meichen Sound, at 0^h 30^m ; springs rise 17 ft.

Sorrel Rock, bearing E. by N. $3\frac{3}{4}$ miles from Rogues Point, is 60 ft. high, and has a detached rock three-quarters of a cable South of it.

Pinghai Bay, the next inlet N.E. of Meichen Sound, is $6\frac{1}{2}$ miles wide at

entrance, between the Rowan Islands on the West and Ping Point on the East, and shoals gradually from 5 to 3 fathoms. *Ping Rock*, 90 feet high and conical shaped, lies 4 cables southward of the latter point; there is a sunken rock S.W. by W. a quarter of a mile from it. The anchorage in this bay is in 3 fathoms, off the town of Pinghai, with the Ping Rock bearing S.E. by E.

Loutz Rock is about $5\frac{1}{4}$ miles E.S.E. from Ping Rock, and between them, $1\frac{3}{4}$ mile from Loutz, are two sunken rocks, named *Loutz Shoal*, from which the Ping is in line with Marlin Spike Peak N.W. by W. $\frac{1}{4}$ W.; and the islet lying N.E. of the Loutz in one with the South Yit, E. $\frac{3}{4}$ N. N.N.W. 2 cables from the above islet is a half-tide rock, and another S. $\frac{3}{4}$ W. 8 cables from the islet and East from the highest part of the Loutz.

The **OCKSEU** or **WOKEU GROUP** consists of two islands, with a barren rock in the centre joining the eastern island. The north-western island, the largest, is 260 ft. above the sea, round-topped, with smooth sides, and bears from the Sorrel Rock E. by S. $\frac{1}{4}$ S. $15\frac{1}{2}$ miles, and from the South Yit S. by W. $\frac{1}{2}$ W. $10\frac{1}{2}$ miles. A strong tide ripple, or reef, appeared to break about $1\frac{1}{2}$ mile W.N.W. of the western Ockseu Island.

LIGHTHOUSE.—On the high or West Ockseu Island stands a round stone tower 64 ft. high, painted black. The surrounding buildings are painted white. The light, first exhibited in December, 1875, is a *bright revolving light*, showing a flash every minute. It is elevated 286 ft. above the sea, and through a clear atmosphere is visible 24 miles off.

LAM-YIT ISLAND, the southern and largest of the archipelago, called the Eighteen Yits, fronts the deep and extensive inlet, Hungwha Sound. Off the South point of the island is *South Yit Islet*, to the N.W. of which will be found a snug and excellent anchorage, in 7 to 10 fathoms, in the N.E. monsoon. N.W., 2 miles from the South Yit, is a flat rock, always above water; and S. by E. 4 cables from this rock, is a reef awash at low tide.

Lam-yit Channel is on the West side of Lam-yit Island. A sand-bank extends $2\frac{1}{4}$ miles in a southerly direction from the West point of Lam-yit from its South end, the South Yit bore E. $\frac{3}{4}$ S.; its western edge will be avoided by keeping Lam Point (the West point of the island, which will be known by its three chimneys) to the eastward of North. On the western side of the channel there is also a rocky patch of $1\frac{3}{4}$ fathom, the eastern edge of which bears S. by W. 2 miles from *Clam Islet*, the largest islet between Lam-yit and the main.

Anchorage.—The *Plover* rode out a strong N.E. gale between Lam Point and Clam Islet; but better shelter will be found southward of Lam Point, where the junks anchor. For vessels of large draught there is anchorage in 4 or 5 fathoms, at $1\frac{1}{2}$ mile northward of the point.

HUNGWHA SOUND.—Besides Lam-yit Island, there are many islands and rocks within Hungwha Sound, bordering its shores, the principal ones

being near the entrance points. The only passages that must be used to enter it are, the Lam-yit and Hungwaha Channels, and Hai-tan Strait.

Pilots can be obtained at Chin-chu. Hungwaha River flows into the western part of Hungwaha Sound.

Hungwaha Channel.—The *Eighteen Yits* are a scattered group of islands lying N.E. and eastward of Lamyit Island, and extending over a space of 10 miles. On no account ought vessels to stand in among the Yits, as the ground is very uneven.

Cliff Island lies $1\frac{1}{2}$ mile northward of the North extreme of Lam-yit. From this dangers extend for nearly $1\frac{1}{2}$ mile to the N.E. by E. At 2 miles E.N.E. of Cliff Island is *North Yit Rock*, surrounded by dangers, and lying a mile northward of the N.W. point of *Red Yit*, the largest of the Eighteen Yits. The best channel into Hungwaha Sound will be found by passing northward of the North Yit and Cliff Island, and southward of the *Passage Islands*, which lie 2 miles northward of Cliff Island. *Henry Rocks*, $2\frac{1}{2}$ miles eastward of the North Yit, and S.S.W. $1\frac{1}{2}$ mile from White Island, are a dangerous cluster of sunken rocks, lying W. by N. and E. by S. 1 mile in length. *Kerr Island* lies N.E. by E. $2\frac{1}{2}$ miles from White Islet, and has numerous dangers lying South and S.E. of it. With White Island bearing W. by N., however, all these dangers will be cleared.

Hungwaha Channel leads out to seaward North of the Eighteen Yits, and the northern side of which is bounded by the island and reefs off Vangan Point.

Entering Hungwaha Channel from the eastward, pass (taking care to avoid the Sedan and Comet Rocks) between Double Yit and Sentry Island, and westward of Sand Island and the rocky islets on its N.W. face, off which there is anchorage, should daylight or the tide fail; but the best shelter is off Station Island, to the North of Chim Island.

On no account whatever pass between Sand, Sentry, Reef, and Chim Islands, as this locality has not been sufficiently examined, and beware of the reefs eastward and southward of Reef Island. Some of these have been accurately placed. The *Comet Rock*, with 9 ft. water, lies $1\frac{3}{4}$ mile S. by W. $\frac{3}{4}$ W. from the summit of Reef Island. *Breaker Rock* lies $1\frac{1}{4}$ mile South of the same. *Sedan Rock*, the outermost yet discovered, is of small extent, with 8 feet water over it, steep-to, having 11 to 13 fathoms close around. From its shoalest part, Red Yit Island summit is just open northward of the North extreme of Double Yit Island, bearing W. $\frac{1}{2}$ N.; and Chim Island summit is in line with the eastern extreme of the reef lying 3 cables westward of Bent Island, bearing N. by W. $\frac{1}{2}$ W.

HAI-TAN ISLAND.—This large and irregular shaped island, lying between the parallels of $25^{\circ} 24'$ and $25^{\circ} 40'$ N., is separated from the mainland by the fine navigable strait bearing the same name. Its northern part is high, the peak of Kiangshan Hills rising 1,420 ft. above the level of the sea,

whilst the eastern and western shores are low, and indented by deep sandy bays. Numerous small islands and rocks occupy Hai-tan Strait, between the island and the coast, and although it is not to be recommended to sailing vessels except with a commanding breeze, being very intricate, yet the coasting steamers and junks invariably use it; one of the latter was found lying there, having being detained 27 days waiting for an opportunity to get out at the northern end.

There is very good anchorage under Hai Head, the S.E. point of Hai-tan Island, in the N.E. monsoon. It is reported free of rocks. H.M. gun-boat *Dwarf* in 1872 anchored in $3\frac{1}{2}$ fathoms, with the outer point S.E. by E., and the easternmost village on the bay N.N.E. This anchorage is frequented by junks.

To enter the South end of Hai-tan Strait, after passing Junk Sail, steer North for Low Islet until the East end of Junk Sail and the West end of Station Island are in line, keeping them so until Pass Island bears South; but be careful to shut the points in somewhat at the moment of passing the Ashuelot Rocks,* or when Low Island will be coming on an East bearing. Then steer N. $\frac{1}{2}$ W. or N.N.W. as may be desirable to pass East or West of Flag Island.

Since the date of Kellett's and Collinson's Survey in 1843, the channels North of Flag Island have materially altered, the old channel on the East having decreased in depth of 17 ft. at its northern part, and a new channel, the Wilson, on the western side of the strait, has 22 ft. at low water springs. Between the two a middle ground 3 miles in length has grown up with only 4 to 6 feet water over it. The banks are generally discoloured, and their edges show, but not invariably. In thick weather, especially when coming from the northward, the Wilson channel, is preferable.

The Cow's Horn, a remarkable peak on the main to the northward of the strait, kept in line with the summit of Slut Island N. $\frac{1}{2}$ W., leads clear of all dangers to within a mile of the northern entrance.

The best channel out of Hai-tan Strait is eastward of Slut, between Slut and Shingan Islands. The course is N.E. $\frac{3}{4}$ N. Reefs extend from both shores, narrowing the channel to 4 cables. Between Slut and Shingan there are often strong tide rips and overfalls, which render the steerage very difficult. For *Pilots*, see page 1025.

Tessara Islands are a group of four islets lying N.N.E. 6 miles from Slut Island. There is nothing here sufficiently extensive to shelter a vessel in N.E. monsoon, and it cannot be considered safe for large vessels to pass by any of the channels inside Tessara Islands.

Red Rock is a small islet with reefs about it, lying S.E. by S. 3 miles from

* Station Island kept open of the point inside Junk Sail Rock, leads through the channel westward of Ashuelot Rocks.

Tessara Islands. Vessels should not close the Hai-tan shore to the eastward of this rock.

Norton Rock, about 50 ft. high, with a rock awash half a mile westward of it, lies East $6\frac{1}{2}$ miles from Tessara Islands.

TURNABOUT ISLAND, lying E.S.E. about 4 miles from Hae Head, in lat $25^{\circ} 26' N.$, long. $119^{\circ} 58' 42'' E.$, has two small islets off it, and *Sunda Rock*, dry 3 ft. at low water spring tides, bears North from its northern extremity, distant $3\frac{1}{2}$ cables, with foul ground inside.

Also a rock, awash at low water spring tides, lies South of the South point of Turnabout Island, distant $1\frac{1}{2}$ cable.

Vessels should not approach Turnabout Island within three-quarters of a mile. The lighthouse keepers report that several steam vessels have been hazarded, by rounding the South point of the island too closely.

A LIGHTHOUSE, 54 ft. in height, black, surrounded by white dwellings, is built on the summit of Turnabout Island, from which is shown a *fixed bright light*, visible all round. It is elevated 256 ft. above the sea, and should be seen, in clear weather, a distance of 23 miles.

WHITE DOG ISLANDS, called by the Chinese *Pih-keun*, are 22 miles N.N.E. $\frac{1}{4}$ E. from the peak of the Kiangshan Hills on Hai-tan Island, and $8\frac{1}{2}$ miles S.E. of the entrance of the River Min. They consist of two large and one smaller islet, named Middle Dog, South Dog, and Tong-sha Island. *Tong-sha*, the western and largest of the group, has a reef of rocks running off its West extreme, terminated by a square islet called the Breakwater. The highest part of the island is flat-topped, and 590 ft. above the sea

Rocks and reefs extend both northerly and westerly from the Middle Dog, but the outer ones always show; a rock on which the sea generally breaks, lies N.E. by E. $\frac{1}{2}$ E. 11 cables from its N.E. point. The channel between Middle Dog and Tong-sha is safe. The islands are inhabited by a few fishermen, and were, at the time of the survey, occasionally visited by pirates.

A LIGHTHOUSE, white in colour, and 35 ft. high, is erected on the N.E. end of Middle Dog Island. It shows a *fixed bright light*, varied by a *bright flash every half minute*, visible all round, except to the westward, where it is intercepted by the higher ridges of the White Dogs. It is obscured by Tong-sha when bearing between E. by S. $\frac{3}{4}$ S. and East; by the northern hill of Middle Dog when between E. $\frac{3}{4}$ N. and N.E. by E. $\frac{1}{2}$ E; and by the southern hill of the same when between N.E. by E. and N.E. $\frac{1}{2}$ N. It is elevated 257 ft. above the sea, and in clear weather should be seen from a distance of 23 miles.

Anchorage in the N.E. monsoon, for vessels of any draught, will be found under Tong-sha Island. Small vessels will be well sheltered in 18 ft., close under the Breakwater, and here whole fleets of Chinese junks remain during foul weather. As the water decreases gradually towards Tong-sha, large

vessels may approach as convenient, bearing in mind that the rise and fall is 18 ft. H.M.S. *Cornwallis* anchored here for five days, with strong north-easterly winds, and rode easy, with the Breakwater bearing N. $\frac{1}{2}$ W., the village N.N.E., and the Middle Dog E. $\frac{1}{2}$ S.

The Passage from Lam-yit to White Dog Islands may be considered as the most difficult portion of the coast that a vessel has to contend with in the N E. monsoon, and it is believed there are few men who know the coast of China but will allow that Turnabout Island is well named. The attempt of the flood to force its way through Hai-tan Strait forces the water back, and occasions a strong current off Kwing Bay, at the N.E. end of Hai-tan. It is a great misfortune that this bay does not afford shelter, as it would prove an uncommonly good halfway house ; it is, however, one of the worst places on the coast of China the *Plover* dropt anchor in, being full of rocks, with a heavy swell. Sailing vessels have, therefore, no alternative but to stand boldly off and trust to a slant on the Formosa side, or take the Hai-tan Strait. The open sea is, however, preferable, notwithstanding that some vessels have got successfully through the strait ; yet it requires local knowledge and a handy vessel to prevent great detention.

CHAPTER XXII.

FORMOSA AND THE PESCADORES ISLANDS.

FORMOSA ISLAND, 210 miles in length and 80 miles wide at its broadest part, is high and mountainous throughout its whole extent, except at the central part of the West coast, where a broad alluvial plain stretches from the mountains to the sea, and on which is situate the Chinese capital of Tai-wan-fu.

The Chinese have long been in possession of the plain and the harbours and villages of the West and North coasts, but the East coast is still peopled by aboriginal and warlike tribes, not subject to the Chinese, yet who hold intercourse with them of a more or less friendly character. The population is estimated to number $1\frac{1}{2}$ million.

Coal is found in many parts of the island, and in the North is worked by European machinery. It is of a quick burning nature, gives out much heat, and fairly answers for steamers, if mixed with a harder kind. Sulphur is also found. Among the products of the island may be mentioned rice, camphor, wheat, coffee, tobacco, tea, and sugar. The cultivation of the tea plant seems to be on the increase. The climate is not healthy for Europeans, being very damp during a greater portion of the year.

In consequence of repeated acts of outrage and murder towards the shipwrecked crews of foreign vessels, in revenge for former injuries, a treaty was concluded on 15th October, 1867, with the hostile tribes of the South part of Formosa, by the United States Consul of Amoy, by which the southern end of Formosa was thought to be rendered safe to those driven on its coasts by distress. The outrages continued, however, and a Japanese force was sent there in 1871 to punish the natives.

The **BASHEE CHANNEL**, frequented by vessels making the eastern passage to China, is 80 miles wide between the Batanes (page 937) and the South end of Formosa, but its navigable breadth is greatly contracted by the dangerous Gadd Rock, which must be remembered when sea room is needed to avoid the track of a typhoon.

Gadd Rock, or *Cumbrian Reef*, in the fairway of the Bashee Channel, is in lat. $21^{\circ} 42\frac{1}{2}'$ N., long. $121^{\circ} 39'$ E., Little Botel Tobago bearing from it N. $\frac{1}{4}$ W. $14\frac{1}{2}$ miles. It may be considered one of the worst hidden dangers known, being steep-to, with deep water all round. At low water the sea would probably break, but the locality is generally covered by violent tide ripples.

When passing southward of Gad Rock in thick weather or in the night, make allowance for a northerly current, which is generally experienced in light winds and during the S.W. monsoon. Several vessels during light winds have been drifted by the current between Formosa and Botel-tobago.

BOTEL-TOBAGO is high, $7\frac{1}{2}$ miles long, N.W. and S.E., appears in form of a saddle, or with a gap in it when viewed from a S.S.W. or N.N.E. direction, and is visible about 50 miles from the mast-head. The island is well inhabited, and its highest part is crowned with trees; the N.E. peak is 1,850, and the West peak 1,820 ft. above the sea.

Indifferent anchorage was found by H.M.S. *Sylvia* in 1867, about half a mile from the beach, on the North side of the island, in 21 fathoms, black sand and rock. The coast is rocky in almost every part, and needle rocks are seen in many parts of the island; and if the ground under water assumes the character of that which is above, a vigilant look-out for rocks is necessary when rowing along the coast. When circumnavigating the island deep water was found at a mile off shore. The island is densely inhabited, but the natives were timid.

Little Botel-Tobago is a small island of considerable height, lying about S.S.E. $3\frac{1}{2}$ miles from the southern part of Botel-Tobago; foul ground appears to extend all round this island.

Alceste Shoal, formerly marked on the chart in about lat. $22^{\circ} 5'$ N., long. $121^{\circ} 18'$ E., is supposed to have no existence.

Vele-rete Rocks, in lat. $21^{\circ} 45'$ N., long. $120^{\circ} 49\frac{1}{2}'$ E., lie 9 miles S. by W. from South Cape, and on nearly the same parallel, and about 47 miles westward of Gadd Rock in the Bashee Channel. The highest is S. by W. 9 miles from the South Cape of Formosa, and with two others is from 15 to 25 feet above the sea. The channel between them and the South end of Formosa is safe; but very heavy tide ripples are often experienced.

Caution.—The northern current of the Japan stream sets with great strength over these rocks to the north-eastward.

SOUTH CAPE or **NAN-SHA**, in lat. $21^{\circ} 54'$ N., long. $120^{\circ} 50'$ E.; is low, and, together with the one which is three-quarters of a mile E.N.E. of it, formed of coral limestone. At 4 miles to the N.W. is a peculiarly rugged hill, 1,035 ft. high, from which the land slopes down gradually to the cape. Farther northward is a high, double-peaked mountain, visible 60 miles in clear weather.

EAST COAST of FORMOSA, extending 200 miles to the N.N.E., is mountainous, and with the exception of Sau-o Bay is without harbours, and deep water will be found close in to the land. The mountains rise almost immediately from the sea; their sides in some places are cultivated, and scattered houses are seen.

This coast is not visited by the full strength of the N.E. monsoon, which probably results from the mountainous character of the country preventing the breeze blowing home. Sailing vessels, however, experiencing strong gales at 20 miles to the eastward, might feel cautious in venturing in-shore. Nor is there any necessity to run to leeward; but if, when beating up, they should experience the breeze declining in strength, with less sea on the western board, particularly between 9 a.m. and 3 p.m., or up to sunset, they will find it advantageous to hug the coast within a moderate distance; but good judgment and caution are requisite, as sudden loss of wind, attended by inconvenient swell, might be attended, if followed by calm, with imminent danger.

Double Peak, a mountain on the coast 58 miles to the northward, is about 2,500 ft. high. *Samasana Island*, $15\frac{1}{2}$ miles from the coast abreast Double Peak, is in lat. $22^{\circ} 39' 26''$ N., long. (assumed) $121^{\circ} 28' 48''$ E., and lies N. $\frac{3}{4}$ W. 34 miles from Botel-Tobago. H.M.S. *Sylvia*, in 1867, anchored in the North bay in 13 fathoms. The anchorage is not recommended. It is advisable to avoid the lee side of the island, as calms, eddies, and variable winds are likely to cause delay. *Black Rock Bay*, in lat. $23^{\circ} 6' 30''$ N., and long. (assumed) $121^{\circ} 26'$ E., and 22 miles northward of Double Peak, might afford shelter from S.W. and southerly gales, but the bottom is rocky and uneven. The coast North of Black Rock Bay is rugged and rocky. The lower slopes of the hills are covered with grass; behind the hills the mountains attain an elevation of 5,000 and 6,000 ft., and are clothed with dense forest. *Chock-e-Day*, 60 miles northward of Black Rock Bay, is in lat. $24^{\circ} 6\frac{1}{2}'$ N. The inhabitants were nearly naked, and used threatening gestures to the surveying party. The coast from Chock-e-day to Dome Point, 20 miles to the northward, is the boldest and most precipitous that can be conceived, the mountains rising 7,000 ft. almost perpendicularly from the water's edge. *Dome Point*, 650 ft. high, is 3 miles South of Sau-o Bay.

Boudruet Rocks, reported to be about 65 ft. high, and in lat. $24^{\circ} 10'$ N., long. $122^{\circ} 34'$ E., would be 48 miles from the nearest point of Formosa.

Reported Dangers.—A shoal, which would lie in lat. $24^{\circ} 17'$ N., long. $122^{\circ} 48'$, was reported in 1844 as showing heavy breakers. Another shoal in lat. $24^{\circ} 30'$ N., long. $122^{\circ} 49'$ E., 3 miles in extent, E. by N. and W. by S., is reported as lying N.W. by W., distant about 10 miles from Kumi. The ripples are very strong in this vicinity, and it is possible that the above dangers are not existing, the ripple having been mistaken for breakers.

Sau-o Bay, in lat. $24^{\circ} 38'$ N., long. $121^{\circ} 50'$ E., will be found an excellent

place of shelter for vessels working up this coast against the N.E. monsoon. *Sau-o or Arlyi Rocks*, 98 ft. high, lie off the entrance of Sau-o Bay, about a mile from the northern promontory. To the N.W. of the Arlyi Rocks is much foul ground, with rocks awash, generally breaking. *Breakwater Reef* (or *Tong-sim-tai*), about 2 cable in extent, N.E. and S.W., lies a little more than half a mile from the shore, and nearly in the centre of the bay.

The inhabitants of Sau-o Bay are mostly Chinese fishermen. Fresh supplies were obtained.

There is good holding ground in the outer part of the bay in 10 to 13 fathoms, black sand and mud, E. by S. of Breakwater Reef, and with the South point of the bay about South, but the anchorage is unsafe with easterly winds. The best anchorage is under Breakwater Reef, but in rounding its North end a berth of 2 cables must be given, to avoid the *Serpent Rock*, of 11 ft. water, which lies $1\frac{1}{2}$ cable N.W. of the highest rock on the reef (the clearing mark is the easternmost rock of the Sau-o Reef in a line with a conspicuous rocky islet off the North point), when vessels may haul to the southward, and anchor in 7 fathoms, with the conical or high rock bearing E.S.E. distant about $2\frac{1}{2}$ cables; or if of 12 ft. draught with the rock bearing East. The water shoals rapidly. It is high water, full and change, at 5^h 50^m and the rise 3 to 6 ft. The tidal streams are weak in the bay; the flood sets along the coast South and the ebb North, with a velocity of $1\frac{1}{2}$ knot per hour.

Approaching Sau-o Bay from the northward, pass half a mile eastward of the Sau-o or Arlyi Rocks, the highest of which may be seen 8 or 10 miles off in clear weather, and when Breakwater Reef bears W. $\frac{1}{4}$ N. haul up for it. From the south-eastward vessels can boldly approach the South point, off which reefs extend 2 cables.

Kaleewan River.—At 6 miles to the northward of Sau-o Bay and 10 miles S.W. $\frac{1}{2}$ S. of Steep Island has only 3 ft. on the bar at low water, the rise of tide being from 2 to 3 ft. The banks and country on either side of the river were everywhere under cultivation, principally with rice, Indian corn, and millet; sugar-cane also in small quantities. The inhabitants behaved with great civility.

Steep Island, 14 miles northward of Sau-o Bay, is inhabited by Chinese, and cultivated in terraces to its summit, which is a sharp conical peak, about 1,200 ft. above the sea. S.W. $1\frac{1}{2}$ mile from Steep Island is a small islet, with a rock to the S.W. of it.

SANTIAU POINT, the N.E. extreme of Formosa, is 10 miles N. by E. $\frac{3}{4}$ E. from Steep Island. The point itself is low and flat, but a little inland is a hill range which terminates in a bluff. Here the coast line turns abruptly to the N.W. for 30 miles, and midway is the harbour of Kelung, described hereafter.

Petou Point, N.W. by N. 7 miles from Samtiau, is a peninsula 400 feet high, and from a distance appears like an island. The small boat harbour and fishing village of Petou is close to the westward of it. The coast from thence to Kelung Harbour is steep-to, all the off-lying rocks, which are of sandstone, showing above water. The most remarkable feature on this coast is *Dome Peak*, which makes in that form from the N.E.

Chimmo Bay is 5 miles westward of Petou Point, and in it a vessel might anchor if in distress, or forced in by a northerly wind. The point on its eastern side is foul.

Directions for making the passage along the East coast are given in pages 91—94.

The WEST COAST of FORMOSA has been surveyed by Messrs. Wilds and Stanley, of H.M. surveying vessels *Swallow* and *Dove*, and Commander E. Brooker, of H.M.S. *Sylvia*, in 1867.

Kwa-liang Bay is 6 miles W. by N. from South Cape (page 1033). In the N.E. monsoon good anchorage will be found in 10 or 12 fathoms, about half a mile from the shore, anywhere on the North and N.E. sides of the bay.

SOUTH-WEST POINT, 1 mile West of Black Point, is the angle of the coast where it turns to the northward. The small bay of Chim-kong-o, North of it, has 23 fathoms at half a mile off shore, and 52 fathoms at a quarter of a mile off its North point, where are strong tide ripples.

Tossapon Hill is on the south-western promontory. The fort, erected in consequence of the treaty mentioned on page 1032, is situated over Black and S.W. Points, and is therefore plainly visible from the sea, and had the Chinese flag flying on it.

Gooswa Promontory extends in a N. by W. direction 7 miles from S.W. point. The promontory is backed by an inland range, *Ba-swa*, rising to the height of 2,235 ft., 8 miles N.N.E. $\frac{1}{2}$ E. of S.W. point. The bold shore of the promontory consisting of dark rocky cliffs is steep-to. Its most conspicuous feature is the sand beach of Chim-kong-o Bay. *Aou-wa-nah* is a nook at the head of the small bay which lies immediately North of Gooswa promontory. The reefs from either shore meet within a cable, forming the entrance to a basin about 2 cables in diameter, having a depth of 5 to 3 fathoms. To the northward, the coast is inhabited by Chinese, who move about armed for protection against the natives, with whom they carry on a perpetual warfare.

Liang-kiau or Expedition Bay, 3 miles in extent, between Bay Hill and Lang-kiu Point, 2 miles North of it, is open to all westerly winds, but affords good anchorage in the N.E. monsoon. The approach to the bay is quite clear, but a sandy spit runs out three-quarters of a mile from the North point of the bay, on which account vessels are recommended not to hug the shore

too closely. Lang-kiu is the principal town or village of the district, and the most southern settlement in which Chinese authority is recognized.

Caution.—About 5 miles N. by W. from Liang-kiu Bay, when not in soundings, the leadsman struck what must have been a peaked rock at 9 fathoms, which caught the lead line and nearly pulled the leadsman out of the chains.—(H.M.S. *Flamer*, 1865.)

San-Liau Bay, North of Liang-kiu Point, affords anchorage in 3 fathoms at 3 cables from the shore. All the low shore of Liang-kiu Point is bordered by an extensive reef. *Le-liang-swa*, 2,500 to 4,000 ft. high, is a mountain range on the coast North of Liang-kiu, extending 6 miles North and South.

Hong Kong, 6 miles North of Liang-kiu Point, is a large Chinese village. *Che-tong-ka*, N. by W. 13 miles from Gooswa Promontory, and $4\frac{1}{2}$ miles from Hong Kong, is on a point, bordered by a reef; the coast is bold and steep-to. Vessels can anchor anywhere along the coast in 8 or 9 fathoms. *Pong-li* is a small Chinese town, 7 miles N.N.W. $\frac{1}{2}$ W. of Che-tong-ka, and a short distance inland, about a mile northward of a remarkable square clump of trees on the beach, called *Kay-a-kaou*.

Lambay Island, or Seo-liu-kiu, in lat. $22^{\circ} 20\frac{1}{2}'$ N., long. $120^{\circ} 22\frac{1}{2}'$ E., is flat, the most elevated part being 258 ft. No anchorage can be obtained near this island, but a mud-bank, having 15 to 26 fathoms water over it, is reported at 3 miles eastward of it. Reefs extend a mile off the N.E. and S.E. points of the island.

Tang-Kang River has its entrance N.N.E. 7 miles from Lambay Island and 11 from Pong-li; at low water there are only 4 ft. on the bar. The town stands near the entrance, and has about 20,000 inhabitants.

Ape Hill, 1,110 ft. high, called by the natives Ta-kau, is N. by W. $\frac{1}{2}$ W., 18 miles from Lambay Island. It appears like a truncated cone; its barren, rugged sides rise with a steep slope from the sea, facing which is a large white land-slip. At $4\frac{1}{2}$ miles N.E. of Ape Hill is another remarkable hill, 700 ft. high, named *Whaleback*; and N.N.E., 12 miles, there is a small triangular-shaped hill, and a large detached piece of table-land resembling a quoin on a North and South bearing. These are the only landmarks on this part of the coast, which is all very low, and of these Ape Hill is the most useful, as it stands out on the coast line, and is frequently seen distinctly when all the others are shrouded in mist.

Saracen Head, 173 ft. high, 2 miles South of Ape Hill, is surmounted by a *Signal Staff*. It is a huge nearly level block of a mole-like appearance, bounded on the sea face by a line of precipitous cliffs rising from the water's edge, and which, jutting through the beach to seaward for about 300 yards, forms a sheltered harbour for small vessels in the strength of the N.E. monsoon. This mole is separated from the hill by a deep channel about 60 yards wide, which is the entrance to the little port of Ta-kau-kon.

Anchorage in the N.E. monsoon is good and safe under Ape Hill, which stretches out so as to afford smooth water. In the S.W. monsoon heavy rollers come in, making it undesirable to remain at anchor there.

Ryder Rock, half a mile off shore, with Ape Hill bearing E. by N., was reputed as above water in 1876.

TA-KAU-KON, or Harbour of Takow, the Consular port of Tai-wan-fu, is the only harbour on the West coast of Formosa available for vessels of 12 feet draught. It is a small basin just within the entrance of a great lagoon. The entrance to it is immediately North of Saracen Head, where the fair channel is only 200 ft. wide.

The Bar is formed by a narrow ridge of sand, curving outwards and extending from under the bluff of Saracen Head round towards the shore at half a mile North of the entrance. There are 10 to 11 ft. over its North and South parts at low water springs, but over the central part, N.W. of the entrance, only 7 to 9 ft. It consists of loose sand, and is said to be constantly shifting.

The harbour is immediately within the entrance. The anchorage is too confined to allow a vessel to swing, it is therefore necessary to moor head and stern. In 1873 there was water only for vessels drawing 9 ft., larger vessels having to anchor outside the bar. The Chinese town or village stands on the South side at the back of Saracen Head. Here is the British Consulate. Water can be obtained from a spring on the North shore, and care must be taken that it is not procured from the wells on the South side. Fresh beef of inferior quality is supplied, also vegetables, besides pigs, fowls, ducks, eggs, rice, sugar, and fish.

Takau was opened to trade in 1864, but as its importance arises from the fact of its being the port of Tai-wan fu during the S.W. monsoon, and the only accessible one where ships can then lie with safety, its trade is chiefly limited to that period. The *pilots* are Chinese, and are under the superintendence and regulations of the European harbour master. The signal station on Saracen Head is under the direction of the harbour master. It is high water, full and change, at Takau, at 8^h 30^m, springs rise 4 ft.

Directions.—If obliged to run for the entrance in bad weather, bring it to bear E. by S. $\frac{1}{2}$ S., and run boldly in. Keep close to the outer North rock (steep-to), and haul close round the point, but not within 10 yards, as there is a rock inside, within that distance, with only 4 ft. on it at low water. As the rocks are neared, starboard the helm and round the northern head close-to, shooting into a little sandy bay, where a vessel may touch the ground with her fore-foot without sustaining any damage. Great care is required if entering at springs on the ebb, which runs at the rate of 4 or 5 knots through the entrance. The harbour is also difficult of exit in the S.W. monsoon. It is said to be shallowing year by year. At present, at the outside, it can contain twelve vessels of 12 ft. draught, moored head and stern; but it is sus-

ceptible of great improvement at small expense, and as Formosa becomes more opened to commercial enterprise this place must advance in importance.

The Coast, northward for 20 miles between Ape Hill and the old Dutch *Fort Zealandia*, is nearly a straight line of beach, pierced by four small streams, the banks of which are densely populated by fishermen, who appear to be well fed and clothed and a happy and contented people.

The old Dutch ruined fortress, built in 1630, and now surmounted by a large tree, visible 8 or 9 miles from a vessel's deck, is the only conspicuous landmark in this neighbourhood, except a large clump of trees $1\frac{3}{4}$ mile N.W. of the fort, on the outer sand-bar. The fort stands about two-thirds of a mile from the sea, and about it has grown up, along the continually rising mud and sand-banks, the village of Amping.

AMPING ROAD, off an opening in the beach, which is the nearest approach to Tai-wan fu from the sea, is an open roadstead, where, during the strength of the N.E. monsoon, from December to March, capital sheltered anchorage with smooth water may be found, in $5\frac{1}{2}$ fathoms, at 2 miles S.W. of Fort Zealandia. During the rest of the year the chances of S.W. winds render this position an unsafe one, and anchorage should be sought farther out, but in the strength of the S.W. monsoon no vessel could lie off a coast so fully exposed to its full force, and the heavy rollers which accompany it. Then also the bar is most dangerous, and cannot be passed by the cargo boats for days and weeks together.* Catamarans are used as at Takau, and are managed by the Chinese with great skill. Trade ceases entirely for four months, viz., from June till September, all goods being then sent to Takau for shipment. The anchorage should be approached from the northward with caution, and the lead used constantly.

Amping has a population about equal to Takau, a resident Mandarin, and a superintendent and tide-waiters of Chinese customs. The British Consul, a Medical Missionary, and a Surveyor of Customs reside at Tai-wan fu. Excellent fresh water is supplied from the latter place.

Between Amping and Tai-wan fu, 2 miles S.E. from the fort, is a large expanse of mud flat which at times during the S.W. monsoon is entirely covered with water. A narrow creek or canal runs up to the West gate of the city, by which cargo boats can go up at high water.

TAI-WAN FU, the capital of Formosa, is a prefectural city of 70,000

* The bar was last crossed in 1869 by H.M. gunboat *Bustard*, drawing 7 feet, but its channel is constantly shifting, and, like the harbour within, shoaling rapidly. The same change is taking place all about this part of the coast, for where good harbours existed formerly, with 15 to 20 ft. water, there is not now sufficient to float a junk. According to Dutch and other records, the sea at one time extended to the fort inside the city. H.M. ships are now prohibited from entering this harbour, by order of the Commander-in-Chief.

inhabitants, surrounded by a wall 20 ft. high, quadrangular, and 5 miles in extent.

Vuyloy Shoal, about half a mile in extent, and with only 8 to 12 ft. on it at low water, lies upwards of a mile off shore, S. by E. $4\frac{1}{4}$ miles from the entrance of Port Kok-si-kon, W. by N. $\frac{3}{4}$ N. $4\frac{1}{2}$ miles from Fort Zealandia, and S.W. by W. $\frac{1}{2}$ W. $2\frac{3}{4}$ miles from Joss Islet. With southerly winds the sea breaks heavily on it, but with off-shore or N.E. winds there is but little break. The soundings are $4\frac{1}{2}$ to 5 fathoms at $1\frac{1}{2}$ mile westward of the bank, and 3 fathoms between it and the shore. Vessels bound from Kok-si-kon to Ta-kau, will pass westward of this shoal by keeping 3 miles off the sand bars fronting this part of the coast, or not shoaling to less than $4\frac{1}{2}$ or 5 fathoms, until Fort Zealandia bears East. This will also clear two sand-banks which uncover at low water. They lie W.N.W. $2\frac{1}{2}$ miles from Fort Zealandia, and three-quarters of a mile West of the tree clumps.

Tides.—The flood stream sets in a N.N.W. direction for $1\frac{1}{2}$ to 2 knots an hour along this part of the coast. The ebb runs S.S.E., except near the entrance of Kok-he-mung, $3\frac{3}{4}$ miles N.W. of Zealandia Fort, where its direction is S. by W. out of the harbour.

PORT KOK-SI-KON, the North point of entrance to which, *Gull Point*, is 32 miles N.N.W. of Saracen Head, is the outlet of several small, shallow streams, which here unite and form a channel through the mass of sand-banks fronting the coast. This channel or port runs N.E. and S.W., and, taking the 3-fathom line as its boundary inside, is three-quarters of a mile long and only 2 cables broad, with $4\frac{1}{2}$ fathoms in the middle; it will be, therefore, necessary to moor N.W. and S.E. The bar has 12 ft. on it at low water springs. The deepest part is generally marked by the natives with bamboos; but as the channel is both wide and straight, and the bottom remarkably even, it is by no means difficult of access for vessels of 12 or 13 ft. draught at high tide. The channel and sand-banks are said to have altered since the survey. It is high water, full and change, at 11^h 30^m, rise about 3 ft.

Directions.—The high land of Formosa, immediately over Port Kok-si-kon, may be distinctly seen in very clear weather from the Pescadores, but as it is generally obscured, and the coast low and sandy, it will be prudent at all times, when bound to that port from the westward, to be certain of the vessel's position before losing sight of East Island, or one of the southern islands of that group.

The mast heads of a large fleet of junks usually at anchor in the small harbour of *Kok-he-mung*, 5 miles S.E. by E. of Kok-si-kon, will serve as a guide on approaching the coast; and when 2 or 5 miles from the shore, three clumps of huts and trees (the southernmost clump abreast West Point being the largest and most conspicuous), Joss Islet, and Fort Zealandia, are objects sufficiently well defined to mark the locality. Joss Islet has a clump

of dark trees on its southern end, and the Joss House on it has a white front to seaward. *Ung-lo* and *So-co*, to the south-eastward, are remarkable hills, and may generally be seen when the mountains in the interior are hidden. The clouds sometimes rest upon them, when they appear as the highest land in the vicinity. *Ung-lo*, 1,080 ft. high, is the southern termination of a long table range which falls steeply for a few hundred feet, and rises again to the round hill of *So-co* 880 ft. high.

The Coast for 20 miles to the northward of Fort Zealandia has no distinguishing feature, the highest bushes and huts being but a few feet above the low level land. *Kakaou*, 7 miles northward of *Kok-si-kon*, is a small and narrow inlet, as is also *Paw-tay-chui*, N.N.E. $\frac{1}{4}$ E., 11 miles from *Kakaou*. Four miles W.N.W. of the entrance to *Paw-tay-chui* are the *Ay-aw Banks*. *Ay-aw Creek* is at the northern part of the bay, formed by the *Wanckan Banks* and the low opposite shore. The creek is approached from the S.W., between the *Ay-aw Banks* and the *South Wanckan Shoal*.

Wanckan or Chin-ne-yah Banks form the westernmost part of the Island of Formosa. The South end is in lat. $23^{\circ} 31' N.$, long. $120^{\circ} 2' E.$, 24 miles northward of *Kok-si-kon*. To the southward the bank at low water dries nearly 2 miles, and continues in a N. by E. direction for 11 miles. The Chinese say that there are many junks and ships lost on them during the year. When coming from the North or South there are no land-marks to guide the navigator, and the strong tides experienced render a ship's position at all times doubtful.

The *Pescadores Channel* is narrowed to a breadth of 3 miles between *Outer Wanckan Shoal* and the *Nine-foot Reef* which lies W. by S. $\frac{1}{4}$ S. from it, and which is 4 miles S.S.E. $\frac{1}{2}$ E. of *Three Island*, the easternmost islet of the *Pescadores Group*.

The Coast from the hut on the sandy patch of the South extreme of the *Wanckan Banks* to *Lokiang*, in lat. $24^{\circ} 3' N.$, is low, and has no distinguishing feature, the bushes and huts being only a few feet above the land. This uninteresting seaboard becomes even more dreary at low water, when the mud and sand-flats uncover for miles.

East 8 miles from *Lo-kiang* is a peak, 701 ft. high, and between them is a sand-hill. To the westward of the town of *Lo-kiang* is a small outlet, marked by two bamboo beacons; in this creek a great number of junks find anchorage. From *Lo-kiang* the coast trends N.N.E., with extensive mud flats; but having passed the village of *Goché*, 13 miles to the northward, the flats uncover only for a distance of half a mile. *Goché* is situated at the northern extremity of the great alluvial plain, which extends as far southward as *Tai-wan fu*, a distance of 80 miles.

Off *Wanckan*, and as far as *Goché*, a distance of 50 miles, the soundings off the low coast being shallow and irregular, ships should not stand into a

depth of less than 10 fathoms; and the strong tides which run round the Wanckan banks and reefs should also be borne in mind. From about 3 miles North of Goché to Tongsiau the coast can be approached to a mile, when soundings of not less than 10 and 12 fathoms will be found. The tides along this coast are less strong than off Wanckan.

Tyka or Tai-kia, the principal town of the first hilly district North of the plain. It stands 3 miles from the sea on the banks of the Tyan-kiang, a small stream, 8 miles northward of Goché. The entrance is marked by beacons. The town is situated between two detached hills northward of the Goché range, and which are described as the most striking features of the coast; the southern hill, *Stone Peak*, is 501 ft. high; the northern is a remarkable square topped hill, 743 ft. high, seen from the sea in all directions.

The *Mow-lung-sui*, a considerable stream, on which, a mile above its entrance, is the large village of *Tong-siau*, is 8 miles north-eastward of the Tyan-kiang. Between the two, 7 miles inland, a rocky-topped range rises to the height of 2,227 ft. *Mount Sylvia* is E. $\frac{1}{4}$ S. 35 miles from Tong-siau, and 15 miles nearer in the same direction is *Mount Royalist*, 9,000 ft. high. Petroleum springs have been discovered 15 or 20 miles inland, a few miles beyond the first flat-topped ridge.

Port Heong-san, in lat. $24^{\circ} 41' N.$, is available for vessels of light draught, and affords room for several large junks. *Table Hill* or *Hong-san-ki*, 360 ft. high, and $7\frac{1}{2}$ miles N.N.E. $\frac{1}{2}$ E. from Heong-san, is a conspicuous object.

PAKSA POINT, the N.W. point of Formosa, lies 10 miles N.N.E. $\frac{1}{2}$ E. from Table Hill. An elevated sand hill stands at its extremity. The point is not bold; shoal water extends $1\frac{1}{2}$ or 2 miles northward of it, which has been observed to break at $1\frac{1}{4}$ miles off shore.

From Paksa to Tam-sui Harbour, a distance of 22 miles, the coast line curves in an E.N.E. direction; the first 14 miles being low with sand hills, and along this part reefs project about half a mile off shore, with soundings of 7 fathoms well clear of them, and there are numerous creeks in some of which junks are seen lying. The low land is succeeded by table land about 600 ft. high and steep-to, until within 2 miles of Tam-sui.

DIRECTIONS.—As far as Lieutenant Gordon was enabled to examine the N.W. coast, it was his opinion that a great advantage would be obtained, if, instead of hugging the coast of China or beating up in the middle of Formosa Strait during the N.E. monsoon, sailing vessels were to reach well over, and at all events during the day stand close in to the Formosa shore, particularly on the ebb tide. The latter stream was always found setting strong to the N.E., whereas the flood ran very weak to the S.S.W., the former having the advantage over the latter of at least 8 miles every 24 hours.

The time of high water, full and change, on the N.W. coast of Formosa is at noon. The bottom is dark sand, with, occasionally shells and broken

stones; soundings of 30 to 40 fathoms near the shore, and 25 to 17 fathoms at 10 to 20 miles off. The water commences shoaling about $1\frac{1}{2}$ or 2 miles off shore, and the depths decrease rapidly. The sea near the coast in moderate weather is smooth, the wind blowing along the land.

TAM-SUI HARBOUR is formed in the lower reach of Tam-sui River. South of the river entrance is a remarkable double hill, the North peak of which is 2,014 ft. above the sea. The river has a funnel-shaped entrance, where is the bar, and the shores of which are low, with sand hills, bordered on the South side by sand and mud flats, and on the North by a stony flat, on which is a small Chinese lighthouse, only used occasionally.

The bar is a mile in extent; the fairway channel over it is direct, 1 to 2 cables in width, and has a depth of 7 to 8 ft. at low-water springs. The river within is three-quarters of a mile broad, but the South side is filled with mud banks. The deep water channel is only a cable wide between the banks off the low points of entrance, and within preserves the same breadth along the North shore for the distance of a mile with 12 to 15 ft. water. The white fort and entrance beacon are on the North point of entrance; the old Dutch red fort, which is the British consulate, is half a mile higher up on the same side, and above is the town of Hoo-wei, at the lower part of which is the custom-house. Foreigners have not unfrequently been insulted in this town, the lower classes of which are lawless and turbulent.

Five miles above Hoo-wei the main branch of the Tam-sui River runs to the S.E., on the right bank of which, about 13 miles from the entrance, is the town of Mang-kia or Bang-ka, the largest in the North of Formosa. About 5 miles above Mang-kia a smaller branch enters from the southward, and numerous other tributary streams feed this river, which is said to take its rise 70 or 80 miles above Tam-sui Harbour, and wind its course among the high mountain ranges of the interior. A confluent branch takes a turn at Kang-tow, 6 miles from the entrance, and after several small rapids ends a few miles from Kelung, where the coal mines are situated.

The exports of Tamsui and Kelung consist chiefly of tea, rice, camphor, and coal, amounting, in 1871, to £160,367. Good water and provisions of all kinds are to be obtained; bullocks, pigs, goats, poultry, vegetables, and fruit in profusion. Water is brought off in sanpans at $1\frac{1}{2}$ dollars the ton.

Tides.—It is high water, full and change, in Tam-sui Harbour at 11^h 45^m., springs rise 7 to 10 ft.

Directions.—If approaching Tam-sui from the westward, steer midway between the two mountains, one of which rises on either side the entrance, until the leading marks to cross the bar are discerned, but as the channel across the bar is liable to shift from the effects of freshets or gales, no vessel should enter Tam-sui for the first time without a pilot, one of whom can generally be obtained off the port, or at the village just inside the white

fort.* If intending to anchor, do not stand into less than 8 fathoms, unless in a steam-vessel, for the anchorage off the harbour is unsafe, as the holding ground of loose shifting sand is not good; and a vessel, though with a good scope of cable out, is likely to drive even in moderate weather. When the wind freshens from the N.E. a heavy sea rolls in, breaking even in 3 fathoms water, and a sailing vessel must immediately proceed to sea, for should the wind veer to N.W. it might be impracticable. In summer also it is exposed to short, sharp south-westers, which rise suddenly with little or no warning, but which are not of very common occurrence; in the event of one, it is necessary to put to sea without delay.

The recent survey in the *Sylvia* showed the deepest water over the bar to be in nearly the same direction as it was in 1845, when Lieutenant Gordon surveyed it, but 5 ft. shoaler. Since then the entrance has been entirely altered by a typhoon, which swept over the harbour in September, 1871, but it is probable that the freshets of the ensuing rainy seasons have re-established the channel in its old position. The leading mark for entering the harbour previous to this change was a *white* beacon placed near a small fish hut on piles, near White Fort, just open to the right of the old red brick square Dutch fort, E. $\frac{1}{4}$ S., both situated on the northern side of the river. The passage over the bar is usually marked with bamboos, but these are unintelligible to a stranger.

The entrance beacon on the North bank, W. $\frac{1}{2}$ N. half a mile from the Red Fort, is 40 ft. high, and pyramid shaped, consisting of three poles with a triangular facing towards the bar; the whole painted *white*. The beacon in line with the Red Fort is the leading mark for entering the harbour.

On entering the river pass the white beacon at about three-quarters of a cable, and run up along the North shore at the same distance. The anchorage for large vessels is off the custom-house; the best berth for men-of-war is nearer the Red Fort. It is necessary to moor, and ships should be prepared with a spare anchor in the winter months, as the freshets have been so strong, after continuous rain, as to cause a vessel to drift out and be wrecked on the bar. The holding ground is not very good. Of the advantages of this harbour, it may be said that it is quite secure from all storms; and although there is only a depth of 8 ft. over the bar, yet, the rise being from 7 to 10 ft., vessels of moderate draught may enter or leave daily throughout the year.

The North end of Formosa is high and mountainous, except the North and N.W. points, which are low, and have reefs extending a considerable distance off. From Tam-sui the coast trends to the N.E., 10 miles to *Syau-ki Point*,

* These pilots have not always proved trust-worthy, shipmasters should therefore be on their guard and procure a licensed pilot, if possible. The charge is five dollars.

and then 4 miles East to *Foki Point*; a reef fronts it, and in some places extends nearly half a mile off shore. The shore rises gradually, and is very flat for several miles inland to the Tam-sui range. *Masou Peninsula* is 8 miles S.E. of *Foki Point*. Its N.W. point is formed by a remarkable hill of sandstone, 250 ft. high, perpendicular to the N.W. To the westward of this peninsula is the deep bay and valley of Masou, in the middle of which is an islet with three rocks lying S.E. of it. Immediately eastward of Masou Peninsula is a bay 3 miles across, with numerous reefs running off the points within it; and 2 miles farther on the entrance of Ke-lung Harbour.

The coast between *Foki* and *Petou Points*, 20 miles apart, forms somewhat of a bay into which the N.E. monsoon rolls a heavy sea; in this bay, about 6 miles eastward of Masou Peninsula is *Ke-lung Island*, a remarkable black rocky island rising precipitously on all sides to the height of 580 feet. This excellent landmark guides to Ke-lung Harbour, the entrance to which bears from it S.W. $2\frac{1}{2}$ miles. Off its N.W. end is a conical rock 100 feet high, and extending S.W. by S. from the island is a spit of gravel or rock, a mile in length.

KE-LUNG HARBOUR is easy of access and well sheltered in all winds, except those from the northward, which send in a heavy sea. Ke-lung Island directs to the entrance which is marked by beacons, and the hidden dangers within are marked by buoys.

Audacious Rock, on which H.M.S. of that name struck in 1876, is a small pinnacle, with 21 ft. over it, and 10 fathoms at the distance of 50 yards in all directions. From the shoalest part, the islet, 100 ft. high, adjacent to the West side of Ke-lung Island, bears E. $\frac{2}{3}$ S., distant 17 cables; and the second peak West of *Image Point* (293 ft. high), S. by W. $\frac{1}{4}$ W., distant $2\frac{1}{2}$ miles. *Petou Point*, just overlapping the South point of Ke-lung Island, bearing S.E. by E. $\frac{1}{3}$ E., leads about 2 cables north-eastward of *Audacious Rock*. The summit of the distant range of hills (southward of Ke-lung town) in line with the Saddle between the first and second peaks West of *Image Point*, bearing S. $\frac{1}{4}$ W., leads about 2 cables westward of the rock in 15 fathoms water.

Palm Island, three-quarters of a mile long, East and West, is 2 miles S.S.W. $\frac{1}{3}$ W. from Ke-lung Island. Close to its N.W. extreme, and almost connected with it, is *Macedonian Mound*, 140 ft. high. *Bush Island*, low and rocky, about 10 ft. high and covered with shrubs, lies 3 cables West of *Palm Island*. Its extreme North end is marked by a beacon, 43 ft. high, painted black.

Image Point, the West point of entrance to the harbour, is a low projecting shelf half a mile W.S.W. of *Bush Island*, and remarkable from the number of detached pieces of sandstone rock which the action of the sea has worn into grotesque figures. The point is or was marked by a white beacon and may be rounded at a cable. There are 7 to 16 fathoms in the

entrance, which is 4 cables wide between Image Point and the reef off Bush Island.

Inflexible Reef, on which several ships have struck, is a sunken ledge of rocks. On its outer edge are two knolls of 4 and 6 ft., from the westernmost of which Image Point bears N.W. by W. 4 cables, and the left extreme of Bush Island N. by E. This knoll is marked by a *red* buoy on its western edge, in $7\frac{1}{4}$ fathoms.

Crag Peak, a remarkable sugar-loaf hill, about 150 ft. high, lies on the western shore of the harbour, half a mile southward of Image Point. From it projects another shelf of sandstone, on which is the mushroom-shaped rock to which has been given the name of *Ruin Rock*. A sunken ledge with 3 to 9 ft. on it extends $1\frac{1}{2}$ cable eastward of this point, the outer edge of which is marked by a *white* buoy (coral shoal buoy), in $5\frac{1}{2}$ fathoms. The town of Ke-lung stands at the head of the bay a mile above Ruin Rock. The coal mines are about a mile E.S.E. of the town.

The trade of Ke-lung is extensive, principally with the Rivers Min, Chin-chu, Amoy, and Tongsang. For the latter place quantities of coal are shipped, and for the former rice, ground-nut oil, camphor, and camphor wood. Good water is easily obtained on the western shore of the harbour, in the second small bay within Crag Peak. Pigs, poultry, and sweet potatoes may be purchased. The Ke-lung coal is a small bituminous mineral, good for domestic purposes and for steamers making short passages, but it is otherwise unsuitable. (See page 1032.)

It is high water, full and change, in Ke-lung Harbour at 10^b 30^m, and the rise, when uninfluenced by the weather, is about 3 ft.

Directions.—The entrance of Ke-lung may be boldly steered for even in a N.E. gale with thick weather, if the land about it, especially Ke-lung Island, can be well made out. Avoiding Audacious Rock, Crag Peak, a conspicuous landmark within the harbour, may be steered for on any bearing between S. $\frac{1}{4}$ W. and S. by W. $\frac{3}{4}$ W., and will lead in within the entrance clear of all danger. After passing Image Point, which it is preferable to hug, steer for the sandy bay to the S.E., getting the point on a N.W. $\frac{1}{2}$ N. bearing, and anchor in 6 to 7 fathoms, mud, good holding ground, with the West extreme Bush Island N. by E., or Crag Peak S.W. $\frac{1}{2}$ W. This anchorage is $1\frac{1}{2}$ cable South of Inflexible Reef, and if the buoys are in position the *red* buoy will bear North.

If proceeding into Junk Harbour, round Ruin Rock at 2 cables, passing outside the *white* buoy, and anchor with the rock S.E. by E. $\frac{1}{2}$ E. A gun boat may proceed higher up.

A sailing vessel must use much caution in leaving this harbour during the N.E. monsoon, in consequence of the heavy sea rolling in, and there being no anchorage outside. With a light wind short tacks should be made, and the entrance kept open until an offing is gained.

Coal Harbour, or Petaou Bay, a small inlet of the coast $1\frac{1}{4}$ mile south-eastward of Palm Island at the entrance of Ke-lung, and bearing from Ke-lung Island S. $\frac{3}{4}$ E., is so called from its proximity to the coal mines on the hill sides of the southern shore of Quar-see-kau Bay. It lies open to the northward, and is surrounded with reefs and rocks, and shoal at the head; it might, however, be available to a vessel in distress, if embayed to windward of it.

It offers anchorage and shelter for one or two vessels only, and should the mines ever be worked by Europeans, the coal, which is of good quality, could be conveyed to Harbour Rock at its head by means of a railroad along the West shore of the bay, at the base of the hills. A short pier from the North side of the rock would enable a vessel to lie alongside in 3 or 4 fathoms water, and receive or discharge her cargo.

ISLANDS NORTH-EAST OF FORMOSA.

From the northern extremity of Formosa there extends for 170 miles in an E. by N. direction, a chain of rocks and islands of small size, bold of approach, and for the most part widely separated, lying on or near the edge of the bank of soundings extending from the coast of China.

Pinnacle Island, called by the Chinese Tsaou su or the Chair-bearer, owing to its resemblance to coolies carrying a sedan chair, is in lat. $25^{\circ} 25\frac{1}{2}'$ N., long. $121^{\circ} 58\frac{1}{2}'$ E., and 19 miles N.E. by N. from the entrance of Ke-lung Harbour. It is a rugged mass of rock, 170 ft. high, with perpendicular sides, and around it are three semi-detached pinnacle rocks about half the height of the island, two of which are visible in almost every direction. They all stand upon a low reef, the western point of which extends, probably 2 cables.

Craig Island, in lat. $25^{\circ} 29'$ N., long. $122^{\circ} 8'$ E., is 10 miles E.N.E. of Pinnacle Island. Its eastern point is a steep cliff from the summit of the island, 240 ft. in height, off which lie the two high craggy rocks, surrounded by a large reef, from which the island has probably received its name. H.M.S. *Serpent* anchored off the North side of the island in 9 fathoms, in June 1866.

Agincourt Island, 9 miles N. $\frac{3}{4}$ W. from Craig Island, is in lat. $25^{\circ} 38'$ N., long. $122^{\circ} 5\frac{1}{2}'$ E. It has a round summit, 540 ft. high, stretching out into high, bold headlands on the North and South, and off the S.W. point is a reef.

Hoa-pin su, the North face of which is in lat. $25^{\circ} 47'$ N., long. $123^{\circ} 0'$ E., is an island 3 miles in extent, and 1,181 ft. high. The S.W. point, when seen on a S.E. by E. bearing, appears low and shelving. The western part

of the island rises symmetrically to a sharp peak, and is separated by a deep gap from the eastern peak which is somewhat lower, very rugged, and steep on its southern side; the S.E. point is a high cliff. The island may be said to slope to the N.W.

The Pinnacle Group, which is connected by a reef and bank of soundings with Hoa-pin su, allowing a channel of about 12 fathoms water between it and the Channel Rock, presents the appearance of an upheaved and subsequently ruptured mass of compact grey columnar basalt, rising suddenly into needle-shaped pinnacles. Although a safe channel exists between Hoa-pin su and the Pinnacle Islands, it ought not (on account of the strength of the tides destroying the steerage), to be attempted by sailing vessels if it can be avoided.

Ti-a-usu, N.E. northerly, 15 miles from Hoa-pin su, is about $1\frac{1}{2}$ or 2 miles in extent, and its summit is a round hill about 600 ft. high, with a lower hill of similar shape on its N.E. side, which both show very prominently when the island is first made from the eastward.

Raleigh Rock, in lat. $25^{\circ} 35'$, long. $124^{\circ} 35' E.$, and 50 miles E. $\frac{3}{4}$ S. from Ti-a-usu, is a narrow elongated mass of bare rock, rising abruptly from a reef to the height of 270 ft., and perpendicular on all sides. Reefs stretch off its West, East, and North sides. In the distance it appears like a junk under sail.

The Bank of Soundings appears to terminate a little eastward of Raleigh Rock, for at 12 miles N.E. by E. of it no bottom was obtained with 150 fathoms of line. In the vicinity of the islands, the depths were found very irregular, varying from 60 to 90 fathoms, over a bottom of grey sand, or rock, or stones, so that it would not be possible to determine a ship's position in thick weather by means of soundings, beyond the fact of her being on the bank.

MEIACO SIMA GROUP form the westernmost portion of the long chain of islands which extend in an easterly and north-easterly direction from Formosa to the southern extremity of Kiusiu, Japan.

KUMI ISLAND,* conspicuous by the peculiar sharpness of its single peak, 770 ft. high, and table base, is 60 miles E. by S. of Sau-o Bay, Formosa. The island is 6 miles long, East and West, and its peak is at the southeastern part. The principal town and port is on the North side, but the entrance from the sea is narrow and shallow. Tolerable anchorage is found in fine weather, in 17 fathoms, sandy bottom, apparently over coral, at 3 cables from the shore, northward of the town.

Chung-chi and Sandy Islands are the south-western outliers of the western

* Reefs, reported to have been seen lying westward of Kumi, are described on page 1034.

group of the Meiacó simas. Chung-chi, 33 miles S.E. by E. $\frac{3}{4}$ E. from Kumi Peak, is a high uninhabited mass of basaltic rock. Sandy or Hasyokan Island, 13 miles S.E. by E. from Chung-chi, is 3 miles in extent, East and West, with a few trees and huts on it, and stands on a coral reef, which extends a mile from its S.W. point. There is no safe passage between the two islands; between Chung-chi and Ku-kien san several coral patches have been observed, and Sandy Island is stated to be connected with Loney Island, 16 miles north-eastward, by numerous reefs and shoals.

KU-KIEN-SAN is 16 miles in extent, and rises at its highest part to an elevation of about 2,000 feet, its shores affording several commodious harbours, which, with good charts, are safe of approach. *Seymour Bay* is on the southern coast, 2 miles East of Seymour Point, the S.W. angle of Ku-kien san. Here is perfect shelter in the N.E. monsoon, and a fine stream enters the sea in deep water, where a vessel might water, without the intervention of boats or casks.

At the middle of the western coast is *Herbert Island*, 700 ft. high, detached from the extremity of a long peninsula, which separates two narrow inlets. *Port Cockburn*, on the South, carries very deep water, 30 decreasing to 20 fathoms up to its head, which is 3 miles from the entrance; but there are many coral reefs off its shores. The harbour is almost landlocked, and only open to N. W. by N. *Port Herbert*, North of the peninsula, is fringed by broad reefs throughout its whole extent. It has 3 fathoms in the middle of its entrance, which opens out into a broad basin within, with a depth of 22 fathoms, from whence a narrow channel, about 2 cables in width between the reefs, and carrying 14, 7, and 10 fathoms, leads S.E. by S. $1\frac{1}{2}$ mile to the head of the inlet, where is anchorage, clear of a coral reef, in 6 fathoms. This harbour is also nearly landlocked, and open only to N. W. by N. *Port Gage* is a small bay, also on the West side of Ku-kien san, 3 cables across, open to West and S.W.

Isaac Island, 40 ft. high, is 2 miles northward of Ku-kien san. *Koubah Island* is a mile off the East point of Ku-kien san.

PA-CHUNG SAN, 8 miles eastward of Ku-kien san, is about 10 miles in extent across the body of the island, and the hills on its North side rise to the height of 1,500 feet, from which range a narrow peninsula stretches 12 miles N.E. by N., terminating in Adams Point, off which is an islet on the reef. South-westward of Pa-chung is *Roberton Island*, 60 ft. high, $4\frac{1}{2}$ miles westward of which is Koubah Island, before mentioned; the two are connected by a coral reef, which is steep-to, and on the edge of which are three islets. Roberton is also connected by reefs with *Baugh*, *Inglefield*, and *Loney Islands* to the S.W., which also lie off Ku-kien san; and *South Rock*, which is high and marks the edge of the reef, is S.E. of Roberton, and $3\frac{3}{4}$ miles from Pa-chung.

On the North side of Pa-chung are several good bays, where anchorage might be found in the S.W. monsoon, but which are certainly not adapted for refit.

Port Haddington is a spacious bay on the West side of Pa-chung-san. Off Hamilton Point, the North point of entrance, will be noticed a remarkable little rocky hummock, upon which was left, at the time of the survey, a very large pile of stones. The bottom for more than half a mile off the point is rocky and dangerous; but as all the dangers of this port are visible from aloft, there is no risk with a proper look-out. This is a well sheltered port during the N.E. monsoon, but not so safe in the S.W. monsoon; for although it is landlocked, there is a long fetch for the sea with a S.W. gale, and in the latter season typhoons are said to be very violent about this region.

A convenient watering-place was established by H.M.S. *Samarang*, by sinking a cask and suspending the suction hose of Hearle's pump over it, so as to prevent the sand from being sucked in. Here wood is abundant. The inhabitants are a poor, contented, and an unarmed race, in appearance similar to the Loochooans, to whom they are subject, but resembling the Japanese more in manner, customs, and language.

It is high water, full and change, at 6^h 45^m, and the rise and fall about 7 ft.

Directions.—From the westward, Port Haddington may be sought and reached more expeditiously by working up on the N.W. side of Ku-kien-san, rounding Isaac Island and running down off the danger line from Melros Point (the northern part of the peninsula which forms the North side of the bay) round the reef, which extends 6 cables off Hamilton Point, and shoot into 15 fathoms. The chart exhibits several awkward patches, but a vessel which works decently can thread her way between them, if the sun be bright, as all the shoals may easily be traced from aloft.

There is a passage from Port Haddington into Broughton Bay, which was used by H.M. sloops *Lily* and *Contest*, in 1852; it abounds in coral reefs.

About 15 or 20 miles E. by N. $\frac{1}{2}$ N. of the N.E. extremity of Pa-chung are two low islets, *Mitsuna* and *Tarara*, from which extensive reefs stretch northward and westward, and the ground is shallow and foul at 10 miles N.N.E. of them. The vicinity of these shoals ought therefore to be avoided by night, but by day the dangers are clearly denoted by breakers.

TAI-PIN SAN GROUP, the eastern division of the Meiaco simas, comprises the large island of Tai-pin san and four small off-lying islets, and is distant 50 miles from Pa-chung san in an E. by N. $\frac{1}{2}$ N. direction. Tai-pin san is 15 miles long, N.W. and S.E., and is surrounded on all sides except the South by a very extensive chain of coral reefs, upon which lie the four small islands. Off the S.W. point is *Ashumah* or *Kurimah*; to the westward is *Erabou* or *Yerabu*, 4 miles in extent; off the North point is *Corumah* or *Ykima*, and 2 miles eastward of the same is *Hummock* or *Ogame*.

Safe anchorage during the S.W. monsoon might be found inside the reefs of Hummock Island, and also safe in the N.E. monsoon; but the passage in or out at that season would be attended with risk, and there can be no inducements for any vessel to visit Tai-pin san; neither wood, water, nor any other necessaries could be procured.

YKIMA ISLAND (Doubtful), is placed on the charts as 3 miles in extent with an islet off its N.E. side, and in lat. $24^{\circ} 26'$ N., long. $125^{\circ} 26'$, which position is 20 miles South of the eastern point of Tai-pin san.

CAUTION is requisite in approaching the Meiaco sima group from the N.E., East, or South, particularly with fresh breezes, and in the absence of the sun, by the aid of which the coral reefs below water can be detected. They are here, from their greenish hue, being covered by seaweed, less distinct than at other places, and therefore, where they are not marked on the chart, it must not be presumed that the space is free from danger; for the lead will not afford timely warning.

Vessels should not venture near these islands after dark until the dangers have been more closely examined. From the western limit of Chung-chi Island to the eastern range of the breakers of Tai-pin san, the space is dangerous. Independent of the many reefs which connect the islands, the constant strong winds, with haze and rain during the N.E. monsoon, render the approach at that season, unless in a clear day, very hazardous.

Of the dangers on the northern side of the group, all that is known has been said, and no off-lying shoals appear to exist westward of Pa-chung san. But it is not considered prudent that any vessel should run the risk of being hampered by these islands and shoals, and therefore, when beating up to the northward, should not come farther eastward than to sight Chung-chi Island. The currents, as these islands are approached, press more southerly and easterly than on the coast of Formosa, and stronger breezes are met as a vessel advances eastward; indeed it blows incessantly at this western group.

PESCADORES ISLANDS.

The **PESCADORES** or Panghou Archipelago consist of twenty-one inhabited islands, besides several rocks, and extend from lat. $23^{\circ} 11\frac{1}{2}'$ to $23^{\circ} 47'$ N., and from long. $119^{\circ} 16'$ to $119^{\circ} 40''$ E. From their basaltic formation the land is generally flat, and no part of the group is 300 ft. above the level of the sea. Panghou or Ponghou and Fisher, the two largest islands, lie near the centre of the archipelago, and between them is an extensive and excellent harbour. The general depth of water on the western side of the archipelago is 30 and 35 fathoms; there are, however, some places with 60 fa-

thoms. To the eastward of the group the depth is 40 fathoms, and the current strong.

These islands contained, in 1843, a population of about 8,000, and are extensively cultivated, potatoes, maize, millet, and ground nuts being produced in considerable quantities, as well as a few other vegetables, but the soil is not good; owing to the violence of the wind there are no trees, but the islands are well supplied with fruits and vegetables from Formosa. Bulls are numerous, being used to till the ground. Fresh water was abundant in the months of June and July, but it was stated that at some seasons it was scarce. Dried fish forms the only article of export, and the imports are rice, sugar, fruits, and vegetables from Formosa; tea, &c., from Amoy.

JUNK ISLAND, the most southern of the Pescadores, is 2 miles long, East and West, and $1\frac{1}{2}$ mile wide, and the soundings in its vicinity are 15 and 16 fathoms. The highest part of the island is 260 ft. above the sea, and from it High Island bears N. W. $\frac{1}{2}$ N. $8\frac{3}{4}$ miles, Reef Island N. E. by E. $5\frac{1}{4}$ miles, and East Island E. by N. 13 miles. A reef of rocks extends 6 cables from its S. W. side, and within them is a small artificial harbour for junks. Its eastern face is fronted by bold cliffs; and its western extreme is a long shelving point.

Reef Islands are three in number, one of which, *Steeple Island*, is a remarkable pyramid. The other two are rather more than a mile each in circumference, and are connected at low water by a stony ledge; reefs extend half a mile to the southward of them, and South one-third of a mile from the West end of the eastern island is a pyramidal rock 80 ft. above the sea. There is also a low flat rock, nearly level with the water's edge, lying S. W. by S. $1\frac{3}{4}$ mile, and a small peaked rock with a reef northward of it lying S. E. 2 miles from the East end of this island.

East Island is 8 miles eastward of the Reef Islands, and between them and distant 5 miles from the latter is a smaller island, named *Pe-ting*, $1\frac{1}{2}$ mile in circumference, with a reef extending in an easterly direction, not quite a mile from its North point. East Island is $2\frac{1}{2}$ miles in circumference, and a small islet lies half a mile from its north-western shore.

Nine-foot Reef lies N. by E. $\frac{3}{4}$ E. $12\frac{3}{4}$ miles from the North end of East Island, and from it Dome Hill on Poughou Island bears W. by N. $\frac{1}{2}$ N. $10\frac{1}{4}$ miles, and Three Island N. N. W. $\frac{1}{2}$ W. 4 miles. The lead gives no warning.

ROVER GROUP, consisting of two large islands, *Pa-chau* and *Tsiang*, and several rocks, are sufficiently extensive to afford shelter under their lee in either monsoon. *Pa-chau*, the western island, is $2\frac{1}{2}$ miles long, North and South, and a mile broad, and its summit rises like a dome with a large pile upon it. A reef extends $1\frac{3}{8}$ mile in a westerly direction from the S. W. point of the island, and its extreme shows at all times of tide. *Tsiang*, the eastern island, is only $1\frac{1}{4}$ mile long N. E. and S. W., and about $1\frac{1}{2}$ mile broad,

and the channel between it and Pa-chau is barely a cable wide. The East point of this island is remarkable from an isolated cliff, called *Rover Knob*, 100 ft. high, which forms the most striking feature in the group; and 7 cables eastward of the cliff is a ledge of rocks, part of which are always above water.

The channel between the Rover group being so narrow and intricate, the only excuse for a stranger using it would be his vessel being caught at anchor to the northward of the group in a breeze from the northward, and unable to fetch clear either eastward or westward.

High Island, bearing W. by S. $\frac{2}{3}$ S., $9\frac{3}{4}$ miles from the highest part of Pa-chau, is dome-shaped, 247 ft. high, and three-quarters of a mile in circumference. At 1 mile eastward of it is a low flat island, and between the two are several rocks, one of which has a remarkable gap in it, and rises 60 feet above the sea. A rock nearly level with the water's edge lies S.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ mile from the summit of High Island.

Yih-pan Island, 158 ft. high, 2 miles in circumference and uneven in appearance, is 4 miles northward of High Island, and S.W. $\frac{1}{2}$ S. $11\frac{1}{2}$ miles from the lighthouse on the S.W. end of Fisher Island.

Table Island, bearing S.S.E. $\frac{3}{4}$ E. nearly 5 miles from the lighthouse on Fisher Island, is aptly named, the summit being a dead flat 200 ft. above the sea. The island is not quite 2 miles long E. by N. and W. by S., and is seldom 3 cables wide. *Tablet Island* is about a mile northward of Table Island, and between them the depth is 12 to 19 fathoms. A shoal of only 9 feet least water extends N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ mile from the N.W. side of the island. From its north-western limit Dome Island bears N.E. by N. $\frac{3}{4}$ E.

PANGHOU or Ponghou Island, the largest of the Pescadores, is $9\frac{1}{2}$ miles in extent, North and South; it is, however, separated into three portions by narrow channels, which have only 2 ft. in them at low water, and are further blocked by stone weirs. The whole of the western face of the island is fronted by coral reefs. On its south-eastern side, between *Hou* and *Leechin Points*, are two bays with fishing villages, either of which afford anchorage in the N.E. monsoon. *Dome Bay*, on the S.W. side of the island, will also afford good anchorage in 6 fathoms. *Makung Harbour* is formed at the S.W. part of Ponghou, and although much confined by coral reefs it has sufficient depth for vessels of large draught. The town of Makung stands on the North side of an islet, close to the N.E. of the entrance, and will be easily recognized by a citadel and a line of embrasures. The large junks waiting for a favourable wind to take them to Formosa, anchor S.W. of the town in 7 and 8 fathoms, with Black Rock lying midway between Fisher Island and Makung, bearing N.E. by N. The harbour runs back 3 miles to the eastward from *Chimney Point*, the South point of entrance, on which is an old Dutch fort.

Running for Makung Harbour from the westward, pass about half a mile

southward of *Litsitah Point*, the South extreme of Fisher Island, and then steer E. $\frac{1}{2}$ N. for the town of Mukung. The only dangers to be avoided in entering this passage are, the shoal with 9 ft. on it, extending N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ mile from Tablet Island; and a reef, just awash at high water, at half a mile westward of Dome Island.

FISHER ISLAND, which in a collection of voyages in Dutch, published in 1726, is called D'Visser's Island, lies westward of Ponghou, and between them is the excellent and extensive harbour of Ponghou. The island is 5 miles long, North and South, and $3\frac{1}{2}$ miles broad. The S.E. point, *Siau Head*, is a bold cliff, 170 ft. above the sea. A reef breaks at low water at 7 cables from the western shore of the island, and its outer extreme bears N. by E. $\frac{1}{4}$ E. from the lighthouse.

Litsitah Point Lighthouse, on the S.W. extremity of Fisher Island, is a round iron tower, painted black, and 33 ft. high. The keepers' dwellings are painted white. The light is a *fixed bright light*, elevated 205 ft. above the level of the sea, and visible 15 miles off. It was established in December, 1875, and superseded an old native light which had been established a century.

Vessels seeking shelter in a N.E. gale will find smooth water off the southern shore of Fisher Island between the lighthouse and *Siau Head*, where there are two sandy bays. *Niu-kung Bay*, between the N.E. end of Fisher Island and Pehoe Island, will afford shelter in the S.W. monsoon.

PONGHOU HARBOUR.—The eastern coast of Fisher Island trends northward from *Siau Head*, and forms several small bays which are steep-to to a cable's length of the beach until $2\frac{1}{4}$ miles North of the head when reefs extend nearly 3 cables off shore. To avoid these reefs the fall of *Siau Head* must not be brought southward of S. by W. $\frac{1}{4}$ W.

The harbour northward of the anchorage is much choked with coral patches. There is a passage out to the northward between Fisher Island and Pehoe Island, and it may be used on an emergency by vessels of 15 ft. draught, but a local knowledge is necessary to render it available.

The archipelago, to the northward of Fisher and Pehoe Islands, does not afford any inducement for a vessel to enter it.

Tortoise Rock, 9 ft. above high water, and steep-to, lies about $2\frac{1}{2}$ miles from the N.W. point of Fisher Island, and N. by E. $\frac{1}{8}$ E. $7\frac{1}{2}$ miles from the lighthouse. There is a shoal patch of $1\frac{3}{4}$ fathom at 6 cables S. $\frac{3}{4}$ E. from the rock, and N.W. $\frac{3}{4}$ N. from the N.E. point of Fisher Island.

Sand Island, three-quarters of a mile long, North and South, and a quarter of a mile broad, bears N.E. by E. $\frac{1}{4}$ E. $2\frac{3}{4}$ miles from the Tortoise Rock, and it will be known by a hummock which rises on the low land in the centre of the island, and also by its yellow appearance; a rock lies off its S.W. end, and reefs extend N.W. 3 cables from its N.W. point.

Bird Island bears E.N.E. from Sand Island, and a long sandy point, off

which is a small sand island with a house upon it, forms its southern extreme. Shoal water extends 3 miles northward from the North point of Bird Island, and near its centre is North Island, which has a house upon it to shelter the fishermen, and upon a reef half-way between them is another house. The northern edge of the shoal water uncovers at low tide. Shelter during a north-easterly wind might be found on the West side of Bird Island; and from southerly winds, to the northward of the reefs extending from the North point of the island. *N.W. Outlier* is a shoal patch of 5 fathoms, lying N. by W. $\frac{3}{4}$ W. from Sand Island, and West $3\frac{1}{2}$ miles from North Island. *Sable Island*, bearing S.E. by S. 5 miles from the N.E. end of Bird Island, is a small islet with a sand patch on its South cliff, and surrounded with rocks.

Organ Island is 3 miles S. by E. $\frac{1}{2}$ E. from Sable Island. N.E. $\frac{3}{4}$ N. 1 mile from it is a reef, from which Sable Island bears N.W. by N. *Ragged Island* is nearly a mile S.E. by E. from Organ Island.

Round and Three Islands.—Leechin Point, the East extreme of Ponghou, is low and shelving, and $1\frac{1}{2}$ mile eastward of it is Round Island, bearing S. by E. $\frac{2}{3}$ E. $3\frac{1}{2}$ miles from Ragged Island; and S. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile from Round Island is Three Island. N.W. by W. $\frac{1}{3}$ W. from Three Island, and S.W. from Round Island, is a reef which covers at half tide.

Tides.—It is high water, full and change, in Makung Harbour, at 10^h 30^m; springs rise $9\frac{1}{2}$ ft., neaps 7 ft. The tidal streams among the Pescadores run with great strength, but they are much affected by the prevailing winds. Vessels navigating in this neighbourhood may safely allow that the effect of the current and tidal stream together will set them, according to the prevailing monsoon, 17 miles in one tide. Tide races are common, and overtop with great violence.

CHAPTER XXIII.

RIVER MIN TO SHANGHAI.

The RIVER MIN, $8\frac{1}{2}$ miles N.W. $\frac{1}{2}$ W. from the anchorage at the White Dogs, is formed between sandbanks, which extend 7 miles from the land, that partly dry at low water. The range of banks terminates to the eastward at *Outer Min Reef*, a detached rocky patch, two peaked heads of which show at the last quarter ebb. Woufou Island, 6 miles long East and West, and 4 miles broad, is situated within the entrance, and near its N.E. point is the little island of Hokeang, with its two contiguous islets called the Brothers. Vessels of 12 ft. draught can go up to Fuchow.

Pilots.—A staff of European pilots conducts the navigation of foreign vessels entering or leaving the River Min, but notwithstanding the skill of many of these individuals, wrecks are of not unfrequent occurrence among the shifting sandbanks and intricate channels of the river. Pilot-boats are always cruising in the vicinity of the White Dogs and Matsou, or between Tongsha and the entrance; they are of Chinese rig, and carry a flag, white and red horizontal.

Caution.—To those well acquainted with the port, it is easy of access with proper care and attention, but in face of the frequent changes of the entrance, it would be imprudent in others to risk taking their ships in without a pilot. There are unlicensed Chinese pilots at the White Dogs, but these are not to be trusted, notwithstanding their numerous testimonials.

Tides.—It is high water, full and change, at the White Dog Islands, at 9^h 0^m, springs rise 18 ft.; at Temple Point, River Min, at 10^h 45^m, springs rise 19 ft., neaps 14 $\frac{1}{2}$ ft.; and at Losing Island it is high water at noon. It is high water at the White Dogs about 2 hours before the tide has done flowing at the Rees Rock.

Considerable alteration has taken place in the entrance to the River Min, previous to 1868, when the entrance was again surveyed by Commander E. Brooker, of H.M. surveying vessel *Sylvia*. The banks between North

Breakers and Rees Rock had shoaled to 9 ft., and thus closed the principal or South channel, whilst the North channel, heretofore irregular and uncertain, opened out with a clear, direct, and accessible passage, having 15 ft. on its outer bar at low water springs.

With a 16-ft. rise of tide the best time for entering the Min is from half-flood to half-ebb. The North sands of the entrance begin to cover at a quarter flood. At low water springs they dry about 3 ft. ; at neaps they do not show. In fine weather the North and South breakers appear from half-ebb to half-flood, and the Outer Knoll, which has only 10 ft. on it, seldom until after the last quarter ; but in bad weather a line of breakers extends from the Outer Knoll across the North bank, and a continuous line from the South breakers to Black Head.

Outer Min Reef is nearly half a mile in extent, and only shows at low water. In clear weather it may be passed outside at a mile by keeping the summit of Tong-sha S.E. by S. till Rees Rock is open southward of Wou-fou Island.

Rees Rock is a small black rock which never entirely covers. It is marked by a beacon built of granite, which is "used as a range for the Middle Channel and as a general landmark."

South Channel is now disused by large ships. The leading mark in was Rees Rock in line with the North extreme of Hokiang, N.W. by W. $\frac{1}{4}$ W.

BUOYS of North Channel.—*Outer or No. 1 Buoy* is a fairway buoy in 8 fathoms, off the northern entrance of North channel, and is about 3 miles N.W. $\frac{1}{2}$ W. from the outer part of Outer Min Reef. It is a large buoy, 10 feet in diameter, painted in *red* and *black* horizontal stripes, and surmounted by a black cage, 18 ft. above the water. From the buoy, Sharp Peak bears W. $\frac{1}{2}$ N. nearly, and Rees Rock S.W. $\frac{2}{3}$ W.

Middle or No. 2 Buoy is a fairway buoy in 4 fathoms, and about $2\frac{1}{2}$ miles S.W. by W. $\frac{3}{4}$ W. from Outer Buoy, to which it is in all respects similar, except that its cage is in the form of a truncated cone. From it, Sharp Peak bears W. by N. $\frac{2}{3}$ N., and Rees Rock S.W. $\frac{1}{2}$ S.

Inner or No. 3 Buoy is also a fairway buoy in $7\frac{1}{2}$ fathoms, and lying about $2\frac{1}{2}$ miles W. $\frac{1}{3}$ S. from Middle Buoy, with Sharp Peak bearing N.W. $\frac{1}{2}$ W., and Round Island S.W. $\frac{2}{3}$ W. It is precisely the same as Outer Buoy.

The small Round Island in line with the first gap left of the Serrated Peak, W.S.W., leads over the Outer Bar and up the North Channel, until Kushan Peak is in the middle of the saddle of Square Peak, bearing W. $\frac{3}{4}$ S. With these latter marks, run in until the highest part (white patch) of West Brother is on with the right fall of East Brother N.W. by W. $\frac{3}{4}$ W., which leads over the Inner Bar, in 10 ft. at low water. This bar is very narrow, and the marks must be carefully attended to. The Inner Bar is to the southward of Sharp Peak Island, the peak of which, 616 feet

high, is a prominent landmark. On the south-western extremity of the shelf off Sharp Peak Island is a sunken rock, having 8 ft. on it at low water springs, and on which the British ship *Erne* struck in August, 1872. A *red nun buoy*, 6 ft. in diameter, is moored in 14 ft., low water springs, on the southern extremity of the rock, with Sharp Peak Point bearing E. by S. $\frac{1}{4}$ S., and Sharp Peak N. by E., easterly.

South Coast Passage.—South of Woufou there is a passage, over the flats at the entrance, and along the mainland, by which the Min is entered, about 6 miles below Pagoda Island, and 10 miles above Sharp Peak. Large junks use it, and the English pilots, occasionally, to save time, as the distance is about 5 miles shorter than by the main channel. The deepest water is found with square Peak on Wou-fou Island bearing from N.W. by W. $\frac{1}{2}$ W. to N.W. by W. $\frac{3}{4}$ W., till the highest peak left of Serrated Peak is in line with the outer rock off Sand Peak Point, W. $\frac{3}{4}$ S. Keep on this leading mark until close in, passing the outer rock at a cable, from which steer well open of Meewah Town Point.

The River.—On the North side of the first reach of the river, off the point under Woga Fort, which is a circular building on the summit of the southern hills of Woga, is the *Zephyr Rock*, with only 5 ft. on it, at three-quarters of a cable from the shore: there are 5 fathoms inside it.

Off Temple Point are two patches of 2 fathoms; also, in mid-channel, 3 cables off the point, is the Temple or Six-foot sunken rock, marked by a *red buoy* on the southern extremity of the rock, to the southward of which vessels should pass. When on this rock, Woga Point is in line with Sharp Peak.

On the South bank, on the mud spit which extends westward from West Brother and abreast the Six-foot Rock, is a patch of rocks which cover at a quarter flood.

The best position for anchorage is said to be with East Brother S. $\frac{1}{2}$ E., and Sharp Peak Point E.S.E. In the N.E. monsoon, the high land of Woga in line with or a little open of Temple Point is a good line to anchor on; in the S.W. monsoon Woga Creek is the best anchorage.

Kinpai Pass is dangerous to strangers, particularly at or near spring tides, for then the violence of the current produces eddies among the rocks, that occasionally cross the channel, and renders the vessel totally unmanageable, even in a fresh breeze; it therefore should never be taken without a pilot or personal knowledge, and then at slack tide. On the flood a dangerous eddy extends from Kinpai Point above it, in the direction of the Ferry; and for this reason the passage North of the Middle Ground is considered the best. The *Wolverine Rock*, with 13 ft. over it, lies S.W. by W. $\frac{1}{2}$ W. from the North extreme of Kinpai Point, and $1\frac{1}{2}$ cable from the shore. The *Vixen Spit*, at the eastern end of the Middle Ground, lies S.W. 3 cables from the point, and the distance, from $1\frac{1}{2}$ fathom on its South edge to the southern shore, is about a cable.

Enter the pass South of Pass Island and the other islet S.W. of it, and when past White Fort, close the northern shore, which is steep-to, until Serrated Peak is in line with the Ferry house on Woufou, S. $\frac{1}{2}$ W., which is the leading mark across between the Middle Ground and Quantao Shoal. This is also a good line for vessels to anchor on when coming down the river, and waiting for an opportunity of dropping through the Pass.

The danger of this passage is in passing the northern shoulder of the Middle Ground, which forms a sharp angle with only 1 foot on it at low water springs, and 4 fathoms close-to; from this point to the shore the distance is only $1\frac{1}{4}$ cable. After clearing this spot, in passing either up or down, the tide will tend rather to set the vessel from the bank into the stream. The highest part of Pass Islet in line with White Fort bluff outer extreme is a near clearing mark for the northern shoulder of the Middle Ground. It is recommended to shut Pass Islet in altogether until past that point, opening it again immediately afterwards. Vessels drawing 8 ft. (and sometimes 12 feet) can pass over the Middle Ground at half tide.

At Slack water, Kinpai Point and the small islet off it (not marked on the chart) may be rounded closely and the South shore kept on board for half a mile, when a vessel may edge across the stream W. $\frac{1}{2}$ S. towards the other shore, and steer for Wedge Island, thus clearing the shoal that extends 3 cables off the Ferry house on the Kinpai shore.

Tongue Shoal, which is steep-to, skirts the Wou-fou shore, extending more than half across the river. Its elbow, with only 7 ft. water, which is the most necessary part to avoid, is half a mile N.N.E. of Half-tide Rock, and may be cleared by keeping the Ferry house midway between Kinpai Bluff and the tower, until the highest point of Kowlui Head comes in line with Half-tide Rock.

Half-tide Beacon.—Half-tide Rock, which is near the upper end of the Tongue Shoal, is marked by a granite Beacon like a monument. From this to Tintao, 2 miles higher up, the bottom is very irregular.

Mingan Pass.—Proceeding upwards, the river narrows at the Mingan Pass, where the land rises on either side to 1,500 or 2,000 ft. About three-quarters of a mile above Mingan, and on the same side of the river, is Couding Island, off the East point of which H.M.S. *Scout* grounded on a rock at the end of a ledge projecting 25 yards from the islet, with 7 ft. near its extreme.

Buoys.—At the upper or South end of the gorge, where it opens out, and on the East side of the river, are *Spiteful* and *Flat Islets*, which must be left on the port hand. The *Spiteful Rock*, showing at low water, is part of a rocky ledge projecting about 30 yards from the S.W. point of the island, and is marked by a *black* nun buoy. There is also a *red* nun buoy on the opposite side, at the extremity of the spit extending north-eastward from Losing

island, from which Spiteful Island bears N.E., and Flat Island S.E. $\frac{3}{4}$ E.; a course between the two buoys leads clear of all danger.

To pass between Spiteful Rock and Losing Spit, and avoid the latter, do not shut in Younoi Head with Flat Island until Black Cliff Head, just passed (marked with a white spot) comes in line with the northern edge of Spiteful Island.

Pagoda, Rock, Beacon, and Light lie off the South point of Losing Island. The rock dried formerly at low-water springs. The beacon is an iron pile, 28 ft. high, surmounted by a cage, and a red light, 14 feet above high water, is exhibited from it from sunset to sunrise.

FUCHAU FU (or Foochow), 34 miles within the entrance of the River Min, was opened to foreign commerce by the Treaty of Nanking in 1842. The city is built on a plain, and lies about 3 miles from the river side, to which it is connected by a line of suburbs. The foreign hong and British and other foreign consulates are principally at Nantai, on the opposite or South bank of the river, which is connected with Fuchau by a massive stone bridge. So also are the church, hospital, cemeteries, &c.

The anchorage for foreign vessels is at Losing Island, generally called Pagoda Island, 10 miles from the city of Fu-chau. Foreign vessels, with the exception of small schooners or steamers of very light draught, are obliged to anchor here, farther approach to the city being prevented by difficulties of navigation and lack of sufficient depth of water, the natural shallowness having been largely increased of late years through shoaling caused by the barrier constructed in 1841, with the object of preventing access to the city by the British ships of war. The channel of the river is very tortuous, and is said to be constantly changed by heavy freshets.

The dock here is owned and managed by Europeans. Its length is 300 feet, breadth 95 feet, and depth 22 feet. It has an average depth of water at springs of 17 ft., and neaps of 14 ft. Steam power is used for pumping dry. An imperial dockyard and arsenal is also established.

Supplies.—Coal is to be obtained, both British and Kelung, from floating hulks and from coal stores on shore. There are some general stores in the place, and boarding houses kept by Europeans. Beef and poultry are the staples of animal food. Foochow bacon and hams are much prized, and largely shipped to all parts of China. Game and wild-fowl are to be had in their season, and occasionally venison. Fish abounds in great variety, and oysters are very plentiful in the cool months, but are dangerous if eaten raw. Fruit and vegetables are abundant, and excellent potatoes are largely grown for the supply of foreigners.

The principal foreign imports are cotton and woollen manufactures, metals, and opium; and the native imports bean cake, beans and peas, tea, mats, oil, sugar, &c. The exports are tea, paper, oranges, woods, &c., but tea is the only staple of importance.

On leaving the river, take care that the set of the tide across the channel between Sharp-peak Point and Rees Rock does not force the vessel on the shoals on the North side of the channel. Fair anchorage in 6 fathoms, to stop during a tide, will be found with Rees Rock bearing S.S.E.

The junks generally use the *Woga Channel* between Woga and Sharp-peak Islands, but to the northward of the latter island there are several sandbanks which show at low tide, with not more than 6 to 9 ft. water between the banks. Small steamers may proceed to sea by this channel with considerable advantage in the N.E. monsoon, as they are enabled, with fore and aft sail, to fetch up between Matsou and Chang-chi, and if bound to Formosa a very weatherly departure is ensured. A pilot, however, should be taken and due caution exercised, because the banks are liable to change, and personal knowledge is requisite for the safe navigation of the channel.

MATSOU ISLAND lies N.E. of the entrance of the Min, and North 10 miles from the western White Dog; and between the two and N. by E. $\frac{1}{4}$ E. $6\frac{1}{2}$ miles from the latter is a precipitous black rock, the *Sea Dog*, 60 ft. high, and surrounded by rocks.

Hebe Reef.—S.W. by S. 1 mile from the Sea Dog is a rock which shows when there is a heavy swell on and at low-water springs. When on it the West end of Matsou bears N.N.W. $\frac{1}{4}$ W., and Breakwater Rock at Tongsha Island S. by W. $\frac{3}{4}$ W. The East end of Reef Island (off the East point of Matsou) in line with Changchi Peak N. by E. $\frac{1}{2}$ E. leads to the westward.

Between the Sea Dog and the East end of Matsou are two other rocks above water, the *Sea Cat* and *Flat Rock*.

Pilot Rock was examined by H.M.S. *Nassau* in 1878. It breaks at low water, and lies 3 miles East of Sea Cat Island, with Changchi Island peak bearing N. by W. $\frac{1}{2}$ W. and Sea Dog Island S.W. by W. $\frac{3}{4}$ W.

Flat Rock should not be approached on its southern side, as two dangerous pinnacle rocks lie 6 and 9 ft. below the surface of the water at nearly half a mile to the southward. These pinnacles are named the *Norman Court Rocks*, and between them and Flat Rock is a $2\frac{1}{2}$ -fathom patch. A rocky ledge, with 6 fathoms over it, extends S.E. by S. $1\frac{1}{2}$ cable from Norman Court Rocks.

Ayma Rock, on which the American barque *Benjamin Ayma* struck in Jan. 1878, lies 5 miles westward of the West side of Matsou Island. It is a small 3-ft. patch, steep-to, with 9 and 10 fathoms close around. The South extreme of Changchi Island, in line with the North extreme of Matsou leads southward of it, and Crab Island bearing North leads eastward of it.

Anchorage will be found on the western side of Matsou during the N.E. monsoon, and good shelter in the deep bay on its northern face in the S.W. monsoon.

CHANGCHI ISLAND, at $1\frac{3}{4}$ mile N.E. of Matsou, has on it two remarkable sharp peaks, the highest being 1,030 ft. above the sea. Off the northern

face of the island are several islets, the largest of which, Gordon Islet, bears North $2\frac{1}{2}$ miles, but there is no safe passage between them. N.E. $1\frac{1}{2}$ mile from the North point of Gordon is a small black rock, with a reef lying westward of it.

At half a mile S.S.E. $\frac{2}{3}$ E. from the islet off the South point of Changchi are two rocks always above water; and West $1\frac{1}{4}$ mile from the South point is the *Pastel Rock*. The *Frio Rocks*, about 50 ft. in height, lie N.E. by E. $\frac{1}{2}$ E. 2 miles from the N.E. point of Changchi.

The bay on the South side of Changchi affords good shelter in the N.E. monsoon, but a heavy swell rolls in at times. Vessels entering from the northward can round its eastern point close-to, and anchor within the point, in 6 fathoms. Either this or the anchorage on the western side of Matsou, which is preferable, should be used by sailing vessels bound to the River Min during the N.E. monsoon, as they may always get to the bar from hence the precise moment they require it, whilst from the White Dogs a vessel will barely fetch.

Alligator Island, or Tungsha, in lat. $26^{\circ} 9' N.$, long. $120^{\circ} 26' E.$, is a barren rock, about 40 ft. above the sea, bearing East $22\frac{1}{2}$ miles from Matsou Island, and N.E. by E. $\frac{1}{3}$ E. 26 miles from the South end of the White Dogs.

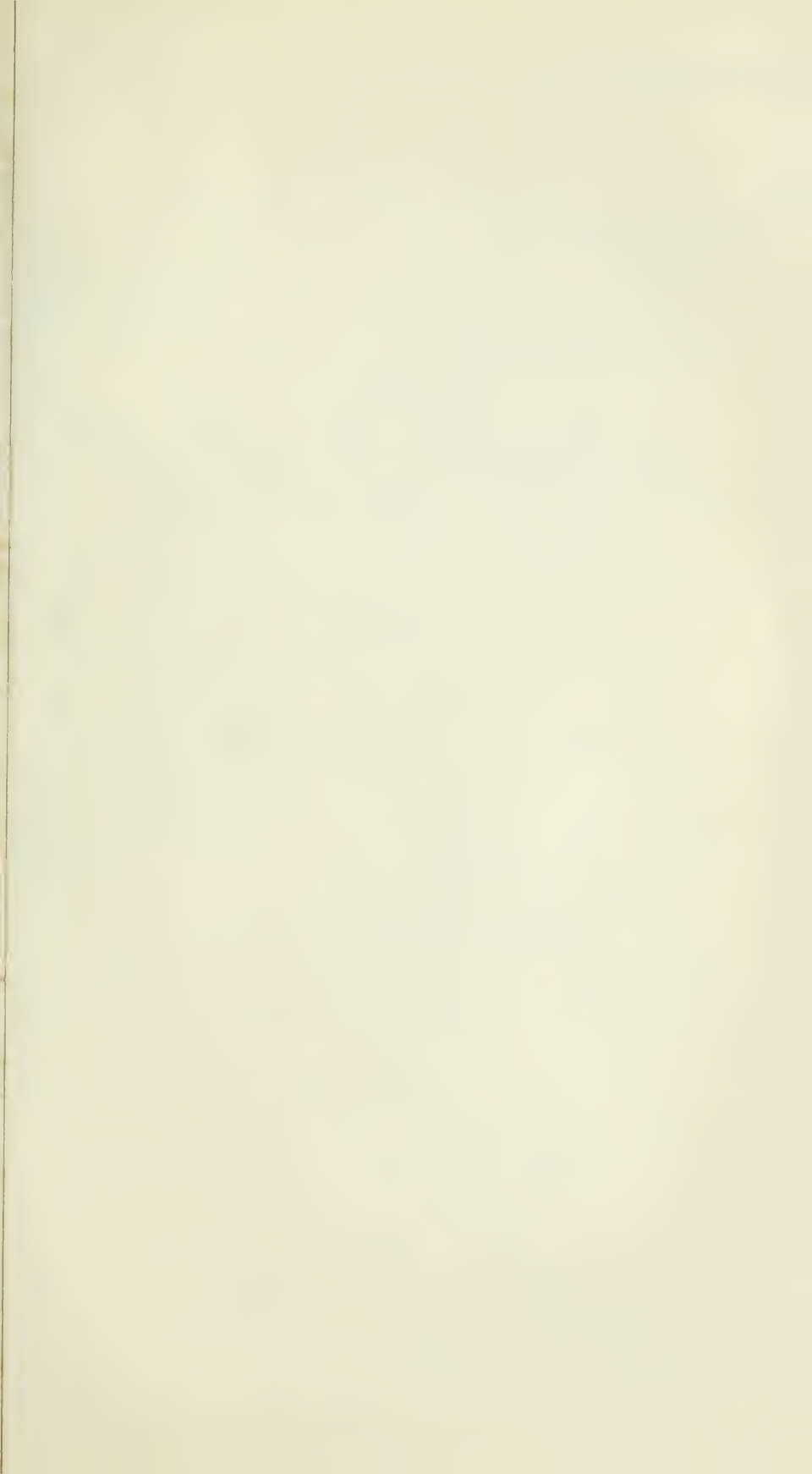
Larne Rock, lying N.W. by W. $12\frac{1}{2}$ miles from Alligator Island, is low and flat, with a reef lying 2 cables North of it. *Larne Islet*, bearing N. by E. $5\frac{1}{2}$ miles from Larne Rock, has ledges extending from its North and South ends. It is about 200 ft. above the sea, with large boulders sticking up here and there; near its summit are three houses.

Black Rock, 40 ft. high, is 7 miles W.N.W. of Larne Islet, and 6 miles E. $\frac{1}{4}$ N. of Ragged Point on the mainland. A reef shows at low water E.N.E. $5\frac{1}{2}$ miles from the Black Rock, and from it Larne bears S. by E. $\frac{1}{2}$ E. 5 miles, the North end of Tung-ying Island E. by S., and Cony Islet N.W. $\frac{2}{3}$ N.

Tung-ying, the easternmost island on this part of the coast, bears E. $\frac{1}{2}$ N. 13 miles from Larne Islet, and its peak rises 855 ft. above the sea. Its appearance is level and flat, with steep cliff shores, and a large village stands on its western side; off its South extreme is a ledge of rocks. It is proposed to establish a *lighthouse* on its summit.

There is good anchorage in the N.E. monsoon in 10 fathoms, at half a mile southward of the small island lying off the N.W. point of Tung-ying. This island appears as part of Tung-ying, except on a N.E. by N. or S.W. by S. bearing.

Cony is a remarkable conical island, lying W.N.W., 19 miles from Tung-ying. A reef extends 3 cables off its N.E. shore, otherwise the channel, nearly $1\frac{1}{2}$ mile wide, between it and the two islands North of it, is safe. A rock awash at low water, lies East $1\frac{1}{2}$ mile from the cone, and another S.E.



$\frac{1}{2}$ E. $1\frac{3}{4}$ mile; from the latter, S.W. of which there is uneven ground, the South end of Spider Island bears W. $\frac{3}{4}$ N.

Spider Island is $3\frac{1}{4}$ miles westward of Cony, and its highest part is 620 feet above the sea. There is a large village in a bay on its South side, a reef off its S.W. point, and four small islets off its N.E. face. Between it and the main, which is $5\frac{1}{2}$ miles distant, there are three other and larger islets; between the first and Spider Island is a half-tide rock; the centre one, named *Isthmus Island*, has a sandy isthmus, and a mud bank extends westerly from it, but the channel between it and the first islet is clear. The passage between Isthmus and Inside Islet, $1\frac{1}{2}$ mile to the westward, is obstructed by a reef, some rocks of which uncover at half-tide, and which extends 6 cables E.N.E. from Inside. The channel between the latter islet and Cox Point has 6 to 4 fathoms, and is a mile wide. West of Spider and southward of Isthmus are the two groups of Larva Rocks, with a channel between them; two rocks on each are above water. The channel between Isthmus and Larva is contracted to a mile by reefs extending northward from both the latter groups.

There is good shelter from N.E. winds on the West side of Spider Island.

Ting-hae Bay, formed on the West side of a peninsula of the mainland, 13 miles westward of Changchi, affords safe anchorage in $2\frac{1}{2}$ to 3 fathoms in the N.E. monsoon.

Fronting this bay to the southward and S.E. are many islands and rocks. The outermost (four islets above water, named *Square Rocks*) lie 3 miles to the southward, with reefs extending northerly from them. To the N.E. of them is *Crab Islet*, surrounded by reefs, which extend off its N.W. part at least half a mile. In the channel between Crab Islet and Ting-hae Point are two islets.

Wanki Bay, 6 miles E.N.E. of Ting-hae, is frequented by junks, but although it affords them good shelter it cannot be recommended for larger vessels. There is a rock, which shows at low water, lying near the centre of the bay at 7 cables off shore, with Pe-kyau Point E. $\frac{1}{2}$ N., and the nearest Claret Rock S.E. by S.

Claret Rocks are $1\frac{1}{2}$ mile southward of the East point of Wanki Bay. Three of them are from 20 to 30 ft. above the sea, but they are all surrounded by sunken rocks, the southernmost of which lies S.W. $\frac{1}{2}$ S. half a mile from the South Claret. A stranger should pass South of the Claret Rocks, and haul up when the village in Wanki Bay bears North.

Ragged Point is the N.E. extreme of a narrow peninsula, in some places only half a mile across, which runs $5\frac{1}{2}$ miles E.N.E. of Wanki Bay. A quarter of a mile eastward of the point is *Diplo Islet*, with a reef extending three-quarters of a cable eastward of it. Steamers frequently anchor under the small island westward of Ragged Point.

Sam-sah Inlet.*—The entrance to this inlet, at 10 miles westward of Spider Island, is $1\frac{3}{4}$ mile wide, with deep water and strong tides. There is a rock in mid-channel W. $\frac{1}{4}$ S. 6 cables from Castle Point, from which the centre peak of Cone Island bears N. $\frac{1}{4}$ W. and Steep Rock N. by E. $\frac{3}{4}$ E. ; to pass eastward of it, keep the West end of Cone Island in line with the highest peak of Crag Island.

On the eastern side, close to the entrance, is a small bay with a fort in it, and here the junks remain for a tide, but the water is very deep, and shoals too suddenly for vessels that cannot take the ground.

At 4 miles southward of the entrance of Sam-sah Inlet is the opening to another inlet, 10 miles deep ; there are 30 fathoms water at the entrance, but circumstances did not admit of its being examined.

Off the entrance to these inlets, about 4 miles north-westward of Ragged Point, and 7 miles south-westward of Spider Island are three islets, named *Rag Islands*, and a mile northward of the easternmost is the *Bittern Rock*, which covers at high water. The *Plover* anchored westward of the westernmost islet and found tolerable shelter. Off the Rag Islands the tides run with great strength, and a long swell rolls home into Sam-sah Bay with N.E. winds.

Double Peak Island is $3\frac{1}{2}$ miles long, N.N.E. and S.S.W., and near its northern end are two remarkable peaks, the highest of which rises 1,193 ft. above the sea. It lies 3 miles N.E. of Spider Island, the only danger in the channel between being the rocks lying off the North end of the latter island.

There are two cone-shaped islets between Double Peak and Cony Island, with channels between too narrow for sailing vessels, but there is a good passage between the southernmost of these islets and the reefs extending north-eastward of Cony Island. A rock above water lies a cable N. by W. from the West point of Double Peak Island. At $1\frac{1}{2}$ mile westward of the North end of Double Peak is *Flap Island*, a low flat islet, with a sunken rock off its southern point. There is no passage fit for vessels between this islet and the mainland.

There is good anchorage in the N.E. monsoon on the S.W. side of Double Peak Island, to the S.E. of a small islet, with a rock above water on each side of it, lying three-quarters of a mile westward of the West point of the island ; the two cone-shaped islets northward of Cony Island sheltering from the eastern swell. There is also good shelter abreast the first sandy bay within the point westward of Flap Island. Here were found six piratical junks plundering part of a convoy they had captured.

* Sam-sah Inlet is not known by that name to the natives or European coasters. The true Sam-sah lies farther North, being a small cove at the N.E. angle of Fuh-ning Bay, at 2 miles N.W. of the North point of Fongho Island. There is anchorage, in the N.E. monsoon, in the cove half a mile eastward of it, in 3 to 5 fathoms, but it would be scarcely safe to proceed into it without the services of a pilot,

From Flap Island the coast trends northward for 10 miles to *Fielon Island*, and off it is *Bittern Island* and several rugged rocks, which vessels of large draught should give a berth to, and not close the shore under the depth of 6 fathoms. Between Bittern Island and the main there is good anchorage in $3\frac{1}{2}$ fathoms for small vessels in either monsoon. On the N.W. side of the island is a sandy cove, where fresh water will be found. From Fielon Island the coast falls back to the westward, forming a deep but shallow bay, on the shore of which is the city of *Fuh-ning*. In the northern part of the entrance is a group of islets extending 2 miles from the coast.

Pih-seang Islands lie E. by N. $8\frac{1}{4}$ miles from the North point of Double Peak Island. The northern islet, named *Town Island*, is the largest, and the little cove at its S.W. angle will afford shelter to one or two small vessels. Between the northern and southern islets of the group there is a channel free from rocks, but the intervening space is thickly studded with fishing stakes. A reef extends half a mile in a north-easterly direction from the easternmost of the Pih-seang Islands, which lies S.E. 2 miles from Town Island. The sea breaks on the reef.

Fuh-yan Island, 1,700 ft. above the sea, lies North 12 miles from the Pih-seang group, and between it and the coast is a good roadstead, named *Lishan Bay*, where good water is plentiful and easily obtained. It is high water, full and change, at $10^h 15^m$; springs rise 16 ft.

Dangerous Rock, in lat. $26^\circ 53' N.$, long. $120^\circ 34' 18'' E.$, has its summit 8 ft. above high water, or 24 ft. above low water springs. It is 9 miles E.S.E. of Fuh-yan, and 14 miles N.E. of Town Island, Pih-seang group.

Tae Islands lie E. by N. 16 miles from the eastern point of Fuh-yan. The eastern one, 618 ft. above the sea, is the largest, and remarkable for its table top. Shelter in the N.E. monsoon can be had under this island as close as a vessel can safely go (say half a cable's length), but it is bad. S.S.W. $\frac{1}{4}$ W. 3 miles from the easternmost Tae Island are two rocky islets named *Strawstack*, about 100 ft. high; they almost join. Close to the N.E. point of the northern Tae Island is a remarkable rock, the *Mushroom*, 260 ft. high. A rock has been reported by the master of the steamer *Waratah* as lying about 4 miles westward of the Strawstack, and visible at low-water springs.

Between the Tae group and Fuh-yan are the *Incog Islands*, too small to afford shelter; they are low and flat, with steep cliffs. At 3 miles N.W. of these islands is *Solitary Rock*, with a reef extending 2 cables in an easterly direction from it; the soundings between this and the main, from which it is distant $3\frac{1}{2}$ miles, vary from 7 to $5\frac{1}{2}$ fathoms. A slight examination was made in 1866, of the Incog Islands and the channel between these and Solitary, by Commander Charles Bullock, R.N., H.M.S. *Serpent*. The channel was found clear, and the islands appeared to be steep-to all round the group.

Vessels passing inside the Tae Islands should keep well to the westward, as the ground in their vicinity has not been well explored. *Two reefs*, which show at low water, have been found; from one, with the rocks on it 8 ft. above high water, the Mushroom Rock bears E.S.E., and the West end of the eastern Incog Island S.W. by W. $\frac{1}{2}$ W., on which bearing it is in line with the East end of Fuh-yan; and from the other, the table top island of the Tae group bears E. by S. $\frac{1}{4}$ S. and the West rock of the group N.E. by E. $1\frac{1}{4}$ mile.

Seven Stars are a group of rocks and islets, $2\frac{1}{2}$ miles in extent, which may be passed on the outside safely at a mile. The southern islet, about 200 ft. high, which is the largest, and split into two, is 7 miles N.E. by E. $\frac{1}{4}$ E. from the eastern Tae Island, and S.S.E. from Cleft Rock. A rugged islet, 70 ft. high, lies a mile N.E. by E. of it; and a mile farther are three low flat rocks, the easternmost of which covers, and bears S.E. $\frac{1}{2}$ E. 3 miles from *Cleft Rock*; the latter, 50 ft. high, and having the appearance its name implies, is 8 miles N.E. by N. from the eastern Tae Island.

Pih-quan Harbour lies N.W. 14 miles from the Tae group. Its entrance is between Ping-fong and Chin-quan Islands and the main. To the northward there is a high and very remarkable, sharp, conical hill, *Pih-quan Peak*, in lat. $27^{\circ} 18' 48''$ N., long. $120^{\circ} 28' 42''$ E., having on its summit the appearance of a cairn. The harbour is $1\frac{1}{2}$ mile wide, carries a depth of 3 fathoms, and affords good shelter in the N.E. monsoon to vessels under 15 ft. draught. Care is required, however, in entering, as a sunken rock, reported in 1877, lies in mid-channel, from which the islet at the South end of Chin-quan Island bears W. by N., and Ping-fong Rock (West side of Ping-fong Island) N. by E. H.M.S. *Growler*, in October, 1874, obtained shelter with the West extreme of Ping-fong Island bearing S.E. $\frac{3}{4}$ S., and the S.E. extreme of Chin-quan Island bearing S.W. $\frac{1}{4}$ W., in 3 fathoms at low water, muddy bottom, and good holding ground. The tidal streams are very strong.

Ping-fong has three chimneys on its summit; off its S.E. point is a low rock, which is never covered, and between this rock and Ping-fong is a sunken rock. Vessels bound from the northward may round this low rock at a cable's length, and then haul up for the South point of Ping-fong, giving it and also the S.W. point a berth of 2 cables. The Pih Pass, between the North end of Ping-fong and the main, is fit only for such junks as use sculls. Fresh water can be procured in the sandy bay at the foot of the three chimneys on Ping-fong.

NAMQUAN BAY, lying westward of Chinquan Island, is shallow, but anchorage will be found on the western side of Chinquan Island. Namquan town is on the North shore of Nam-quan Bay. Immediately westward of Nam-quan Bay is the entrance to Nam-quan Harbour, an inlet which runs about 15 miles in a general N.W. direction, when it appears to expand into a wide basin called Gordon Bay.

Within the North point of entrance is a town, 2 cables off which is a sunken rock. Having arrived within the point anchor in 14 fathoms, as the mud banks rise almost vertically. On the South side of entrance is a small fort with a few houses. The narrowest part of the channel is 6 cables wide, and the strong tides and baffling winds make it necessary to have a boat ready to tow the vessel's head round.

H.M.S. *Nimrod*, when proceeding up Nam-quan Harbour, January, 1857, struck on a rock with only 9 ft. water on it, lying about 11 miles from the entrance, and $1\frac{3}{4}$ cable eastward of a small islet on the western shore.

The Coast from Nam-quan Harbour trends N.E. by N. 21 miles to Ping-yang Point, and at the distance of 12 miles is *Tanue Bay*, which is too shallow to afford shelter to any vessel drawing over 10 ft. water. A low rock, named *Gap Islet*, lies $1\frac{1}{2}$ mile southward of Tanue Point; and N.E. $\frac{3}{4}$ E. $4\frac{3}{4}$ miles from it is *Farmer Rock*, which shows at low water, and lies $3\frac{1}{4}$ miles off shore, with Ping-yang Point bearing N.N.W., and Tanue Point S.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles.

From Ping-yang Point the coast takes a north-westerly direction, and is fronted by mud banks taking a N.N.E. direction, which dry 3 miles from the land at low water, and on which are several small islets and rocks 5 or 6 miles from the shore. At the distance of 11 miles from the point is the embouchure of the *Shwin-gan River*, by which the commerce of Wan-chu fu is maintained.

The bar at the entrance of the Shwin-gan has only 9 ft. on it at low water, and off it are the four *Tsang Islets*, the southern of which is the largest.

NAMKI ISLANDS lie N.E. by N. 30 miles from the Tae group, and on the south-eastern side of the largest, 740 ft. above the sea, there is a good harbour, called Port Namki. Vessels should not pass among the islets forming the S.W. part of this group, as there are many reefs which cover at high water. The westernmost islet, *Turret*, makes like a cone, and has reefs to the North and West of it. The southern islet, *Castellated Rock*, lies S.S.W. 5 miles from the rest of the group. In the N.E. monsoon, and with S.E. winds, a swell rolls into Port Namki. There is a bay on the North side of the West point of Namki which the junks frequent, and which is a good smooth water anchorage. Good water can be obtained in Port Namki.

PIH-KI-SHAN ISLANDS.—N.N.E. miles from Namki is another group, the largest island of which is named Pih-ki-shan. The four islets close to its S.W. side protect the anchorage on its South side from the easterly swell. Vessels should not, however, choose this anchorage, unless from necessity. Fresh water may be obtained.

At 11 miles W. $\frac{1}{2}$ N. from Pih-ki-shan, with five small islets intervening, is another group of one island and four islets. The island, called *Tung-pwan*

or *Brass Basin*, has anchorage off its S.W. face in 8 fathoms in the N.E. monsoon, but the shelter is not so good as that on the South side of the Tae-pih Islands, lying 3 miles to the N.W. of it, under which the water will be smooth in 4 fathoms.*

In working up to the northward of the Tae-pih and Tung-pwan groups, shoal water will be found to extend 8 miles from the foot of the hills on the main; at which distance is the 2 fathoms' line of soundings. On the eastern edge of this line, at $6\frac{1}{2}$ miles northward of Tae-pih, is the Pang-peto Reef, visible at low water; from it the western of the Tae-pih Islands bears S.S.W. $\frac{1}{2}$ W., and the southern of the Tseigh Islands E. by S. $\frac{1}{2}$ S.

TONG WHANG GROUP.—The *Tseigh Islands*, three in number, 8 miles N.N.W. of Pih-ki-shan, lie on the South of a large and numerous group. Between the Tseigh and Pwan-peen Island, the next island northward, is a navigable channel for vessels, 3 cables wide. Tong-whang, the largest island of the group, is 6 miles long N.E. and S.W., $2\frac{1}{2}$ miles at its extreme breadth, and its eastern face is high and precipitous; there is a junk channel between it and Pwan-peen. *Coin Island*, the eastern of the Tong-whang group, has three rocks lying N.W. of it, and to the W.S.W. is a low flat islet, named *Flask*, with rocks off its southern end, and two rocky islets to the north-westward, between which there is a safe channel of 8 fathoms water.

The entrance to *Bullock Harbour* is between the Tseigh group and a high island with bold cliffs, named Fakew. It has excellent anchorage in 4 to 10 fathoms, sheltered from all winds.

Vessels have no business in the space between the Pih-ki-shan and the Tseigh Islands, as the clusters of rocks there are interspersed with reefs covered at half-tide.

The San-pwan pass between Tong-whang and Miaow to the westward of it is of great value to small vessels steaming up against the N.E. monsoon; but in September, 1866, the north-eastern end of the pass was so filled up with fishing stakes and nets, that there was great difficulty in finding a passage for a gunboat.

WAN-CHU RIVER.—N.W. by W. 8 miles from Niaow Island is Wan-chu Island, fronting the mouth of the Wan-chu River. A mud spit extends

* It is stated by Nav. Lieut. Barns, R.N., who was cruising in these parts in 1866, that several of the names on the chart have been wrongly inserted or misapplied. For instance, Tung-pawn is not known to the Chinese by that name, but one of the Tae-pih group is so called. The natives call the Pih-ki-shan Islands Pah-ki, and Bittern Island Pih-ki-shan. And in the River Min, Wou-fou Island is properly Lowgai, and Pinnacle Island the true Woufou.

6 miles south-eastward from this island, leaving only a shallow channel of 7 ft. water between it and Niaoow, close to the latter.

At the entrance of the river it is high water, full and change, at 9^h; at Wan-chu fu it is high water at 9^h 30^m; and the rise at each place is 15 to 16 feet. The velocity of the flood is from 3 to 4 knots at springs; that of the ebb 4 to 5 knots.

Bound to this river from the southward, when abreast Coin Island steer N.W. $\frac{1}{2}$ N., leaving the Cliff Rocks to the northward and the North rock of Great San-pwan (Chwang-pien) Island to the South. Having passed the latter, edge away West for the South point of Hutau Island, leaving a remarkably steep bluff island, called Hokeen, to the South. Off the South point of Hutau, and abreast Hokeen, is a *sunken rock* lying $1\frac{1}{2}$ cable off shore, but it will be avoided by opening the S.W. point of Hutau to the southward of White Rock in Hutau Bay. South of White Rock there is a middle ground confining the channel, which is North of it, to a width of 7 cables. There is good anchorage in 4 and 5 fathoms to the S.W. of White Rock, but the bay within the rock is shoal.

From half a mile off the S.W. point of Hutau the entrance of the river bears W.N.W. 5 miles, and it will be known by an isolated range of hills with a square fort at the East, and a small walled town at the West end. The depths will vary from 3 to 4 fathoms in the channel outside the entrance which is more than a mile wide, but upon either side the edges of the extensive mud banks shoal suddenly, and at low water large tracts of them are dry.

Having passed the range of hills keep the left bank or Notch shore of the river aboard, until the first hill on the flat island (Wan-chau Island) bears S.W. by S., when the vessel will have cleared a little ground at half a mile from the South shore, and $1\frac{1}{2}$ mile E.N.E. of this hill; the highest part of Hutau in line with the South foot of the hills at the entrance bearing E. $\frac{1}{4}$ S. is the mark for its northern edge.

From abreast this middle ground, in the vicinity of which and fronting a village the depth decreases to 11 feet, keep mid-channel, passing a large walled town on the North shore of the river in 4 to 5 fathoms, then gradually haul over to the first point on the South side, where the hills come down to the water's edge, passing a point with a circular fort and a building like a large jar upon it close-to. The leading mark across, in 5 fathoms, is Salamis Point, East of Jar Point, in line with a remarkable gap, S.W. by W. $\frac{1}{2}$ W.

Vessels ought not to go more than $2\frac{1}{2}$ miles above Jar Point; they will then find anchorage in from $3\frac{1}{2}$ to 7 fathoms water. At this position, with the West extreme of the largest island bearing about North, there is a sunken rock off the South bank. From this anchorage the distance to Wan-chu fu is $5\frac{1}{2}$ miles, but the channel is too intricate for a stranger. Provisions are

cheap and abundant, and the authorities and people well disposed toward foreigners. Wood is procurable at 25 cents per picul.

In 1869 the upper channel was partially re-examined and found to have considerably altered since the survey of 1843. The spit extending from the large island had greatly diminished, along which a narrow channel ran in a N.N.W. direction, with soundings varying from 3 to 5 fathoms, deepening towards the high land and a dark bluff, close to which was 7 fathoms. The depth over the flats on the South side is only 3 ft.

Southern Channel.—There is said to be a good channel into the river on the southern side of Wan-chu Island and Flats, carrying from 3 to 5 fathoms, between the S.W. point of Niaow (Miaow) and the rocks lying a mile westward of it. It has a bar of 9 ft. *Pilots* can be obtained at a village on the West side of Niaow.

Junk Island, lying on the North side of Hutau, is low and rocky, and the channel between them, and between Junk Island and the main, can only be used by small junks. North of Junk is *Lot-sin Bay*, in the southern parts of which there is good anchorage. At 2 miles eastward of Hutau is *Quang-ta Island*, under the West side of which H.M. brig *Plover* anchored.

Kemong Harbour.—Westward of the East point of Ta-on is a bight named Kemong Harbour, with an islet off each point, in which the junks are fond of taking shelter. It is, however, confined, and vessels will have better anchorage to the eastward under either Taluk or Seoluk Islands. A rock lies awash in the middle of the entrance to the harbour.

Seoluk, Taluk, Chin-ki, Towan, and Pe-shan Islands form a group off the coast from 3 to 14 miles eastward of Ta-ou. Taluk, the centre and highest of the group, 770 ft. above the sea, is 30 miles N.N.E. of Pih-ki-shan. At the anchorage between the islands of Chin-ki and Taluk it is high water, full and change, at 9^h 20^m.; springs rise 13 ft.

Taow-pung Island, at 9 miles N.N.E. of Pe-shan, is 7 miles long N.N.E. and S.S.W., and 1½ mile broad, and forms the East side of *Yeyvan Bay*, which is shoal and affords no shelter. The island is separated from the main by *Penetration Pass*, a narrow channel through which all the country trade passes.

At 2½ and 3 miles respectively to the S.W. of Song-men Point, the South end of Taow-pung, are two flat rocks above water, a mile apart. To the south-eastward of the point are three islets, and the nearest, named *San-shi*, has a reef off its West side; the outer islet of the three has a shoal off its North end. There is a navigable channel, a mile broad, between *San-shi* and the rocks off the point. At 3 miles north-eastward of *San-shi* are the *Stragglers* and *Shetung Islets*; the northern and highest islet of the latter group has a reef lying 3 cables from its S.W. point, and many rocky islets off its South end, between which and the *Stragglers* there is a channel carrying a depth of 6 fathoms. Indifferent shelter in the N.E. monsoon may be

found under Shetung. *Soudan*, the easternmost islet of the group, is flat-topped, and has a reef off its South side.

Chikhok Island lies North 6 miles from *Soudan*, and as it rises abruptly in a cone to the height of 760 ft. above the sea, and has a broad yellow stripe on its south-eastern side, it forms altogether one of the best landmarks in this locality; and S.W. by W. $\frac{1}{2}$ W. of it is the most conspicuous hill on the coast seen from the offing. N.N.W. $1\frac{1}{2}$ mile from Chikhok is *Low Chikhok Island* with a half tide rock lying N.W. 3 cables from it.

Tai-chau Group extends 9 miles northward of *Hea-chu*, the southernmost island, and consists of two large and ten smaller islands. Between the two large islands is an excellent harbour, the approaches to which, both from eastward and westward, are free from danger. The southern of these islands, 750 ft. high, is called *Hea-ta*, the northern *Shang-ta*, which is well inhabited. Between *Shang-ta* and the *Shang Rock*, $1\frac{3}{4}$ mile to the N.N.E., there is a safe passage.

About 2 miles southward of the West point of *Hea-ta* are two rocks, the western of which lies S.S.W. $3\frac{1}{4}$ miles from the highest part of *Hea-ta*, and shows at all times of tide; the other, which bears N.E. $\frac{1}{2}$ N., $4\frac{1}{2}$ cables from the western rock, and S. by W. $\frac{3}{4}$ W. from the highest part of *Hea-ta*, covers at high water.

Several watering places will be found on *Shang-ta*, but the supply from any one of them is not abundant. The best anchorage in the harbour between the two large islands of the *Tai-chau* group, during the N.E. monsoon, is to the S.E. of the islets, extending from the S.W. point of *Shang-ta*. It is high water, full and change, at this anchorage, at 9^h 0^m; springs rise 14 feet.

Squall Islands, two in number, the southernmost of another, the *Tungchuh Group*, lie 6 miles N.W. by W. of *Shang Rock*, the northern islet of the *Tai-chau* group, and so close as to appear as one, except on an E.N.E. and W.S.W. bearing. Rocks lie off the N.E. and N.W. points of the northern island, and a reef extends from the S.E. of the southern island. Junks take shelter under the western point of the southern island during N.E. winds.

Crate Island is a small cliff islet $2\frac{1}{2}$ miles eastward of the *Squall Islands*, and the channel between has 8 fathoms in it; but the western end of *Crate* is not steep-to. A group of rocks lie 3 miles W. by N. of *Squall*.

Chuh-seu Island, lying N. by W. $\frac{1}{2}$ W., $4\frac{1}{2}$ miles from the *Squall Islands*, is remarkable, having a sharp cone, 670 ft. above the sea, over its southern point, and a *beacon* on its western summit. Between *Chuh-seu* and the *Squall Islands* are four rocks; and S.E. by E. $\frac{1}{3}$ E. $2\frac{1}{4}$ miles from the highest part of *Chuh-seu* is a solitary rock named *Fir Cone*.

Good anchorage and a convenient watering place, with abundance of water, will be found under and to the S.W. of the cone of *Chuh-seu* in 6 fathoms, between it and an islet with a reef off its N.E. point.

TAI-CHAU BAY, to the N.W. by W. of the Tai-chau Islands, is wide and shallow, and at its head is the entrance to the Tai-chau River, 17 miles West of the cone of Chuh-seu. On the South bank of the river is the walled town of *Haimun*, 4 miles above which the river separates into two branches, one taking a N.W., the other a S.W. direction. The city of *Tai-chau fu* is on the North branch of the river, about 24 miles in a direct line from Haimun. There are only 8 ft. at low water across the bay to the entrance of the river, but inside the headlands at the entrance the depths are $4\frac{1}{2}$ and 5 fathoms. The inhabitants reported that vessels of 12 feet draught could not cross the bar, except at high water, and that the tide, which rises from 18 to 20 feet in this locality at springs, would carry them up to the city.

Tung-chuh Island, lying East, a little northerly, 5 miles from Chuh-seu, is 700 ft. high. The two *Reef Islands* lie S.S.W. $2\frac{1}{2}$ miles from its South point; a reef extends north-easterly from the southernmost of the two. Midway between Reef and Chuh-seu is a cluster of rocks. *Gau-tau Island*, remarkable for four barren peaks, lies 3 miles N.W. of Tung-chuh, and there is a half-tide rock 3 cables North of its N.E. extreme. Shelter may be had in the N.E. monsoon under the South side of Tung-chuh, but vessels had better gain the anchorage under Chuh-seu, or endeavour to reach Barren Bay.

Barren Bay, formed between Gau-tau and Kin-men Islands, is $2\frac{1}{2}$ miles wide at its north-eastern entrance, and besides the half-tide rock just noticed off the eastern promontory of Gau-tau, there are rocks off the eastern point of Kin-men, and a mud spit off the N.W. point of Gau-tau. Immediately to the S.W. of Kin-men, and separated by a deep-water channel rather more than a cable across, is *Nine Pin Island*, divided near the centre by a sandy isthmus, on which is the rock from which the island is named. Very poor shelter will be found between Gau-tau and Nine Pin. South, 2 cables from the West end of Nine Pin, is a rock which will be seen at half tide.

Fall Island, lying nearly 2 miles northward of Kin-men, has off its West end two rocks above and one below water. The channel is safe between these islands, and also between Fall and Chain Islands, but the latter are not steep-to.

Chain Islands, three in number, bear N.W. by W. $4\frac{1}{2}$ miles from Fall Island. South, 2 cables from the centre island, is a half-tide rock; and there is a rock awash and two small islets lying off the West end of the southern island. Between Chain and Pine Cone to the southward are four detached rocks where the ground has not been examined.

Vessels should keep eastward of the whole group just described, for the space inside Chuh-seu, Kin-men, Chain, and Sanmun Islands is shallow, and has in it several rocks covered at high water.

HEISHAN GROUP, consisting of three inhabited islands and eight rocks, lie N.E. by E. $\frac{1}{2}$ E. 17 miles from Tung-chuh, and occupy a space 5 miles North and South, and 2 miles East and West, but they are too small and

too detached to afford shelter. The southernmost island, 320 ft. above the sea, is the largest. The northernmost island is named *Mushroom*, and N.E. $\frac{2}{3}$ E. $1\frac{3}{4}$ miles from Mushroom is a *sunken rock*, of 8 ft. water, from which the Cheng Rock appears in one with the S.E. end of Cliff or Sha-ho Island, bearing S.S.W. $\frac{1}{3}$ W. A quarter of a mile N.N.W. from Mushroom is a *rock awash* at low water.

Montagu Island, or *Tanto-shan*, lies 19 miles N.N.W. $\frac{1}{2}$ W. of the Hie-shan group; the northern portion is called *Gore Island*. There is an islet off the S.E. point, and sunken rocks obstruct the channel to the westward.

To the southward of Montagu, and at 2 to 4 miles from the eastern coast of the large island of Nyew-tew, are six islets; the southernmost, called the *Twins*, are 8 miles from Montagu, and the others are $1\frac{1}{2}$ to 6 miles from it, with clear channels between them. Abreast *Dike Islet*, the middle and innermost islet of the five, is *Nose Islet*, nearly connected with Nyew-tew at low water, and vessels passing between them must recollect that neither are steep-to.

Heroine Rock, awash at low water, was reported in 1851, and has since been placed in several different positions on the chart. Commander Matthews, of the U.S. ship *Ashuelot*, in 1875, examined these different positions, and fixed the position of the rock:—South end of Sanchesan or Triple Island, W. $\frac{1}{3}$ S.; S.W. end of Lea Ming Island, N.W. by W. $\frac{3}{4}$ W.; and the West extreme of Montague Island N. $\frac{3}{4}$ E. This appears to be the only sunken danger in the locality.

SAN-MUN BAY entrance is 20 miles N.N.W. of the Heishan Islands, and it will be readily recognised by the remarkable *Thumb Peak*, 800 feet above the sea, called by the Chinese *Tafou*, and by the opium vessels *Albert Peak*; it rises from the northern end of Tafou Island, on the northern side of the bay.

Vessels wishing to stop a tide or driven in by bad weather, will find good shelter in the N.E. monsoon immediately westward of Lea-ming Island, which forms the North point of entrance of the bay. In running for this anchorage, give a berth of 2 cables to the S.W. point of the island, to avoid a reef lying off it. The soundings will shoal suddenly after the North peak of the island is brought southward of East; the bottom is soft mud. S.W. $\frac{2}{3}$ S. $2\frac{1}{2}$ miles from Lea-ming, is Sanchesan or Triple Island, and the depth between them is 10 and 11 fathoms.

At the anchorage under St. George Island, San-mun Bay, it is high water, full and change, at 10^h 20^m; and the springs rise about 15 ft.

SHEIPOO ROAD.—Vessels bound to the roadstead off the town of Sheipoo may pass close to the northward of the islets off Gore Island, the northern portion of Montagu Island, and steer to the westward for the two forts on the summit of Tungmun Island. On the North side of the road-

stead are the three *Bangao Islands*, and South 3 cables from the eastern point of the centre one, Wangchi, are the *Bangao Rocks*, which always show. There is deep water close to these rocks, except to the westward, where it shoals to $2\frac{1}{4}$ fathoms; to avoid which do not bring the higher fort to the southward of West.

Cliff Island, or *Seao-Seao*, lying nearly in the centre of the roadstead, has anchorage off its N.W. end in 4 fathoms, but with a strong wind a considerable swell rolls in. A reef of rocks extends westerly from Cliff, and the channel between it and the islands off the main has 3 fathoms water. South of Cliff is an islet with foul ground between, and S.S.E. 6 cables from its East point is a sunken rock. There is a narrow channel between this danger and the shoal ground extending from Montagu and Gore Islands, the extremity of which is marked by a flat rock with a sunken rock $2\frac{1}{2}$ cables N.W. of it. This latter is 5 cables E. by S. of Cliff.

Sheipoo Harbour is between the mainland and Nyew-tew Island, and at high water has the appearance of a splendid basin, but when the tide is out the mud dries off shore a long distance, giving it the appearance of a river. At its western end is an entrance into San-mun Bay, and on its South shore there is another leading into the bay West of Lea-ming Island, which is very narrow. The town of Sheipoo stands on the main forming the northern boundary of the harbour near the sea, and derives its importance principally as a convenient stopping place for the coasting trade; the walls are in a dilapidated state, and the houses and shops are not good.

There are three very narrow entrances, with rapid tides and chow-chow water in them, leading from Sheipoo Road into Sheipoo Harbour. Two of these entrances are formed by Tungmun Island. In the centre of the middle entrance between Tungmun and Sin Island, and just within it, is a rock, on which H.M.S. *Sphinx* struck in 1853. It lies in the narrowest part of the channel, and the least water on it was 10 ft., with irregular soundings around, the deepest water being towards Sin Island; it appeared very small, and is probably quite smooth. This passage is not recommended for large vessels, and, if used, they should keep well over on the South shore.

The northern entrance between Tungmun and the main, although tortuous and narrow, is safe; there is also less chow-chow water than in the middle entrance. The South entrance, between Sin and Nyew-tew, is long and narrow, and near its mouth is a small flat islet, with a reef extending eastward from it. Vessels pass north-eastward of this islet; but it is said the Chinese junk-men never use it, and they report rocks in mid-channel.

The Coast from Sheipoo trends northerly about 25 miles to the entrance of Nimrod Sound, and is fronted by several islets, none of which are large enough to afford shelter, and the depths about them generally are under 3 fathoms.

Half-tide Rock lies N.E. by N. 6 miles from the East point of Montagu,

with the Bear (an islet near the main with a sharp peak at its western end, but not always easily made out) bearing N.W. $\frac{1}{2}$ N., distant 11 miles. Should high tides and smooth water prevent this rock being seen, the East point of Montagu kept westward of S.W. will lead to the eastward.

KWESHAN ISLANDS are eleven in number, besides several rocks. The central and largest island is 3 miles long, and deeply indented, and its greatest breadth is $1\frac{1}{4}$ mile; in two places, however, it is not much more than a cable across. Near its western end the land rises to a sharp peak, 490 ft. high. The other islands are much smaller. The whole group is thickly populated. *Patahecock*, the south-easternmost island of the group, is 450 ft. above the sea, and remarkable on account of its flat and table-like appearance. The north-western island of the group is the second in size, and 400 ft. high. The peak of the largest island bears South of the N.W. island, and between the two is a mud-bank. By keeping the West extreme of the N.W. island to the eastward of N.N.E., not less than 3 fathoms will be found with good holding ground, and not much swell.

South $1\frac{1}{2}$ cable from the peak of Kweshan is another island, which is also high, with steep cliffs; off its western point is a *half-tide rock*, and a reef runs off from its South end. The *Holderness Rock* lies W. $\frac{1}{4}$ N. 1 mile from the highest part of this latter island, and having only 6 ft. water over it, occasionally breaks; from it the highest part of N.W. Island bears N.N.E. $\frac{1}{4}$ E. Another sunken rock, with only 4 ft. on it, lies S. by W. $\frac{3}{4}$ W., three-quarters of a mile from the summit of the same island.

It is high water, full and change, in the neighbourhood of the Kweshan Islands, at 9^h 30^m, springs rise about 14 ft. The change in the direction of the stream does not take place until 2 hours subsequent to the change of depth. The flood stream comes from the southward at the rate of about 2 knots per hour, and will sensibly assist a vessel in getting into the Chusan Archipelago. Between the Hieshan and the Kweshan Islands the flood against a strong northerly wind causes an angry sea. The ebb stream out of San-mun Bay will be useful in working to windward, provided the vessel heads up to the northward of N.N.W.

From the N.E. extreme of the Kweshan Group, the *Mouse Rocks*, nearly level with the water's edge at high water, bear N.N.W. 6 miles; the *Whelps*, 50 ft. high, a cluster of four small islets, W.N.W., nearly 10 miles; and a low flat reef, named *Starboard Jack*, about 15 ft. high, with two rocks off its eastern end, N.W. $\frac{1}{4}$ W. $9\frac{1}{2}$ miles. Mr. Joseph G. Dathan, Master, R.N., of H.M.S. *Encounter*, observed that the Mouse bore S. 75° E. of Starboard Jack, which would place the rock 6 cables farther to the South.

Pylades Rock.—Mr. Arthur Meldrum, Ningpo pilot, reports a sunken rock which he had many times seen, with about 6 ft. water, lying nearly 2 miles S.S.W. $\frac{1}{2}$ W. from the Whelps. When on the rock, Mesan Island shows between the two South Whelps, and the peak of Patahecock is on with the

N.E. point of the island which is nearest to the Holderness Rock. The rock is well known to the Ningpo pilots.

The Corkers are several isolated rocky patches, 3 miles in extent, and well above water, lying between the Whelps and *Buffaloes Nose*, an island 6 miles to the N.N.W. From the outer or eastern rock, which is occasionally covered, *Buffaloes Nose* bears N.N.W. $\frac{3}{4}$ W. ; there are two islets 1 cable to the westward of it, which will point out its position if the rock should be covered. The distance between the Corkers and Starboard Jack is about 3 miles, and the channel between has depths of 6 to 5 fathoms.

Buffalo Nose Channel.—*The Tinker* is a steep cliff rock, 80 ft. high, lying N. by E. $\frac{1}{2}$ E. $2\frac{3}{4}$ miles from Starboard Jack. The Buffalo Nose Channel, the entrance of which is between them, has 6 and 7 fathoms in it, and will be found the most eligible to take in entering the archipelago during the N.E. monsoon, as the vessel will be well to windward. There is a sunken rock off the Tinker S.E. by E. 2 cables from it.

Mesan, the largest of a group of four large and several smaller islets or rocks, lies at three-quarters of a mile N.N.E. of the Tinker ; it is about 400 ft. high, its barren summit forming one of the most remarkable features in the Buffalo Nose Channel. There are 7 and 8 fathoms water between it and the Tinker, but sunken rocks extend a short distance from both shores. *Lanyett* is the next island N.N.W. of Mesan.

At 3 miles E.N.E. of the Mesan Group is *Front Island*, the southernmost of a chain of islets extend N.N.E. $3\frac{1}{2}$ miles Beak Island. Between Front Island and a castellated rock 2 miles to the westward is the entrance to *Harbour Rouse*, which will be found a convenient stopping place in the northern monsoon for a vessel that has missed her tide through the Beak Head Channel ; the depth in the harbour varies from $5\frac{1}{2}$ to $2\frac{1}{2}$ fathoms.

Buffalo Nose Island, lying N.W. $\frac{1}{2}$ W. 16 miles from the N.E. extreme of the Kweshan Islands, and 6 miles from Starboard Jack, is $1\frac{1}{4}$ mile long North and South. There are three peaks on the island, the central one, 500 feet above the sea, being the highest. Near its northern end the island is perforated, from whence its native name (Niupi-shan) is supposed to be derived. The anchorage westward of Buffalo Nose is secure ; during the N.E. monsoon, however, the wind blows directly through, and occasional violent squalls are experienced. Fresh provisions and water may be obtained at this anchorage, but the supply of the latter cannot be depended upon.

Ploughman Group is composed of three islets, of which the largest lies W.N.W. nearly a mile from Buffalo Nose, the depth between them varying from 5 to 18 fathoms. Junks usually pass inside the Ploughman and Buffalo Nose, and to the westward of the Corkers ; there are, however, many reefs, and the tides are strong, and vessels will do better to keep eastward of Buffalo Nose.

NIMROD SOUND.—Six miles W.N.W. of Buffalo Nose is the entrance of

Nimrod Sound, a deep inlet of the coast running 27 miles inland in a W.S.W. direction. Within the South point of entrance are the *Hunters*, a group of six islands, and 3 miles N.W. by N. of these, on the opposite side of the channel, which carries 5 to 6 fathoms, is the *Castle Rock*, on the edge of the mud-flat, which extends $2\frac{1}{4}$ miles from the North shore, and which commences at Barren Island, $5\frac{1}{2}$ miles above.

Castle Rock may be passed at 4 cables; the other islands and banks of the sound are for the most part steep-to. Their position will be best understood by studying the chart. At its head the sound is separated into two branches by the Treble Islands. Pass northward of these islands, keeping in mid-channel to avoid the Half-tide Rock, 3 cables from the North shore.

In the shallow bight on the North shore, to the N.W. of the Treble Islands, is the village of Tung-ju, from whence there is a paved footpath communicating with the Fungwha branch of the Ningpo River, the distance from hence to Ningpo being 20 miles in a direct line. On the South side of the sound, at 3 miles S.W. of the Treble Islands, is also a paved footpath leading to San-mun Bay. Having passed the Treble Islands, good anchorage will be found in 6 or 7 fathoms, mud, off the village of Tung-ju.

Tides.—It is high water, full and change, in Nimrod Sound, at 10^h 30^m, springs rise about 20 ft.

CHUSAN ARCHIPELAGO, of which Chusan is the principal island, lies near the mainland between the parallels of 29° 39' and 30° 50' N. The archipelago may be entered from the southward by four channels named the Buffalo Nose, the Beak Head, the Vernon, and the Sarah Galley, of which the two former channels may be considered the best to enter by, and the Vernon to go to sea. Northward of Chusan, the second between Chin-san Island and the chain of islands extending westward from Video, is generally taken if bound to Ning-po and Chusan during the N.E. monsoon, being clear of danger with the exception of the Mariner Reef at its western entrance. The water of the archipelago is very muddy, and causes the boilers of steamers to prime.

Luhwang, the largest of the islands in the S.W. part of the archipelago, is $9\frac{1}{2}$ miles long N.W. and S.E. It is well cultivated, and maintains a large population.

The southern face of Luhwang has two small deep indentations with sandy bays, and a reef projects 3 cables from the point abreast the Mesan and Lanyett Group, described previously. Reefs also extend half a mile from the North extreme of the latter group, narrowing the channel between them and Luhwang to less than a mile. The coast line of Luhwang immediately westward of the reef point trends to the N.W., forming a wide bay with three islets in it, extending to Duffield Pass. South 1 mile from the easternmost islet is a mud bank, of $3\frac{1}{4}$ fathoms water, which extends to Mesan, to avoid which a vessel may keep the islet aboard; a rock lies half a cable from its

South extreme. *Duffield Reef* lies off the western extremity of Luhwang at the eastern side of the entrance to Duffield Pass, and consists of three rocks above water with a sunkén rock between them and Luhwang.

There is good holding ground in 9 to 5 fathoms on the S.W. side of Luhwang outside the line of these islets and Duffield Reef Point. Within this line the soundings are irregular from $2\frac{1}{2}$ to 4 fathoms.

Fu-to Island, to the westward of Luhwang, has a spit off its North extreme, and to the N.E. three islets, with a *rock* 1 cable to the N.W. of Chloe Island, the northernmost. *Tree-a-top Island* is $3\frac{1}{2}$ cables southward of the South extreme of Fu-to, with a deep water channel between. This island, 180 ft. high, and about 4 cables in circumference, has a pile of stones on its summit, but no tree.

Duffield Pass, the nearest but not the best channel in, is between Luhwang and Fu-to. On the Fu-to shore are several islets; among them the water shoals to $4\frac{1}{2}$ and 5 fathoms, and a vessel may anchor and stop a tide if necessary. Off the fourth point on the Luhwang side is a reef extending a cable from the shore; otherwise this side of Luhwang is very steep-to, the depth being 35 fathoms within a cable of the mud. Two small islets, named *The Notches*, lie in the centre of the pass, abreast this reef, and between them and Fu-to is a half-tide rock; unless this rock shows, vessels should not tack inside the Notches, so as to pass westward of them.

Young Hebe Rock, with only 16 ft. over it, lies 2 cables eastward of Hebe Island at the North end of the pass. On the Luhwang side, N.E. from Hebe Island, and a cable from the shore, is *Bird Rock*, which formerly had a stone pillar on it; there are two islets at 2 cables southward of it.

Gough Pass, formed between Fu-to and the Central Islands, is far preferable either to Duffield or Roberts Pass, for both shores are steep-to, and the lead, if hove quickly, will give warning of approach to the shoal extending half a mile S.S.W. from the southern islet of the Central Islands. The south-western of the Central Islands is a small islet connected at low water with the largest of the group by a reef and spit. At half a cable North of the northern island is a reef.

Roberts Pass, between the Central Islands and the mud which dries 1 mile from the embankment on Mei-shan Island, is 2 miles long, N.E. and S.W., and 4 cables wide; the depths in it vary from 6 to 40 fathoms, but as the lead gives no warning, its boundary on the Mei-shan side will not be known except at low water. On the N.E. side of Mei-shan are the two *Damson Islets*, from the northernmost of which, *Cliff Islet*, a bank of 3 fathoms extends nearly a mile to the N.E.

Junk Channel, between Mei-shan and the Ketau shore, is 10 miles in length and $2\frac{1}{4}$ cables wide, and carries a depth of 5 and 6 fathoms except at the South entrance, where it shoals to 10 ft. Anchorage will be found any-

where along the Ketau shore, between Mei-shan and Ketau Point, until abreast of Sing-lo-san Island, where the water deepens.

Caution.—As there is no anchorage besides the above, but in very deep water, until that under Elephant Island is reached, it would not be prudent for sailing vessels to proceed farther unless the wind and tide will ensure their gaining that position.

Tides.—In the above passes the first of the flood often comes from the northward, and runs sometimes for three hours before it takes the direction of the ocean tide.

BEAK HEAD CHANNEL (*Taou-sau-mun* of the Chinese), the next passage N.E. of Buffalo Nose Channel, is considered one of the best by which to enter the archipelago from the southward. Its eastern entrance is $2\frac{3}{4}$ miles wide, between Beak Head, the East extreme of Beak Island, and Vernon Point, the East end of Vernon Island. Beak Island is nearly 5 miles long, in some parts very narrow, and remarkable for two hummocks near its West end. Off Beak Head are three islets; and south-westward of the head are several islets and a rock, between which and Luhwang Island is Harbour Rose (page 1076), which will be found a convenient stopping place for a vessel that has missed her tide through Beak Head Channel. The channel between Luhwang and Beak Island has $3\frac{1}{2}$ fathoms least water; but there would be no object in using it while there are passages so superior.

Off the N.E. face of Beak Island are two reefs, lying respectively 3 cables and half a cable from the shore. Off the North face are Gull, Shag, and Puffin Islands; a reef also extends 3 cables from the N.W. end of Puffin. Near the West end of Beak Island the channel is narrowed to half a mile by the reef of rocks, extending from between Gull and Shag halfway across the channel, the northernmost of which is always above water, and also by two small islets lying off the South side of *Conical Hill Island*, which lies between Shag and Vernon. Between Conical Hill Island and Vernon are two islets, the reefs off which render the channel between these islands intricate.

A N.W. by W. $\frac{1}{4}$ W. course for $8\frac{1}{2}$ miles from the eastern entrance of Beak Head Channel will lead southward of Conical Hill and Conway Islands, and from thence a N.W. course will clear the channel; take care, however, in light winds, to give the *Pai Rock*, the last islet on the North side of the channel at its western entrance, a wide berth, as the flood sets directly towards it. There is good anchorage in 9 and 10 fathoms on the N.W. side of Conway.

To the northward of Conway Island is a group of islets and rocks, through which there is a passage into the Vernon Channel; but owing to the rapidity of the tides, it should not be attempted without local experience. On the Luhwang side of Beak Head Channel is a reef, and an islet with a small pinnacle on it; the reef, which is generally uncovered, bears S.E. $\frac{3}{4}$ S. 2 miles from Cape Luhwang, and by keeping the cape westward of N.W. $\frac{1}{2}$ N.

it will be avoided. The mud dries 7 cables from the Luhwang shore, in the bight to the southward of this reef, which makes landing difficult except at high water.

VERNON CHANNEL (*Hea-che-mun* of the Chinese), the next channel northward of Beak Head, is formed by Vernon Island on the South and Taou-hwa Island on the North. This will be found a convenient passage from Chusan during the northern monsoon, the distance from Elephant Island, off Tinghae Harbour, to the open sea being only 17 miles; it should not, however, be attempted by sailing vessels with light winds, as they are liable to be becalmed, and experience flaws under the high land of Taou-hwa, and in some parts the soundings are 60 fathoms, and the tides strong.

The Vernon Channel at its eastern entrance is $1\frac{1}{2}$ mile wide, but 5 miles within it is divided into two passages by John Peak Island, which has a rock, lying half a cable from its N.E. extreme, which uncovers at the last quarter ebb. The passage between John Peak and Taou-hwa is only $3\frac{1}{2}$ cables wide between this rock and two small islets and some rocks which bound its North side. The passage between John Peak and Vernon is half a mile wide, and good anchorage will be found on the South side of John Peak. Caution is necessary to avoid the fishing stakes West of John Peak Island. The shore of *Taou-hwa* is bold and precipitous, and the peak of the island, elevated 1,680 ft. above the sea, is visible at times when the lower land is obscured by mist. Near its western end the land becomes low, rising, however, again, and surmounted by a peculiar perpendicular crag, called *Miller's Thumb*, 606 ft. high, which will be recognised nearly throughout this part of the archipelago.

Vernon Island has on its N.E. side a wide bay, with two islets and a reef in it, where vessels may anchor in 4 and 5 fathoms, and procure water from the several cascades on Taou-hwa Island; the water may be obtained without removing the casks from the boats. The East end of Vernon is rugged, with large boulders of granite; at this end there is a cove, which runs back three-quarters of a mile to the westward, and affords shelter for boats.

SARAH GALLEY CHANNEL is the next passage northward of the Vernon, but it is by no means so eligible as those just described. Near the entrance, at 4 miles N.E. by E. $\frac{3}{4}$ E. from the South point of Taou-hwa Island, is the *Jansen* or *Laoush Rock*, a steep cliff islet, with rocks extending $1\frac{1}{2}$ cable from its South end; there is also a half-tide rock lying W. by N. $\frac{3}{4}$ N., $1\frac{1}{4}$ mile from the North extreme of Laoush, with the highest part of Ousha Island bearing N.N.E. $\frac{1}{4}$ E. $1\frac{3}{4}$ mile.

The coast line of Ousha is steep cliffs, and off its N.W. end is a ledge of rocks; the southern end of the island is the highest, and rises in a round peak. The channel between the N.E. point of Taou-hwa and Peak Island is not navigable, owing to reefs and strong tides; neither is there a fit passage between Peak Island and Tang-fau. Vessels may pass between Peak Island

and the two patches of rock lying westward of Ousha; but there are some rocks off the North end of Peak which must be avoided.

The *Cambrian Pass*, between Ousha and the large island of Chukeya, or Chus Peak, is 2 cables wide, but it should not be used without a commanding breeze, on account of the strong tides.

Vessels entering the Sarah Galley Channel from the southward generally pass westward of Laoush Rock and Ousha Island, and from thence the channel is between Ousha and the two patches of rock to the westward, which are almost covered at high water; they lie N.N.E. and S.S.W. of one another, 2 cables apart, and half a mile distant from Ousha. After passing these rocks the course is N. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles, leaving Teen and Yung Islets, off Tangfow, and a reef between them, to the westward; and Hut Islet, off Chukeya (so called from a house on its summit), with a reef of rocks off its South extreme, to the eastward. The channel here is three-quarters of a mile wide.

From thence steer N.W. by N. for $1\frac{3}{4}$ mile, leaving an island with two hummocks to the southward, and Druid Island to the northward; but be careful, after passing Hut Island, that Flat or Liwan Island (the southern small island at the inner entrance to the channel) is not brought westward of W. by N. $\frac{1}{3}$ N., as the water shoals suddenly on the North side, and the mud dries nearly all the way across from Druid Island to South Chukeya Island, leaving only a small boat channel.

When in the vicinity of Liwan the East end of Chusan will be seen, having on it a small temple built of large stone slabs. Between Liwan and Chusan is Lokea Island, the southern shore of which is not steep-to; and this is the case with the whole of the islets on the South side of Chusan between this and Pih-lou, after which they become steep-to. After passing the smaller islets South of Ta-kan, the shoal water will be avoided, when standing northward, by not bringing the rocks off the southern part of Pih-lou southward of West, or on with Trunk Point on Elephant Island. Liwan as two rocks off its South end. There is anchorage in 5 fathoms at 8 cables W. $\frac{1}{2}$ S. from it.

Chukeya Island is about 7 miles long, North and South, and near its centre is a smooth-topped cone, 1,164 ft. high, named Chukeya Peak, which is one of the most prominent objects seen in making this part of the archipelago. The South end of Chukeya is a ridge as high as the peak.

There are also several indentations on the eastern side of Chukeya, and the southern one, *Wolf Bay*, affords anchorage at times in the N.E. monsoon. On the North side of the bay is a black islet, and $1\frac{1}{2}$ mile from the shore is a peaked rock, off which, at 2 cables to the N.E., are two reefs, showing at half tide. Off Pelican Point, the North point of the small islet North of Wolf Bay, is a reef visible at low water; and E.N.E. 3 cables from the point is Nob Rock, always above water.

To the eastward of Chukea, at the distance of 5 and 8 miles, are two islets named *Pihiting* and *Tongting*. *Tongting*, the outer one, about 40 ft. high, has detached reefs S.W. of it. *Pihiting* is a similar islet. *Pelican Rock* lies E. by S. $\frac{1}{4}$ S. $2\frac{1}{4}$ miles from Pelican Point on the Chukea shore, and only shows at low-water springs.

North, $6\frac{1}{2}$ miles from *Pihiting*, is *East Islet*, 30 ft. high, and from it *Loka*, the northernmost of the islands on the N.E. face of Chukea, bears W. by S. 4 miles. *East Rock*, nearly awash at low water, lies E. by S. 2 miles from East Islet, with *Tongting Islet* bearing S. by E. $\frac{1}{4}$ E. 7 miles, and the summit of Poo-too (which will be known by a look-out house on it, and the high land of Chusan forming a table top at the back of it) W. by N. $\frac{1}{4}$ N. N.W. by N. 6 miles from East Islet is *N.E. Islet*, a conical rock, in form something like a haycock; it also lies N.E. $\frac{1}{4}$ E. 2 miles from the N.E. end of Isthmus. The *Ninepins* are four pinnacle rocks with reefs around them lying 1 to $1\frac{1}{2}$ miles East-south-eastward of N.E. Islet, and N.E. by E. $\frac{1}{2}$ E. 5 miles from the summit of Poo-too.

Isthmus Island, the outer north-eastern island of the Chusan archipelago, is three-quarters of a mile from the N.E. point of Poo-too, and the channel between has deep water. A half-tide rock lies E. by N. $\frac{1}{2}$ N. 4 cables from the S.E. point of Isthmus, with the East and S.E. extremes of Poo-too in one bearing S.W. $\frac{2}{3}$ S., and the South summith of Isthmus W. $\frac{1}{2}$ N.

Poo-too Island lies $1\frac{1}{2}$ mile from the East extreme of Chusan, and the channel between is called by the Chinese *Leenhwa-yang*, or the Sea of Water-lilies. The island is $3\frac{1}{2}$ miles long, North and South, and in one place only half a mile across. The temples on it are numerous, but the two largest, on its eastern side, are falling into decay. A narrow projecting point extends from the eastern side of the island, forming to the southward a deep sandy bay, in which there are 3 fathoms water; the islet off the point has a sunken rock off its East side, and at a little more than a mile E. by S. from the S.E. extreme of the point is a pinnacle rock, with 6 feet water over it, discovered by the S.S. *Hochung* in 1877. The western face of Poo-too is shoal, the $2\frac{1}{2}$ -fathom line of soundings being 3 cables from the shore. An islet lies off the North end of Poo-too, and some rocks half a mile farther northward; vessels may pass between the rocks and the islet. A stream runs into the above bay, on the eastern side of Poo-too. There is anchorage off the eastern side of Poo-too in 12 and 14 fathoms water, but several vessels have had a difficulty in purchasing their anchors; it is also much exposed, and by no means desirable in bad weather.

To the eastward of the South point of Poo-too, and off the N.E. end of Chukea, are four islands named *Loka*, *Pih-sha*, *Lakeah*, and *Lakeati*. There is a passage between them and Chukea, and a good channel between them and Poo-too.

Channel East of Chusan.—Whang Head, the East point of Chusan, opposite Poo-too, is a low peninsula. Thence the coast trends 4 miles to another head which forms the S.E. point of Chusan. Shoal water extends a mile from this shore.

The N.W. and West faces of Poo-too Island are shoal-to, leaving, however, a channel between them and Whang Head nearly a mile wide. The northern part of this channel has only 4 fathoms in it, and in working through, when southward of Whang Head, do not bring the ship's head eastward of North, as the Chusan shore is shoal.

The channel off the S.E. end of Chusan is 2 cables wide, and in the centre is a reef with a stone pillar on it. The flat extending towards Poo-too has only $1\frac{1}{2}$ fathom on it at low water, and some hard casts; therefore vessels drawing over 12 ft. should not attempt this passage, but use the Sarah Galley Channel. In working through it from the southward between Lokea and Kin-ho Island, bear in mind that the shoal water extends $3\frac{1}{2}$ cables from the former, and 6 cables from the latter; the above pillar or beacon in one with a cliff islet northward of it, is a good mid-channel mark. After passing westward of the beacon, bring the cliff islet in line with a building on Whang Head; this will lead over the flat in the deepest water, and when the South end of Poo-too bears East it may be steered for.

CHINKEAMUN HARBOUR, at the S.E. end of Chusan, carries on a considerable fishery to the eastward of Poo-too Island. The harbour, formed between the island of Lokea and the Chusan shore, is $1\frac{1}{2}$ cable wide. The S.W. entrance to the harbour, between Lokea and Maoutze Island, has not more than $2\frac{1}{4}$ fathoms in it at low water; the mud extends westward $4\frac{1}{2}$ cables from Lokea, and a rock lies S.S.E. a cable from the East end of Maoutze.

Chinkeamun is 11 miles eastward of Ting-hai Harbour. The *Shei-luh Channel*, close along the southern shore of Chusan has deep water in it, but in some places it is so narrow as to be practicable only for small steam vessels or boats.

CHUSAN ISLAND, so called from its supposed resemblance to a boat, is 51 miles in circumference; its extreme length in a N.W. and S.E. direction being 21 miles, and its greatest breadth $10\frac{1}{2}$ miles. The island is beautifully diversified with hill and dale and well cultivated. Besides the principal harbour of Ting-hai there are three other commercial ports, viz., Chinkeamun at the S.E. end of the island, Ching Keang or Singkong on the N.W. side, and Shaaou at the North end.

Tinghae is situated on the western part of the South coast of the island. The town is $1\frac{3}{4}$ mile in circumference, and surrounded by a wall $14\frac{3}{4}$ feet high and 13 ft. wide, surmounted by a parapet $14\frac{1}{2}$ ft. high and 2 ft. wide. A canal nearly encircles the city. The principal exports are fish, coarse

black tea, cotton, vegetable tallow, sweet potatoes, and some wheat. The water is not good at Ting-hai, and is sometimes scarce.

Ting-hai Harbour, formed on the South side of Chusan, is fronted by many small islands, between which are the several channels leading to it. The outer and westernmost island is *To-maou* or *Tower-hill*, East of which and distant 1 and $4\frac{1}{2}$ miles respectively are the large island *Teijo* or *Elephant Island* and *Pih-lou*. Within, or to the northward of these, reckoning from the westward, are the islands called *Ha-tse* or *Bell*, *Pwanche* or *Tea*, *Seaou-keu* or *Deer*, and *Ao-shan*. The two small islands *Tawoo* or *Trumball*, and *Wae-woo* or *Macclesfield*, lie inshore or to the N. E. of Tea Island, fronting the city, and there are many small islands and rocks among those larger ones above named.

The harbour is difficult of access in all its approaches, owing to the strong tides and sunken rocks. The best approach is through Tower Hill and Bell channels, the latter being between Tower Hill and Bell Islands, and between Bell Island and Tea Island; in these no hidden danger has been found; but the tides are strong, and sailing vessels in light winds must be careful that they are not set by their influence between Tower and Elephant, or between Tea and Elephant Islands, where the ground is foul and the channels narrow and deep.

Tower Hill Channel—The best approach to Ting-hai Harbour is through Tower Hill Channel. After passing Ketau Point steer to pass a convenient distance from the South extreme of Tower Hill Island. Should the tide fail, anchorage will be found under the islands eastward of Tygosan Island; for which purpose pass 3 cables southward of Square Stone Islet, to avoid the reef lying $1\frac{1}{2}$ cable S.W. of it, and anchor before the channel between Little Tygosan and Chuen-pi Islands opens, as the water shoals suddenly off the East end of Entrance Island.

Having rounded Tower Hill Island, haul up, steering first for Bell Island, then for Tea Island. The soundings in Bell Channel, between Bell and Tower Hill Islands, vary from 30 to 40 fathoms; but off the N.W. end of the latter is a mud bank of 3 fathoms water extending $1\frac{1}{2}$ cable off shore.

There is good anchorage in 10 and 12 fathoms between Bell and Tea Islands, nearer the latter, but vessels intending to remain here should not open the channel between Bell and Chusan, as the tides are stronger and the ground loose. On proceeding from hence to Ting-hai Harbour, take care to avoid *The Nab*, a sunken rock with 14 ft. over it at low water, lying $2\frac{1}{4}$ cables from the Chusan shore, and South of a small hillock in the valley near the shore. The marks for it are Taching Point, the West extreme of Tea Island, in one with the East side of Taewang or Bell Rock, S. $\frac{1}{4}$ W., and the South point of Guardhouse Isle nearly in line with the summit of Tawoo or Trumball Island. A 3-fathom patch lies about $3\frac{1}{2}$ cables W.S.W. of the Nab, and E. by N. $\frac{1}{2}$ N. nearly 4 cables from Ap-tan-shan Island.

The Spithead anchorage on the Chusan shore, between the Nab Røck and Guardhouse Isle, will be found a convenient place for watering; the anchoring ground is steep-to, and the tides are irregular, and off the entrance to the watering creek is a mud flat of 3 fathoms water. With light winds, vessels should avoid the strength of the ebb when passing through the channel between Tea and Guardhouse Islands, for it is liable to set them through the Melville Channel. A ledge of rocks, covered at high water, extends 1 cable from the high-water mark at Kouching Point, the North extreme of Tea Island.

Proceeding towards Ting-hai Harbour, and being abreast of Guardhouse Isle, steer towards Wae-woo or Macclesfield Island, taking care to avoid the Middle Ground, which has only 2 ft. on its shoalest part. Tower Hill in line with the slope on the southern rise of Tea Island will lead along the southern edge of this shoal, in 4 fathoms. The Wae-woo Channel is only $2\frac{3}{4}$ cables wide between the 3 fathoms line on the edge of the Middle Ground and Wae-woo and Tawoo Islands. The usual anchorage is abreast Taotau, the suburb of Ting-hai, but vessels must moor, as the eddies are strong. The channel between Chusan and Guardhouse Isle is only fit for boats.

Caution.—Spring tides set at the rate of 3 and $3\frac{1}{2}$ knots per hour in the Tower Hill Channel, and with light winds and a strong flood vessels have been swept away to the westward, and carried by the tide beyond Just-in-the-Way, and even through the Blackwall Channel; and after rounding Tower Hill and entering the Bell Channel many have been borne by the ebb amongst the islands between Tower Hill and Elephant Island, or between the latter and Tea Island, where the channels are narrow, the water deep, and the ground foul. In these cases the bower anchors and chains should not be used, but a good kedg and stout hawser, which (as the holding ground is good, and if care be taken to conn the vessel and not break her sheer) will bring a vessel up and prevent her being driven into these narrow passages, where some have been brought up in from 30 to 40 fathoms water, with two anchors down and three or four round turns in the hawse.

Having rounded the North end of Tea Island with a strong ebb, it is necessary to guard against its taking the vessel through the Melville Channel, and if not able to pass northward of Macclesfield Island, send the boats a-head and endeavour to keep the vessel to the northward of Takeu and Sarah Islands, where the water is not so deep.

The Melville or southern passage to Ting-hai Harbour is between Elephant and Deer Islands, but as two sunken rocks lie in the centre of the channel and narrow it to $1\frac{1}{4}$ cable, it should not be attempted unless there be a commanding breeze, and the mariner have a thorough knowledge of their position. Its navigation is rendered more difficult in the neighbourhood of these dangers by the tides rushing through four different channels into this, and

forming eddies which render a vessel unmanageable even with a good breeze at the springs. A boat a-head will be found useful at the neaps.

KIDDISOL ISLAND, lies 2 cables southward of Yanglo Point, the S.W. extreme of Chusan. There is a patch of $2\frac{1}{2}$ fathoms off its S.W. end. From hence to Sinkong Point, 4 miles to the N.W. by N., the coast line of Chusan is mud, with the exception of a small hillock at the edge of low water. Anchorage in 10 and 12 fathoms will be found all along the Chusan shore between Yanglo and Sinkong Points, but in standing towards the shore be careful, as the water shoals suddenly after 10 fathoms.

Ching Keang Harbour, on the western side of Chusan, and distant 7 miles in a direct line across country from Ting-hai, is formed between the islands *Wa-teo*, *Lin*, and *Latea* (otherwise called *Outer*, *Middle*, and *Inner Hook*) and Chusan. Upon the islands, and on the point near the southern entrance, are extensive stone quarries. There is a white rock off the S.W. point of *Wa-teo*, and a mud bank extends from the island nearly to the rock and also bounds its West side. Between *Wa-teo* and Chusan the entrance to the channel is 6 cables wide, with 7 and 8 fathoms water in it, forming a snug anchorage much frequented by the junks as a stopping place, and defended from pirates by a fort. Abreast of *Lin*, the small island next North of *Wa-teo*, the channel is less than a cable wide, with 7 fathoms water. The town stands on the Chusan shore, on the banks of a stream, which at high tide is navigable for boats. Here the channel is also less than a cable wide, and the depths 5 to 4 fathoms.

Kintang or Silver Island is between the West end of Chusan and the entrance of the Yung or Ning-po River. Near its S.E. extreme is a remarkable saddle hill, 1,432 ft. high, which with the Cap Rock forms one of the marks for the Melville Rock. Another remarkable peak, 1,520 ft. high, is $1\frac{1}{4}$ mile northward of the saddle hill. *Alligator Point*, the South end of Kintang, has a reef, which covers at half tide, extending 2 cables to the southward. There is a *beacon*, painted white, on the extremity of the reef. *Algerine Point*, the S.E. extreme of the island, has an islet connected at low tide by a mud flat, from which a ledge of rocks extends S.S.E. 2 cables, the South end of which covers at high water. The eastern face of Kintang is bold-to, without any anchorage along it. The western side affords good temporary anchorage, but it is advisable to take up a position within half a mile of the shore to be out of the strength of the tide.

Off the North end of Kintang there is a group of seven islets, amongst which there is anchorage; off its N.W. end is Taping Island, separated by a narrow channel of 4 to 6 fathoms. Southward of Taping is the small harbour of *Ta-outse* or *Lukon*, a former station for opium vessels, which affords good anchorage in 7 to 10 fathoms, sheltered by the small island of *Ta-outse*. The entrance is between Kintang and *Ta-outse* Island, and the channel is barely 2 cables wide. Between *Ta-outse* and Taping there are

not more than 8 ft. at low water. This harbour is small, but affords good anchorage, and may be recommended as a sanitary station for vessels obliged to make a lengthened stay in the River Yung. Supplies of all kinds can be readily obtained by native boats from Ning-po. Kintang is well cultivated and produces abundant supplies, but they all appear to be sent to Ning-po.

Steward Rock, 5 ft. high, lies in the middle of Blackwall Channel, between Chusan and Kintang Island. The depths in its vicinity are 25 to 45 fathoms, except on a rocky patch 2 cables to the eastward, where the least water that has been found is 6 fathoms.

Blackwall Channel, between Kintang and Chusan, is divided at its northern entrance by Blackwall Island into two passages, both of which are very difficult, owing to the rapid tides.

There is anchorage off the N.W. face of Blackwall Island, from which extends, $1\frac{1}{2}$ mile, a tongue-shaped shoal of 3 to 5 fathoms, exposed to northerly winds. A reef extends westward $1\frac{1}{2}$ cable from the West end of Blackwall, to avoid which do not open Steward Rock eastward of Rondo Islet.

Broken Island is connected at low water to the N.W. extreme of Chusan by a mud bank. *Crack Islet* lies about half a mile from its North point. A mud spit runs of north-westerly 4 cables from Crack Islet.

Dunsterville Group, N.W. $3\frac{1}{2}$ miles from Broken Island, is a batch of low islets which may be approached as convenient, the soundings between them and Crack Islet varying from 5 to 4 fathoms. The tides are strong in this neighbourhood, the flood running to the West, the ebb to the East.

SHAAON HARBOUR, or North Bay, formed between Chang-pih or Fisher Island, and the North end of Chusan, is 2 miles long, $1\frac{3}{4}$ mile wide, and has a varying depth from 5 to 9 fathoms. Broken Island, as before stated, is steep-to on its N.E. side; from the western part of Chang-pih shoal water extends half a mile. The southern shore of Chang-pih is an extensive mud bank, a considerable portion of which has been enclosed from the sea by embankment; off its S.E. end the water is shoal, the 3-fathom line being half a mile from the shore.

The Chusan shore is bordered by a mud bank, which renders landing, unless at high water, difficult, except in one place near the eastern end of the harbour, where there is a causeway. Near the causeway are some houses, but the principal village is some distance up the valley. A small islet lies off the North end of Chang-pih, and a group of islets, named Cluster or Midway Islands, off the N.E. end.

Vessels bound to the eastward from Shaaon Harbour may pass either through the Kwei Channel, between Lan-sew or Sheppey Island and Chusan, or to the northward of Lan-sew, which is the better channel of the two, but both are difficult for a stranger. A sunken rock lies 3 cables from the S.E. point of Chang-pih, with the South extreme of Chang-pih bearing W.

$\frac{1}{2}$ N., the largest of the Cluster Islets, N.E. of Chang-pih, N. $\frac{1}{2}$ W., and the summit of Lan-sew open of the rocks off Ma-aou Point E. by N. $\frac{1}{4}$ N.

The Kwei Channel, never to be attempted during the strength of the tide, is between the large island of Lan-sew, 4 miles East of Chang-pih and the Chusan shore, and, although $1\frac{1}{2}$ mile broad, the navigable passage is greatly contracted by the numerous rocks and islets on either side. At its western end it is only three-quarters of a mile between the two rocks off Ma-aou Point and the Houblan Islets extending from the West side of Lan-sew. In the centre, the Lan-sew shore is bold, but two chains of islets from Chusan stretch half way across. The eastern end is narrowed to 2 cables between Kanlan Point on the Chusan shore and the small islet with a reef of its S.E. end, lying South of Sewshan or Grain Islet off Lan-sew.

There is the Kwimun Channel, close in to the Chusan shore, but it is crooked, and a sunken rock lies near the centre.

The island of Lan-sew appears formerly to have been two, the intervening space having been gained from the sea by embanking; it is now called by the Chinese Lan-shan and Saw-shan, and is $3\frac{1}{2}$ miles long and $2\frac{1}{2}$ miles broad.

Channel North of Lan-sew.—When leaving the anchorage in Shaaon Harbour by the Chang-pih Channel, and intending to pass North of Lan-sew, steer about N.E. by E. for Kwi-si, a barren island with a round peak upon it. The southern side of this island is steep-to, and the distance between it and the N.W. point of Lan-sew is $1\frac{1}{2}$ mile; a mud bank dries $1\frac{1}{2}$ mile from the western side of the latter, and is steep-to, the lead giving no warning, but its northern edge will be avoided by keeping the North end of Mo-un (the largest islet off the North end of Lan-sew) open of the North extreme of Lan-sew.

Having passed Kwi-si steer for the next island, Kwan, the South shore of which keep close aboard, to avoid a reef which lies half a mile to the southward and covers at high water; from the reef Kwi-si Hill bears W. by N., and the highest part of Lan-sew S.S.W. $\frac{1}{2}$ W.; the ground between this reef and Lan-sew is foul. Although the channel is half a mile wide, it is difficult to shoot through, owing to the eddy tides and flaws off Kwan, which is 600 ft. in height. When the reef is passed, take care to avoid a ledge of rocks extending a short distance from the N.W. point of Mo-un, which bounds the channel to the southward.

To the eastward of Kwan are nine islands lying off the S.E. end of Tae-shan to the northward; there is a reef off the southern end of the nearest. From thence an East course may be steered to sea along the southern coast of Keu-shan Island and the Fisherman's group. The channels North of Kwi-si and Kwan are described hereafter.

Anchorage.—Vessels wishing to anchor on the East side of Lan-sew Island may haul to the southward after passing the first islet East of Mo-un,

running between it and Gan-ching, a cluster of rocks to the eastward. At the East end of Lan-sew is a low cliff, named Hartey Island, which may be passed at a cable, when hauling to the southward, anchorage will be found in 5 fathoms, the water shoaling gradually towards the shore. H.M.S. *Pylades*, in 1840, anchored here in $5\frac{1}{2}$ fathoms, with the East end of Hartey Island N. $\frac{3}{4}$ W. 6 cables, and Grain Islet S.W. by W. In the northerly monsoon there is a better anchorage at 7 miles to the N.E. in Peaked Rock Bay on the southern shore of Keu-chan.

Cliffs and Doub Rocks, to the eastward of Lan-sew, at the distance of 2 miles and 5 miles respectively, are two clifly islets. South 2 cables from Cliffs, the western islet, is a ledge of rocks nearly awash at high water, and the ground in its neighbourhood is foul; there are rocks, also, which show at low water, lying $1\frac{1}{2}$ cables from the N.E. point of the same islet.

The N.E. Coast of Chusan, East of Lan-sew, trends S.E. 11 miles to Whang Head, a low peninsula forming the East end of Chusan. At the distance of 3 miles is *Thornton Island*, with a narrow passage between it and Chusan, and a deeply indented bay westward of it, in which the mud dries out a long way, rendering it difficult to land except at the extreme points; an islet and rocks lie off the N.E. face of Thornton. At $2\frac{3}{4}$ miles farther to the S.E. is *Tsae*, a larger island with a remarkable fall in the hills near its centre. The Chusan shore hereabouts is shoal-to.

To the eastward of the North part of Tsae are three islands at the distance of half, $1\frac{1}{2}$ and $3\frac{1}{2}$ miles. The nearest, named *Meih-yun*, the largest of the three, has a patch of rocks lying N.N.W. 4 cables from its North point. *Meih-ting*, the central islet, has a pinnacle rock lying E. by N. half a mile from it, and a rocky patch at 2 cables westward of its North extreme. The outer islet, *Jow Rock*, is a narrow cliff with a rock lying one cable from its North side. There are islets also N.W. of Tsae.

Half way between Tsae and Whang Head is a low island, named Ta-chen, and the depth in its vicinity is 3 fathoms. A reef lies three-quarters of a mile S.E. of Ta-chen, and a quarter of a mile from the Chusan shore, with the N.E. point of Ta-chen in one with N.E. point of Tsae N.N.W., and the North end of the Poo-too group E. by N.

Between Ta-kan and Maoutze there are not more than 6 ft. at low water, and the same depth between the two latter; between Ao-shan and Deer Island there is a deep water channel, but it is confined by mud banks and obstructed by reefs.

LAN-SEW BAY, 10 miles across and 10 deep, is formed between the N.E. face of Chusan and the extensive chain of islands running in an E.N.E. direction towards Video Island. The navigation of the southern part of this bay, from the N.W. point of Chusan to Poo-too Island, has been noticed above, and on page 1088.

The **NORTHERN PART** of the **CHUSAN ARCHIPELAGO** consists of numerous islands and rocks, which extend northward of Chusan a distance of 40 miles to the entrance of the Yang-tze kiang, and front Hang-chu Bay. All of them are inhabited, with the exception of the outlying Barren Isles and Leuconna, and small supplies may be obtained, but the natives, except at Tae-shan Island, were in a very miserable condition, owing to the constant visitation of pirates. Many good anchorages will be found among them, in depths gradually increasing from 5 fathoms off Hang-chu Bay to 30 fathoms on the outer part of the bank. The outer islet, Jow Rock, is a narrow cliff with a pinnacle rock between it and Meih-ting.

As vessels bound to the Yang-tse kiang usually pass eastward of this archipelago, and as, in the northern monsoon, they endeavour to make the island of Video if they cannot weather the more northerly Barren Isles, we shall commence with the eastern islands, and then continue the description westward.

VIDEO ISLAND, in lat. $30^{\circ} 8' N.$, long. $122^{\circ} 46' E.$, bearing E. by N. $\frac{1}{2}$ N. 22 miles from the summit of Poo-too, and N.E. by N. 19 miles from Tong-ting Islet (page 1082), is about 1,500 ft. high, nearly square, and has a bold precipitous appearance, and a remarkable white cliff which shows when the island bears N.W. by N.; when first seen from the S.W. the island appears flat and shelving to the westward. It is proposed to establish a *lighthouse* on this island.

At 5 miles E. by N. $\frac{1}{3}$ N. from Video are four rocks called the *Four Sisters*; and E. by N. 9 miles from Video are two rocks named the *Two Brothers*. As the soundings in this vicinity are above 30 fathoms, any cast below that depth will, in thick weather, point out that a vessel is among the chain of islands.

Leuconna Island bears N.N.E. $\frac{1}{4}$ E. 18 miles from Video, and when seen from the southward it makes like three abrupt, round-topped hummocks.

Beehive Rock, a remarkable rock 35 ft. high, has 14 and 16 fathoms water around it, and a rock awash lying 3 cables to the eastward. Leuconna bears from it E. by N. $\frac{1}{2}$ N. $12\frac{1}{2}$ miles, and Video S. by E. $\frac{1}{4}$ E. 13 miles.

Barren Isles, three in number, in lat. $30^{\circ} 43' N.$, long. $123^{\circ} 7' 14'' E.$, are three-quarters of a mile in extent, East and West, and about 50 feet high, and at 2 cables S.E. of the eastern isle is a reef awash at high water. This reef appears to extend three-quarters of a mile S.E. of the isle. Barren Isles lie E. $\frac{1}{4}$ N. 16 miles from East Saddle Island, and N.N.E. $\frac{3}{4}$ E. 20 miles from Leuconna.

FISHERMAN'S GROUP.—North of Chusan, a chain of islands extends from Video W. by N. $\frac{1}{2}$ N. 45 miles, terminating in the Volcano Islands, facing Hang-chu Bay. Between Video and the Fisherman's Group, the first islands westward, there is a channel 2 miles wide; but among the Fisherman's Group, consisting of four islets and several rocks, vessels ought not to

go. Perhaps the best channel through the chain is close to the westward of this group, S.S.W. $\frac{1}{2}$ W. $9\frac{1}{2}$ miles from the Beehive. From this to *Keu-shan*, westward, is 10 miles, with many intervening islands, but the channels between ought not to be attempted, as, from the character of the land, there are, no doubt, many sunken rocks.

Shelter will be found under Hall Island, the largest of these intervening islands, at 7 miles westward of Fisherman's Group; but a vessel had better go on to Keu-shan Island, and anchor on the South side in Peaked Rock Bay, bearing in mind that the head of the bay is shoal.

Keu-shan, the first large island of this chain, is 8 miles long, East and West. *Peaked Rock Bay* is westward of Eden Point, the S.E. end of the island. Along the southern side of Keu-shan are several islets and rocks, to which give a berth of 2 cables. Off the western part of Keu-shan is *Chang-tow Island*, the peak of which rises over the West side of the island to the height of 920 ft. above the sea, rendering it one of the most conspicuous objects of the chain. Between the islands is a narrow channel, named Chang-tau Strait, carrying 5 fathoms, but the South point of Chang-tau is not steep-to.

Tae-shan Channel is West of Chang-tow, and between it and Tae-shan. Its approach from Lan-sew Bay is $1\frac{1}{2}$ mile wide between the West part of Keu-shan and the Doub and Cliff Rocks (page 1089). From the Cliffs the southern entrance to the Tae-shan Channel bears North, and is formed by the islets of *Pou-no* and *Pou-ti* to the West, and *Funing Island*, with the *Cliff Islet* South of it, to the East; off the West end of the latter is a reef, covered at high water. N.W. by W. 6 cables from Funing are two low rocks, and the space between them and Funing is shallow. Between these rocks and the South point of Chang-tau is Chang-tau Strait.

The Tae-shan channel is a mile wide. Both shores are shoal-to, and a sunken rock lies S.S.E. 2 cables from the projecting point on the Tae-shan shore. A mile N.E. of this point is *Gan-su Island*, which has a double peak on it, and there are two islets on each side; the channel lies between it and Chang-tau, under the North head of which is low rock.

The directions for passing South of Tae-shan Island, between Kwan and Lan-sew, have already been given in page 1088; but it remains to describe Tae-shan and the channels between it and the Volcano Islands.

TAE-SHAN ISLAND, 8 miles long and 5 broad, and the third in point of size in the archipelago, Chusan and Luhwang only being larger, is very populous, and carries on an extensive manufactory of salt from sea water. The centre of the island is an extensive plain, with many villages; the hills also separate near the eastern extreme, leaving a level plain across the island. Off the S.E. end of the island are nine islets, among which vessels have no business to go. There is a passage close to the eastward of Kwan; but owing to strong tides and the flaws under the bluff land of this island,

vessels had better pass South of Kwan and between it and Kwi-si Islands, where there is a channel a mile wide; the mud dries 3 cables from the West end of Kwan.

At Towtow Point, the West end of Tae-shan, the hills come down to the water's edge, and midway between it and Chang-pih are *Miles* and *Ellicott Isles*, with 5 and 7 fathoms in their vicinity. The *Show Islands*, one of which is high, lie 6 cables westward of Towtow Point; the channel between having 4 fathoms at low water. On the North side of Tae-shan are four islets, which are too small to afford much protection in the N.E. monsoon, but during the summer good anchorage will be found off the town near the centre of the island. The bay is very capacious, but the whole of it is shoal, and the tides are very strong.

VOLCANO ISLANDS.—East Volcano, with four peaks on it, lies 6 miles westward of Towtow Point, and is 4 miles long North and South. East of its South point is an islet; and between it and the Show Islands off Tae-shan are the two *Beecher Islets*, with steep cliffs, lying close together, and also two low rocks $1\frac{1}{2}$ mile North of the latter. *Kestrel Rock*, awash at three-quarters ebb, was passed by H.M.S. of that name in 1876. It lies nearly in mid-channel between Beecher and Show Islands, the South extremes of Beecher Islands were in line bearing W. by N. northerly, and the centre of Miles Island S. $\frac{1}{4}$ E.

Vessels passing between the Show Islands and East Volcano should be careful not to stand too close to the latter, as the water shoals to 2 fathoms at $1\frac{1}{4}$ mile off shore. East 3 cables from its North point is a half-tide rock, steep-to.

Anchorage.—There are many sunken rocks among the group of islets which extend $5\frac{1}{2}$ miles off the N.W. face of East Volcano, among which vessels ought not to go, but they will find anchorage with shelter from northerly winds on the South side of West Volcano, the southern of the group of the East Volcano, the anchorage being to the northward of a flat rock, lying westward of the South point of the latter. The northernmost islet of the group has a reef lying $1\frac{1}{2}$ cable northward of it.

WEST VOLCANO LIGHT.—Since October, 1872, there has been exhibited from a lighthouse recently erected on the western island or rock of the Volcano group, a *fixed bright light*, elevated 93 ft. above the sea, which, in clear weather, should be seen at a distance of 15 miles. The illuminating apparatus is of the fourth order, dioptric. The tower is of stone, 33 ft. high, and painted black; and the keeper's dwelling is painted white.

Tides.—It is high water, full and change, at the Volcano Islands, at 11^h 30^m, springs rise 15 ft. The flood sets W.N.W. and the ebb E.S.E. The velocity of the tide will be found to increase as Hang-chu Bay is approached, and in light winds a wide berth should be given to all the islets hereabouts.

Skead Islet, lying $4\frac{1}{2}$ miles northward of the Show Islands, has a smaller islet on its N.W. side and another on its S.E. side. The depths from 2 to 4 miles around Skead are unknown, but towards the Rugged Islands, to the northward, they vary from 5 to 7 fathoms.

Mariner Reef.—A notice was published in the "North China Herald," in February, 1857, of a rock or reef, on which the merchant brig *Mariners Hope* struck, when running between Tae-shan and Chin-san Islands towards Ning-po. The vessel was 12 hours on the reef, which was stated to be about a third of a mile long, East and West, 2 cables broad, and had 7 fathoms at her bows, with only 5 ft. under her stern, at low water. Skead Islet bore S. $\frac{3}{4}$ E., distant 3 miles; South extreme of Chin-san, E. $\frac{3}{4}$ S.; large Volcano, S.W. westerly; and extremes of Rugged Islands from N.N.W. $\frac{1}{4}$ W. to N.N.E. $\frac{1}{2}$ E.

CHIN-SAN ISLAND, 8 miles long East and West, lies W. by N. 13 miles from the Beehive Rock, and $5\frac{1}{2}$ miles to the N.E. of Tae-shan. The channel South of this island, and between it and the chain of islands extending from the Fisherman's group, is sometimes taken during the northerly monsoon by vessels bound to Ning-po or Chusan, and it appears preferable to that through Lan-sew Bay, being broad and clear of danger, with the exception of the Mariner Reef just described. There are several islets lying off the eastern and northern face of Chin-san; the best anchorage in the northerly monsoon is westward of the south-eastern islet, between it and Chin-san; and there is also tolerable shelter on its western side, off Pennell, the S.W. point of Chin-san.

SADDLE GROUP.—This important group of islands lies off the estuary of the Yang-tse kiang, directly in the track of vessels entering from the southward.

East Saddle, the outer southern island of the group, is 32 miles northward of Video, W. $\frac{1}{4}$ S. 16 miles from the Barren Isles, and N. by W. $\frac{1}{2}$ W. 17 miles from Leuconna Island. *South Saddle* on the West, and contiguous to it is rugged, the highest part, at the N.E. end, rising 680 ft. above the sea.

A *rock*, which shows at low water, lies in the bay on the East side of the island, with the highest part of the rocky islet close to the eastern point of the bay in line with a conical hill over the West point of East Saddle.

Eight miles N.W. of East Saddle is *North Saddle Island*, 780 ft. high. Between them is *False Saddle Island*; and south-westward of North Saddle are the *Side Saddles*, two narrow islets which will afford shelter, but not so good as under South and East Saddle. North Saddle forms the North end of the Chusan Archipelago, and from it the Amherst Rocks at the mouth of the Yang-tse kiang bear N.W. $\frac{3}{4}$ N. 26 miles, the soundings gradually shoaling from $12\frac{1}{2}$ to 6 fathoms.

Anchorage.—The most convenient anchorage in the northern monsoon amongst the Saddle group is under East Saddle, and in the event of being

caught in a southerly wind a vessel might run between the islands, taking care to keep South Saddle close aboard, within $1\frac{1}{2}$ cable, as there is a large patch of 3 fathoms occupying the centre of the channel, and three rocks awash North of it. Water can be obtained at the East end of East Saddle.

Tides.—It is high water, full and change, at an hour before noon, and the rise is 14 ft. ; the tides are said to be regular, the flood setting to the N.W., the ebb to the S.E.

LIGHT.—On the N.E. extreme of North Saddle Island there is exhibited from a lighthouse a *revolving bright light*, attaining its greatest brilliancy every minute, elevated 273 ft. above the sea, and in clear weather visible from a distance of 24 miles. The tower, of brick, is 54 ft. high, upper part black, lower part white; the keepers' dwellings are painted white. To the southward, south-eastward, and south-westward, this light is obscured by several of the more lofty islands of the Saddle and Parker groups, which intercept it between the bearings of E. by N. $\frac{1}{2}$ N. and N.W. $\frac{1}{2}$ W. ; but it is visible in all other directions.

Childers Rock, lying $4\frac{3}{4}$ miles South of the East part of East Saddle Island, uncovers at low tides, with the Barren Islands bearing E.N.E., Leuconna Island S.S.E. $\frac{1}{3}$ E., and the summit of Senhouse Island W. by N. The lead will give no warning of approach to this danger, the depth being 24 fathoms close-to.

Bit and Cairnsmore Rocks are in the channel, 4 miles wide, between the Saddles and the Parker group next westward. *Bit Rock*, not much elevated above high water, and with a rock awash reported to lie 1 cable S.E. of it, is 4 miles West of South Saddle and South of the chain of rocks and islets extending from Side Saddle. On approaching from the South, Bit Rock is not easily distinguished at first; it has a remarkable patch of rock with one part standing upright like a mile-stone, a little to the northward of it.

Cairnsmore Rock, a dangerous pinnacle not more than 30 or 40 ft. in diameter, and on which the ship *Cairnsmore* was wrecked in 1858, rises almost perpendicularly from soundings of 12 fathoms at about $2\frac{1}{3}$ miles eastward of the East end of Raffles Island. When examined, the precise depth on the pinnacle could not be ascertained, as the wreck, with her fore-mast standing, quite covered it, but there cannot be more than 11 ft. over it at low water springs.

From the rock, the S.E. point of Senhouse bore South; a small rugged rock lying close to the S.E. point of Raffles, and in line with the point, S.W. by W. $\frac{1}{4}$ W. ; and the northern rock of the group lying off the North part of Chesney Island, N.W. by W. $\frac{1}{4}$ W.

Caution.—Vessels navigating the channel between the Saddle group and Raffles Island are cautioned to keep well over towards the Saddle Islands to avoid the above danger, as the lead will give no warning when approaching it. In sailing North, when the Bit Rock opens South of the South

Saddle they will be northward of the Cairnsmore ; and in sailing South, when the same rock opens North of the South Saddle they will be southward of it.

PARKER ISLANDS.—*Raffles Island*, the largest of this group, bears West 11 miles from South Saddle Island. At half a mile from the N.E. point of Raffles, and 2 miles W. by N. of the Cairnsmore, is a sunken rock. *Senhouse Island*, with steep cliffs, lies $1\frac{3}{4}$ mile S.E. of Raffles ; there is a good channel between them, and anchorage will be found on the South side of Raffles in the northerly monsoon.

Brooke Island is a mile S.W. of Senhouse Island, and the channel between should not be used, as the wind is liable to fail under the latter ; there is, however, a good passage 2 miles wide West of Brooke, between it and the *Bonham Isles*. Off the North end of Raffles is Chesney Island, from which rocks and islets extend 2 miles farther northward. A rock, on which the ship *Tonbridge* struck, is reported to lie $2\frac{1}{2}$ miles northward of Chesney Island, so that this locality must be carefully avoided. N.W. of Raffles, and distant from it $1\frac{3}{4}$ mile, are the *Elliot Islets*, on the S.W. side of which H.M. brig *Plover* anchored, and found fair shelter, with the wind blowing hard from the northward. From the Elliot, Gutzlaff Island bears W. by N. $\frac{1}{2}$ N. $10\frac{1}{2}$ miles.

Morrison Island, 7 miles S.W. of Raffles, with smaller islands about it, is very precipitous. The south-western islet of the Parker group is 2 miles S. by W. of Morrison ; and East of this is a chain with deep water passages between extending to Senhouse.

RUGGED ISLANDS lie W.S.W. 15 miles from Raffles. Formed like a pair of callipers, 10 miles in length, and opening to the westward, the group affords shelter in both monsoons, but the tides set through it with considerable velocity. *Tayung*, on the South, the largest and highest of the group, is 660 ft. above the sea, and differs from the rest by being round topped, whereas the others are, as their name denotes, rugged and barren. Under the South side of an islet West of Tayung is *Pirate Bay*, which affords snug anchorage during the northerly monsoon, and a better shelter than the bay within the S.W. and N.W. horns of the group. A reef, which generally breaks, lies off the East side of Pirate Bay.

On the North side of this group the largest island is Tripoint, remarkable for its triple peak ; and East of it is Spire Islet, on which is a curious pinnacle. The islands are inhabited by fishermen, and the various anchorages are frequented by the trading junks.

At $3\frac{3}{4}$ miles N.E. by N. from the N.W. Horn of the Rugged Islands is an islet having a reef running out from the N.W. of it, with several rocks above water called the *Hen and Chicks*.

A shoal of only 10 ft. has been reported to lie S.W. 7 miles from Gutzlaff Island, which would place it E. by N. $\frac{1}{2}$ N. not quite 2 miles from the Hen

and Chicks. The chart shows indications of a bank of $5\frac{1}{2}$ fathoms in this vicinity, extending from between 2 and 6 miles eastward of the latter, with 6 to 7 fathoms around.

GUTZLAFF ISLAND, 210 ft. high, and N.E. $\frac{1}{2}$ E. $8\frac{1}{2}$ miles from the Hen and Chicks, is a round, smooth-topped island, surmounted by a low light-house, and the most conspicuous object off the southern entrance of the Yang-tse kiang. A small islet lies half a mile N.N.E. of it, and "it has been reported, from many sources, that a bank with only 2 fathoms on it extends a mile from its western side."

A LIGHT was first exhibited on Gutzlaff Island in the year 1869. It is a *fixed bright light*, elevated 270 feet above the level of the sea, and in clear weather should be seen from a distance of 20 miles. The lantern is 24 ft. high, and painted white; there is no tower. When it is desired to attract the attention of passing vessels, a gun or guns will be fired and signals made. During fogs guns will be fired in answer to the fog signals of passing vessels. Gutzlaff Island is a *Telegraph Station*.

Tides of the Chusan Archipelago.—In the Vernon Channel, at the South end of the Chusan Archipelago, it is high water, full and change, at 9^h 40^m, and springs rise 14 ft.; in Ting-hai Harbour, at 11^h 0^m, springs rise 12 ft., neaps 9 ft.; at Pootoo Island at 8^h 15^m, springs rise 12 ft.; in Lan-sew Bay at 10^h 0^m, springs rise 13 ft.; at the Volcano Islands at 11^h 30^m, springs rise 15 feet; and at East Saddle Island at 11^h 0^m, springs rise 14 ft.

Under Luhwang Island the flood sets to the N.W. at the rate of 2 knots per hour, and the ebb to the S.E. at $1\frac{1}{2}$ knot. In Duffield, Gough, and Roberts Passes, the first of the flood, at full and change, often comes from the northward, and sometimes runs in that direction 3 hours before the tide through Buffalo Nose Channel overcomes that through the Beak Head, Vernon, and Sarah Galley Channels. In Duffield Pass the tide sometimes runs 5 knots; in Gough and Roberts Passes it is not so strong; in Beak Head Channel 4 knots is about the maximum; and in Vernon Channel it has been known to run 6 knots. Off Roundabout Island the tidal streams are not so violent, but the eddies take command of a sailing ship at springs.

In the southern entrance to Sarah Galley Channel, between Laoush and Ousha Islands, the flood ran W. by S. at the rate of 2 knots, the ebb E.S.E. $1\frac{1}{2}$ knot; the moon was then 18 days old. In the Cambrian Pass, between Ousha and Chuksa Islands, H.M. steamer *Vixen*, with the *Cambrian* in tow, could not stem the ebb.

In the Tower Hill Channel, as before stated, with a strong flood, vessels have been swept to the westward, and carried by the tide beyond Just-in-the-Way, and even through Blackwall Channel; and after rounding Tower Hill and entering Bell Channel, many have been borne by the ebb, between Tower Hill and Tea Islands. Having rounded the North end of Tea Island with a strong ebb, it is necessary to guard against its taking the vessel

through the Melville Channel, and if not able to pass northward of Macclesfield Island, send the boats a-head and endeavour to keep the vessel to the northward of Sarah Island, where there is shoal water to anchor. In the channel between Bell Island and Chusan, the tide at times runs with great strength, so much so that on one occasion the *Madagascar* steamer had great difficulty in stemming it.

In the Blackwall Channel the eddies are as strong as they are off Roundabout Island, taking a sailing ship round against both helm and sails. In the Kintang Channel, between Kintang Island and Deadman Island, the tides sometimes run 4 knots.

In the northern part of the Chusan Archipelago, with Lan-seu Island bearing West 5 miles, the flood ran to the W.N.W. the first hour, then N.W.; total amount of tide 11 knots. The ebb, S.E. by S. the whole tide; total amount $5\frac{3}{4}$ knots.

KINTANG CHANNEL, between the South Coast of Kintang Island and the mainland, is about $2\frac{1}{2}$ miles wide, but is narrowed to $1\frac{1}{2}$ mile by an extensive mud bank (which borders its southern shore), and by a ledge of rocks extending 2 cables from Alligator Point, the South extreme of Kintang, which is marked by a beacon, painted white, from which Long-nose Point bears N.W. by W. about 7 cables, and Just-in-the-Way E. $\frac{1}{4}$ S. This mud bank dries upwards of three-quarters of a mile from the shore, is steep-to, and the lead gives little warning; there are some small islets lying on its outer edge, near the westernmost of which is a boat creek, from whence there is a paved footpath leading to Tein-tung, and so on to Ning-po, the whole distance being about 18 miles, the last 6 miles of which may be performed by canal.

Just-in-the-Way is a small islet, 20 ft. high, with rocks extending $1\frac{1}{2}$ cable from its S.S.E. side, lying in the eastern entrance of the Kintang Channel. To the S.E., between it and Tygosan Island, there is fair anchorage in 12 to 16 fathoms, which will be found a convenient stopping place should there not be sufficient tide to take a vessel on to the River Yung, the anchorage outside of which is much exposed.

The Deadman is a square island, lying W. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles from the South extreme of Kintang, and $4\frac{1}{2}$ miles westward of Just-in-the-Way. The channel between it and Kintang is rather less than $1\frac{3}{4}$ mile wide, with deep water and strong tides. The *Ko Channel*, between the Deadman and the main, is half a mile wide, but is not recommended, as the tides run with great strength, and the limit of shoal water on the South side is not well defined.

A pinnacle rock lies in the channel between Dumb Island and the main. From the rock Ko Point bears S.S.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ cables; West extreme Dumb Island, N.N.W. $\frac{3}{4}$ W.; South extreme of Deadman Island, E. by N.

Blonde Rock, a short half mile northward of the Deadman, shows at low water springs. The marks for it are, the easternmost islet off the N.E. point

of the Deadman in one with San-shan Islet S.E. $\frac{1}{4}$ S.; and the West end of Dumb Islet S.W. $\frac{1}{2}$ W. Beacon Hill, at the East side of entrance to the citadel) is in line with Cone Hill bearing S.W. $\frac{1}{4}$ S., which leads westward River Yung, in line with the citadel bearing W.S.W., leads northward of the rock. It is marked by a wooden *beacon*, with cage, said to be painted white.

TSE-LE or **SQUARE ISLAND**, off the Yung River, is $2\frac{3}{4}$ miles N.W. by W. from the Deadman; there is a patch of $2\frac{3}{4}$ fathoms water at 6 cables S.E. by S. from its North end.

LIGHT.—A *fixed bright light*, visible all round, at an elevation of 123 ft. above the sea, is exhibited from a white octagonal tower, 33 ft. in height, on the summit of the island. The lightkeepers' dwellings are painted white. A *fog-bell* is sounded once every 15 seconds in foggy weather.

H.M.S. *Conway* anchored W.S.W. of this island, with Pas-yew, the western of the Yew Islands, bearing South. This anchorage in the summer season is safe, but during the autumn and winter violent gales with thick weather rise rapidly, causing an uneasy sea, in which a vessel will have difficulty in weighing her anchor; consequently, the anchorage at Just-in-the-Way or that in Ta-outse Harbour, at the N.W. end of Kintang, should be resorted to at this season.

Pas-yew or **Tiger Island Light**.—A *fixed red light*, visible all round, at an elevation of 148 ft. above the sea, is exhibited from an octagonal tower, painted with alternate red and white vertical stripes, on Pas-yew Isle, the western of the three islets fronting the entrance of the River Yung. A *gong* is sounded during foggy weather, giving five strokes in quick succession at intervals of about one minute. The tower is 30 ft. in height. The lightkeepers' dwellings are also painted in red and white vertical stripes.

YUNG RIVER has its entrance fronted by three islets, called the Yew Islands or Triangles, which form three passages into the river. The town of Chin-hai is built close to the S.W. side of Citadel Hill, on the western side of the entrance to the river, of which it is the maritime town. From Chin-hai the river trends in a S.W. and West direction for 11 miles to Ning-po fu, and is about 2 cables wide, with depths varying in mid-channel from 5 to 2 fathoms. Vessels of 17 ft. draught can proceed up to the city from Chin-hai at springs, at half-tide, and anchor off either face of the foreign settlement. European pilots can be obtained at Chin-hai. The Yung separates into two branches at Ning-po.

NING-PO is situated at the point where the two branches of the river join, the city walls extending along the river side up both branches. It was thrown open to foreign commerce by the treaty of Nanking in 1842. It is situated in Chekiang, the smallest of the eighteen provinces of China, which occupies the southern and terminal portion of the great central plain. Within the limits of Chekiang, which enjoys a favourable climate and varied soil, all the most celebrated staples of China are produced,

besides the advantage of means of intercommunication, natural and artificial. Silk, tea, cotton, rice, dye-stuffs, drugs, and minerals (including iron and coal) are among its principal natural productions. The importance of Ningpo has rapidly increased of late years. Nearly four-fifths of the whole foreign trade is done through Shanghai.

The advantage of Ningpo over Shanghai as a place of residence for Europeans is its proximity to the sea, and the neighbourhood of numerous hilly regions, where pure air and moderate temperature can always be enjoyed.

Native shops established in various parts of the settlement supply foreigners with provisions at prices more moderate than at Shanghai. Game is plentiful during the winter, and fish, including mackerel, is obtained of superior quality and in great abundance.

Tides.—At Chin-hai it is high water, full and change, at 11^h 20^m, and springs rise 12½ ft. At Ning-po fu it is high water at 1^h 0^m, and springs rise 9 ft.

DIRECTIONS.—A vessel bound from Ting-hai Harbour, Chusan, to the River Yung, should, after clearing the Bell Channel, steer W. by S. for Just-in-the-Way, recollecting that the S.E. face of that islet is foul, and that a reef extends a cable's length from Insular Point, the North extreme of Tygosan. As before stated, if the tide should fail, there is fair anchorage to the S.E. of Just-in-the-Way. From hence the peak of Tower-hill Island in line with Insular Point will lead southward of the rocks off Alligator Point, after which keep over towards the Kintang shore, until well past the Deadman, or until Beacon or Look-out Hill at the eastern point of entrance to the River Yung is in line with the citadel W.S.W., which will lead northward of the Blonde Rock, and southward of the 2¾-fathom patch lying S.E. by S. 6 cables from the North end of Tse-le.

A notice from the Chinese authorities, dated May, 1874, states that a conical buoy, surmounted by a red cage, elevated 11½ ft. above the water-line, is moored in 6½ fathoms, 90 ft. N. by W. from the peak of *Sesostris Rock*, with Tiger Island flagstaff W. ¾ S. and Seaou-yew Island summit N.E. ½ N. Should this buoy not be in position, it will be prudent for a stranger before entering the River Yung, if unable to obtain a pilot, to mark the *Sesostris Rock* by a boat. It will also be advisable to examine the entrance of the river, which may have changed since the survey.

The Yew Islands, as before stated, form three passages into the Yung River. The eastern passage is between the islands and Look-out Hill, the East point of entrance, and the first danger in it is the *Nemesis Rock*, which lies E. by N. ¾ N. a quarter of a mile from the summit of Ta-yew, and is covered at half-flood. By keeping Pas-yew open of the South point of Ta-yew, this danger will be avoided.

Having passed the East point of Ta-yew, keep it and Seaou-yew aboard, to avoid the *Sesostris Rock*, with only 8 ft. on it, lying in mid-channel, until

Peak Islet (a remarkable rock on the East side of the river opposite the of the rock.* From the rock the Friendly Islands (7 miles N.W. of Chin-hai) are in one with Talung Island (a high bluff island beyond it) bearing N.W. $\frac{1}{2}$ W.

Having cleared the Sesostris, steer to pass between half and $1\frac{1}{2}$ cable southward of Pas-yew, and then for the point under the citadel, taking care that the tide does not set the vessel over to the eastern bank of the river, where the water shoals to 2 fathoms at half a mile off shore.

The middle passage, or that between Seaou-yew and Pas-yew, is probably the best of the three. A mud spit, the extremity of which is marked by a *black* buoy, extends north-westerly $1\frac{1}{2}$ cable from the West end of Seaou-yew, and shoal water, 3 fathoms, some distance beyond it, but this bank will be avoided by keeping the citadel open westward of the West end of Pas-yew until a small hill on the southern shore bears S. by E. $\frac{1}{4}$ E., which is the leading mark through; then steer as before so as to pass southward of Pas-yew.

The passage between Pas-yew and Chung Point under the Citadel, has 2 fathoms in it at low water, and is the broadest and best for small vessels when the tide has risen sufficiently high for them to enter; the only danger being the *Tiger's Tail Rock*, which covers at high tide, and lies rather more than a cable N.W. $\frac{1}{2}$ N. from the summit of Pas-yew, with the S.E. foot of the Citadel Hill in line with Cone Hill, bearing S.S.W. $\frac{3}{4}$ W.; the rock is now marked by a *beacon*, of iron, surmounted with a cage. Chung Point is steep-to on its East side, and vessels will find good shelter under the fort.

Fishing stakes are moored to the West side of Peak Island in deep water. The bend of the river above Chin-hai is often rendered most difficult to navigation by the immense number of junks at anchor there or dropping with the tide. The passage between them is left so narrow that the greatest caution is necessary to avoid collision. Above Chin-hai, keep mid-channel, giving the points a good berth. Vessels drawing 12 ft. water should go up on the flood, as they are liable to take the ground in many places.

The Coast from Chin-hai trends in a N.W. direction, and is fronted by a mud bank, which dries at low water for nearly three-quarters of a mile from the sea embankment, and is steep-to. At the distance of 7 miles from Chin-hai, and three-quarters of a mile from the shore, is a group of five islets, named *Friendly Islands*, inside of which there was shelter in 3 fathoms at the time of the survey, but the water is said to be shoaling fast. Take care, when rounding the West end of the largest islet, to avoid a spit extending 3 cables to the S.E. from it.

* The merchant barque *Moltan* is said to have struck on a rock having 9 ft. on it and 18 feet close-to, lying with Friendly Island just showing northward of Pas-yew, and the northern extreme of Look-out Hill bearing East.

At 4 miles to the N.W. is *Talung Island*, a high bluff, 920 ft. high, forming the southern horn of the Tsien-tang estuary, or Hang-chu Bay.

Caution.—From Talung the coast trends more to the westward, and for upwards of 30 miles is fronted by a dangerous mud bank, which, at the distance of 8 miles from Talung, dries 7 miles off shore, and on its edge are some small knolls. The *Kite* transport was lost upon this bank in 1840, the tide, which here begins to increase its velocity to 6 knots at the springs, turning her over the moment she tailed on it.

Middle Ground.—N. by W. $3\frac{1}{2}$ miles from Tse-le Island is a Middle Ground, with less than 2 fathoms on it, to avoid which vessels, in proceeding to the northward from the River Yung, must keep over towards the Kintang shore, and, if drawing 18 feet water, should not bring Tse-le to the southward of S.S.W. There is a passage to the southward of this Middle Ground for vessels of 15 ft. draught, but there are two patches, on which H.M.S. *Contest* grounded, lying in a N.W. direction from Tse-le, one with 12 ft. on it at 9 cables, and the other with only 5 ft. at $2\frac{1}{2}$ miles from the island.

Nanho or South Island, bearing N. $\frac{3}{4}$ W. $14\frac{1}{4}$ miles from Tse-le, is the outer and largest of the first group of islands met to the westward when steering to the northward from Chin-hai; it is flat-topped, 216 ft. above the sea, three-quarters of a mile in extent East and West, and cultivated. As the water deepens close around this island to 26 and 32 fathoms, vessels cannot anchor near enough to get shelter, but the holding ground is good. About half a mile North of it is a small rock which always shows.

West Stork is a small islet lying W. $\frac{1}{2}$ N. $3\frac{3}{4}$ miles from Nanho, and there are 8 and 9 fathoms water between them.

Seven Sisters Islets, 2 miles farther West, lie North 9 miles from Talung Island, and although small, will afford shelter from northerly winds. The channel between them and the dangerous mud bank just described, is 4 miles wide, and the depth in it varies from 6 to 2 fathoms, shoaling towards the bank. A reef shows at low water, at half a mile N.N.W. of the western islet; and a shoal of 2 to 3 fathoms extends 4 miles north-westward from it.

Seshan Islands form three distinct groups. *East Seshan*, the easternmost group, lies North 18 miles from Nanho Island, and consists of one island about 400 ft. high, with six islets around it. *Middle Seshan Island*, lying 6 miles W.N.W. of East Seshan, is the largest of a straggling group consisting of eight other islets, the southernmost of which is a small rock nearly awash, at nearly 4 miles S.E. of the highest; the western islet, *House Islet*, is an abrupt cliff with a house on its summit. Neither of these two groups are sufficiently large to afford shelter; but fair anchorage will be found in the neighbourhood of the three islets forming the West Seshan group, at 10 miles W.N.W. from Middle Seshan Island.

Fog Islets.—In the centre of Hang-chu Bay, at 14 miles W.S.W. of Middle Seshan Island, are five low rocky islets, the depth of water about which is 5 to 6 fathoms.

CHAPU is a town of considerable importance, standing in a bight on the North shore of Hang-chu Bay, 17 miles S.W. of West Seshan. It is the port of Hang-chu fu. It will be readily known by the hills in its vicinity, as well as by the islets which protect the roadstead off it from the eastward; on the eastern of these islets is a remarkable white house.

Vessels steering for this roadstead should round the southern islet at about a quarter of a mile, and haul up for the houses which will be seen westward of the hills. The anchorage is sheltered from E.N.E. to S.S.W.; but the tide runs 5 knots at springs, and the rise and fall is 25 ft. The mud dries half a mile from high-water mark, is steep-to, and the lead gives no warning. At 4 miles southward of the southern islet is a shoal on which the ship *Bentinck* tacked in 3 fathoms, and where there is probably less water; should the tide therefore set vessels in this vicinity, it will be prudent to anchor.

Wan-tao-kwan is situate in a small bay westward of the second point of land, about 20 miles south-westward of Chapu. Off the point are two small islands, between which and the point is a narrow passage, carrying 4 to 5 fathoms at low water, but which can only be passed through at slack water on account of the extraordinary velocity of the tide.

When bound northward from the River Yung, endeavour to leave with the first of the flood, and when northward of Tse-le Island, if drawing more than 18 ft., do not bring that island southward of S.S.W., then in line with Look-out Hill, to avoid the Middle Ground. In working up for the East Seshan group some casts of $3\frac{1}{2}$ and 4 fathoms were obtained with the eastern islet N. by E. 8 miles; it is therefore advisable that vessels of large draught should not stand into Hang-chu Bay unless bound for Chapu Road, in which case pass about 3 miles southward of East Seshan, and steer for the South islet of the Middle Seshan group. After passing West Seshan the low land on the North side of Hang-chu Bay will be seen, and to the southward the Fog Islets, a group of five low rocky islets, bearing W. by S. $\frac{1}{3}$ S. 14 miles from Middle Seshan, the depth about them being 5 and 6 fathoms.

If bound for the Yang-tse keep eastward of the Seshan Islands, steering between East Seshan and Rugged Islands. The tides in the vicinity of the Volcano Islands will be found to have increased their velocity, the flood setting W.N.W., the ebb E.S.E. Rugged Islands afford shelter in both monsoons, but the tides set strong through them. From thence steer to pass on either side of the Hen and Chicks, recollecting the 10-ft. shoal; it will be prudent, if the vessel is of large draught, to pass eastward of Gutzlaff Island, as a bank of only $2\frac{1}{2}$ fathoms water is said to extend a mile from its western side.

Tides.—It is high water, full and change, at the Seshan Islands at 11^h 45^m. and springs rise 14 ft. ; at the Fog Islands in Hang-chu Bay at the same time, and the rise is 17 feet ; in Chapu Road at noon, and the rise is 25 feet.

The tidal stream increases in strength as Hang-chu Bay is approached ; near Nanho Island and the Volcano group the flood runs W. by N., and the ebb E. by S. sometimes 3 knots, and in light winds, unless great care is taken, vessels are liable to get entangled among the Dunsterville or Volcano groups. At the Fog Islands, the rate increases to 4½ knots, at Chapu to 5 knots ; and in the S.W. part of Chapu Bay to 7 knots, with a rise of 35 ft. At 25 miles above Chapu, the tide was found to run 11 knots at springs, and 8 knots at neaps, with a rise and fall of 40 ft. In the vicinity of East Seshan, and of the Rugged group, the flood runs 2½ and 3 knots ; South of Gutzlaff the first of the flood makes to the southward of West.

HANG-CHU FU, the capital of the province of Chehkiang, stands on a plain about 2 miles from the North bank of the River Tsien-tang, 20 miles above its entrance, and 80 miles from the sea. The tide rises 6 or 7 feet opposite the city, and it is said about 30 ft. within its entrance. Captain Collinson, when making some explorations of its mouth in Hang-chu Bay, in order to ascertain the practicability of an approach to Hang-chu fu, found the tide to run 11½ knots an hour. The peculiar phenomenon of the eagre occurs off the city, the first of the flood coming up in a huge smooth wave, 6 to 12 ft. in height. The southern termination of the Grand Canal is at Hang-chu fu, but it has no opening into the river ; there is also continuous water communication with Shanghai.

THE YANGTSE KIANG.

GENERAL DESCRIPTION.—This noble stream, which ranks first amongst the rivers of the Old world, and next only to the Amazons and Mississippi in the New, is alike the most useful and important of the rivers of China, and constitutes one of the chief elements in the prosperous development of its commerce ; whilst it has also become, during the short period that has elapsed since its opening to foreign navigation, a highway of the highest importance to European trade. Its sources, though hitherto unvisited by scientific explorers, are known to exist among the mountains of Tibet, on the eastern side of those ranges, from the western declivities of which the Brahmaputra and the great rivers of Burmah and Siam take their rise ; whence the river, called the Muhlusu, flows in a south-easterly direction for upwards of 1,000 miles, and being joined by a large tributary, the Yalung Kiang in Yunnan, it turns suddenly to the N.E. and East through the central regions

of the Chinese empire, traversing its entire breadth in a course, inclusive of its windings, of fully 3,000 miles, from the remote province of Sz'chuen to the Eastern Sea, and discharges itself at a point 1,900 miles in a direct line from its source.

Nearly 1,800 miles of the river have now been surveyed, or two-thirds of its entire length, viz., 200 miles from the sea to Nanking, by the British fleet in 1842; 400 miles farther to Hankow, by the expedition accompanying His Excellency the Earl of Elgin in 1858; thence 124 miles to Yohchau on the Tung-ting lake, by that under Vice-Admiral Sir James Hope in 1861; and further explored for 1,100 miles to Pingshan in the province of Yunnan, in long. $104^{\circ} 25'$ W., by the enterprising traveller Captain Blakiston, R.A., and his party, March to June, 1861, 360 miles of which has been subsequently surveyed, as far as Kwei-chau fu in lat. 31° N., long. $109^{\circ} 34'$ E., by Sub-Lieutenants L. S. Dawson and F. J. Palmer, R.N., in April, 1869.

Hankow is the highest port on the Yangtse at present open to navigation by foreign vessels, but it is said that sea-going steamers could reach the city of Ichang, 950 miles from the mouth of the river.

TREATY PORTS.—The treaty ports on the Yangtse at present open to foreign commerce are four, viz., Shanghai, Chinkiang, Kiukiang, and Hankow, at the respective distances of 60, 193, 480, and 600 miles from the sea. Consular Officers are stationed at these ports, at each of which is a concession for the residence of foreigners. Nanking, although not at present open as a treaty port, is nevertheless specified in the Treaty of Tientsing among the river ports to be eventually thrown open, and now may be, at any time, under "the most favoured nation" clause.

Rise and Fall of the River.—The Yangtse is subject to great periodic changes of level. It has been thus described:—"The waters begin to rise early in the year (February or March), and attain their highest level in July or August, at which season the higher portions of the river assume the appearance of an immense lake, by the inundation of the low lands. No banks are visible; junks and boats of all descriptions are seen sailing over what in the chart is dry land. At many parts between Nanking and Hankow, it exceeds 20 miles in breadth, and sometimes no land can be seen from the deck on either side as far as the bases of the distant hills bounding the horizon, on which the sun is seen to set. The houses to the very roofs are under water, and for miles only the roofs and trees are visible, the inhabitants of the villages encamping on the hills till the waters recede. At the end of January the river is at its lowest level, and that to which the soundings on the Admiralty charts refer. The height of the summer above the winter levels may be considered to be for Nanking 12 ft., Kiukiang 30 ft., and Hankow 40 to 50 ft. At Kiukiang, the rise was 21 ft. between March and June, at Yohchau 20 ft.

In the months of September and October the river is not difficult to

navigate, if proper care and caution are employed, the water being then many feet higher than its winter level. In September it commences to fall, and in November and December sinks very rapidly eight or ten inches a day, on account of which these two latter months are considered the most difficult period for navigation, for the bed of the river becomes altered by the summer inundations and rapid currents, so that if a vessel having touched the ground be not floated off at once, there is great probability of her remaining aground until the water rises in the ensuing spring. It is, therefore, deemed imprudent to attempt the navigation of the river at this season without a pilot.

The latest information is to the effect that the Admiralty charts are sufficiently correct to enable a gun-vessel drawing $8\frac{1}{2}$ ft. water, to proceed from Chinking to Hankow, at the season when the river was lowest, without a pilot. Small steamers may take all the short cuts from June until the time the waters commence to fall.

The most constant part of the river is the entrance of the Southern channel, for beyond some slight extension of the bar seaward, no alteration of any consequence has taken place within 30 years; but the character of the same channel higher up, between Kintoan and the mouth of the Wusung River, which latter is 40 miles from the entrance, has no permanency whatever, and of late years has been subject to many changes, which have resulted in considerable deterioration, caused mainly by the opening out of a deep channel North of the Tungsha Banks.

The Estuary of the Yangtse is 70 miles broad from North to South. Its delta, 60 miles in extent, is divided into two almost equal portions by the main stream of the river, the northern part of which, *Tsung-ming Island*, is 32 miles long in a W.N.W. and E.S.E. direction, 5 to 10 miles broad, and is stated to be the largest alluvial island in the world, containing a population of about half a million, although in the 14th century it did not exist above water. There is said to be a large city on the island, but it is not visible from the sea.

The Tungsha Banks lying south-eastward of Tsung-ming form the southern portion of the delta. These banks are rapidly growing up, and two new islands which appeared in 1862 are still increasing in size, one, *Grass Island*, being about 2 miles, and the other, *House or Dry North Island*, 12 miles to the S.E. of *Block House*, the only island previously existing. In 1869 five new islands were discovered to have grown up along the northern edge of the Tungsha on the borders of the main channel; and Tsung-ming has also extended eastward about 6 miles since 1842.

The Yangtse enters the sea by three channels, of which two only are navigable; these are the *North Entrance*, now quite unknown, and used only by junks; the *Main Channel*, by which the waters of the river are now dis-

charged North of Shawsishan Island, and which of late years has greatly increased in depth and volume, and now is reported to be the best; and the *South Channel*, which has heretofore been the only one affording a sufficient depth of water for navigation by foreign sea-going vessels, as it is also the nearest and most convenient approach to Shanghai.

Great Yangtse Bank, extending seaward in an easterly direction for 150 miles, is a vast bank of clean river sand about 30 miles in breadth. It lies rather off the northern entrances, and is of grey or dark speckled fine sand, its depth varying from 17 to 20 fathoms; the surrounding bottom is chiefly mud, or mud and sand. When more fully examined it will no doubt be a good guide to vessels making the Yangtse from the eastward. South of this bank, a deep water gully of from 25 to 30 fathoms runs up towards Shawsishan Island from the south-eastward, terminating 20 miles E. by S. of that island. The water North of the bank is also deeper, although it shelves off very gradually to the north-eastward.

The breakers said to have been seen from the steamship *Costa Rica*, in lat. $32^{\circ} 10' N.$, long. $125^{\circ} 3' E.$, have been carefully searched for, but not found; 25 fathoms were obtained on the spot, with even depths all round, in a space of 15 miles square.

The **North Entrance**, which, in 1842, was in lat. $31^{\circ} 52' N.$, long. $122^{\circ} 0' E.$, has never been examined since that date, when it was only partially surveyed. It leads into the Yangtse, North of Tsung-ming, where the river flows into the sea by what is called the North Branch. It is exceedingly probable that the banks and channels in this locality have entirely changed since the survey, and on no account should vessels approach it, even in the finest weather, under a depth of 8 fathoms.

The following notice of a buoy moored near Drinkwater Point was issued in 1877.—“A buoy, with *red* and *black* horizontal stripes, surmounted by a black globular cage, has been moored in the North channel in $5\frac{1}{2}$ fathoms at low water springs, $15\frac{1}{2}$ miles W. $\frac{1}{3}$ N. from the Shawsishan Lighthouse. Entering by this channel, when 3 miles from the lighthouse, bring it to bear E. $\frac{1}{4}$ N., and keep it so until you have increased the distance to 8 miles, then steer directly towards the buoy.”

The **MAIN** or **SHAWEISHAN CHANNEL**.—In 1842 the waters of the Yangtsee divided at Bush Island, the greater part flowing through the southern channel, which then carried a good depth of water, but of late years the latter has been filling up owing to the diversion of the greater body of water to the northward of Bush Island, which has had the effect of altering entirely the features of the unnavigable mass of swatchways and shallows which formerly existed in the space between Tsung-ming and Tung-sha, and scouring out a deep, broad, direct channel, which, fortunately for navigation, emerges at Shawsishan Island. This channel, when examined by Captain Charles Forbes, R.N., in 1869, was found to have a uni-

form breadth of fully 3 miles, carrying a depth of 5 to 8 fathoms in an almost direct course to the sea, its South point of entrance being marked by Shaweishan Island and Light, from which its bar, of 4 fathoms at low water and one mile across, extended between 3 and 8 miles W. by N. from Shaweishan.

To enter, pass northward of Shaweishan, taking care to avoid a 16-foot patch at the north-eastern extremity of the Tungsha Banks, which lies W. by S., $2\frac{1}{2}$ miles from the island, after clearing which, bring Shaweishan on an East bearing, and keep it so until 15 miles distant, when the course may be altered to W. by N. for the next 5 miles. Tsung-ming may then be closed, and its shore passed at the distance of a mile or two until abreast Bush Island, but care must be taken not to overrun the above distances on the flood, nor to dip Shaweishan Light, if at night, before hauling in for Tsung-ming.

Shaweishan Island and Lighthouse, in lat. $31^{\circ} 24\frac{1}{2}'$ N., long. $122^{\circ} 14\frac{1}{2}'$ E. and N.N.W. $\frac{3}{4}$ W., 41 miles from North Saddle Light, is a small steep-sided island, 190 feet high, fronting the main entrance to the Yangtse, and surmounted by a lighthouse. When bearing S.S.W. it makes as a flat-topped island with the highest part to the eastward, and when bearing West as a peaked island. When bearing N.W. $\frac{1}{2}$ W., distant about 5 miles, it appears like two islands, the westernmost being the smaller. It is seldom seen when entering the river from the southward.

A fixed light, visible all round, is exhibited from the summit of Shaweishan Island at an elevation of 229 ft. above high water, which in clear weather can be seen at a distance of 22 miles. The lighthouse is round, painted black, and 55 ft. in height, and the lightkeepers' dwellings are painted white.

Amherst Rocks, 10 ft. above high water, lie S.S.E. $17\frac{1}{2}$ miles from Shaweishan, N.W. $\frac{3}{4}$ N. $23\frac{1}{2}$ miles from North Saddle Light, and N.N.E. $\frac{1}{2}$ E. $24\frac{1}{2}$ miles from Gutzlaff. They are a dark cluster of rocks, of which the largest is very prominent, and when first seen always makes as a single black rock, but should there be numerous fishing boats cruising in their vicinity, they might not be distinguished if not on the alert.

Ariadne Rock, with 9 feet on it at low water, is apparently of the same jagged formation as the Amherst Rocks, from which it bears W. by S. 7 miles, and South $17\frac{1}{2}$ miles from Shaweishan Island. There are 5 fathoms water close round within 30 feet of the rock. With a strong ebb tide, the position of this danger can easily be distinguished by the commencement of discoloured water; the brown water resembles the shape of a comet, the nebula being over the rock. The Amherst Rocks are well in sight from it on a fine day, but if they be not seen, the Ariadne Rock is a great danger in entering, particularly on the northern and western streams, for the lead is no guide.

Gutzlaff Island and Light, forming the southern conspicuous object at the entrance of the Yangtse, is described on page 1096. If kept on a South bearing it will lead up to the outer part of the bar at the entrance of the South channel in not less than 19 feet at low water springs, and on a S. by W. bearing in not less than 21 feet.

Cape Yangtse, forming the South point of entrance to the estuary, is 17 miles W. by N. from Gutzlaff Island. The whole coast here is very low and quite level, having been entirely gained from the sea, and the mud dries out half a mile at low water from the embankment. There is anchorage in $4\frac{1}{2}$ fathoms southward of the cape, and fair shelter from northerly winds, unless the wind draws well to the eastward. There was formerly a beacon on the cape, but it has long since disappeared, and there is now no distinguishing mark whatever.

The coast for 20 miles northward of Cape Yangtse is fronted by an extensive mud bank which commences at the cape, and its eastern edge or elbow in 2 fathoms was (in 1864) 13 miles from the shore, and 12 miles N. by W. $\frac{1}{2}$ W. from Gutzlaff. From this elbow the bank trends to the N.W., and gradually narrows up to Kintoan Beacon. It is of very soft mud, and on its outer part large floating fishing stakes in long rows, attached to nets, are generally met with.

The **SOUTH ENTRANCE** of the **YANGTSE**, which is the recognised channel and fairway into the river, is bounded to the southward by the South bank, just described, and to the northward by the southern edge of the Tungsha Banks, and the shallows extending therefrom in the direction of the Ariadne and Amherst Rocks.

The Outer Bar, about 5, narrowing to 3, miles in breadth and 8 or 9 in length, has, according to the Admiralty survey of 1864, not less than 20 feet least water at its outer part, nor less than 18 feet at its inner end, 3 miles below the light-vessel; but seldom will so little be found, and although it has extended seaward since 1842, the alteration is almost imperceptible.

The **Tungsha Lightvessel**, painted *red*, is moored in $3\frac{1}{2}$ fathoms at low water in the entrance of the river, at the inner part of the bar, under the North bank. She has one mast, surmounted by a 10 ft. black ball. She exhibits a *bright revolving light*, giving flashes at half minute intervals, elevated 40 ft. above the sea, which in clear weather can be seen 11 miles. Her position is in lat. $31^{\circ} 7' 20''$ N., long. $122^{\circ} 1'$ E., with Gutzlaff S. by E. $\frac{3}{4}$ E., Shawsishan N.E. by N., and Kintoan Lighthouse N.W. by W. $\frac{1}{2}$ W.

A *gun* will be fired from her to attract attention when vessels are observed running into danger, and the course which should be steered will be signalled by the Commercial Code. In foggy weather a *Steam Fog-horn* will be sounded at intervals of 10 seconds. When necessary to lower the lantern for trimming, a small light will be hoisted and a flash light burned.

Kintoan Lighthouse, 70 ft. high, and painted black, is erected on the south-

ern shore of the Yangtse, N.W. by W. $\frac{1}{2}$ W. $16\frac{1}{2}$ miles from the Tungsha Lightvessel. No light has been shown from it since the lightvessel was established.

KINTOAN LIGHTVESSEL, placed in position in March, 1878, is moored in mid-channel N.E. of Kintoan Lighthouse. She is painted red, and shows a *fixed bright light* at 35 ft. above the sea, visible 11 miles off. A bright light is shown at her forestay to show in which direction she is riding.

A *Fog-bell*, weighing 10 cwt., is sounded on the Kintoan Lightvessel in foggy weather. It will be struck *three double blows every minute*; the interval between the blows in each pair will be *five seconds*, and between two successive pairs of blows *fifteen seconds*.

If the lightvessel should be driven from her station to one where she would not serve as a guide to shipping, the usual light will not be exhibited, but a fixed *red light* will be shown from the bow and stern. By day, the globe will be struck as soon as possible, and until struck a red flag will be shown above it.

Kintoan Small Beacon and Light.—This beacon is a wooden tripod, 40 ft. in height, and situate 5 miles N.W. $\frac{1}{4}$ W. from Kintoan lighthouse. It carries a *fixed light* showing *white* over the channel to the south-eastward, or between the South shore and the bearing of E. by S. $\frac{1}{2}$ S., and *red* across the channel towards Blockhouse Shoal, between the same bearing and S. by W. $\frac{1}{2}$ W. The white light is visible 6 miles, and the red light 4 miles. The light is elevated 32 ft.

Beacon Spit, said to have disappeared in 1871, is a 3 fathoms patch in the centre of the fairway, East of Kintoan Lighthouse, and a little detached from a 3 fathoms spit, which in 1869 was growing out from the South bank. The channel was further narrowed to less than a mile by a similar spit extending from the North side. The Kintoan Bar which first appeared in 1862, N.E. by E. of the lighthouse, appears to be extending both ways, and the channel to be deteriorating. The new lightvessel however is a good guide.

The **Tungsha Bank**, forming the North side of the South or fairway channel, is rapidly growing up. Its south-eastern spit, which borders the entrance and Outer Bar, extends about 8 miles eastward of the lightvessel, with a depth of 13 to 16 feet, and it may be cleared by not bringing the lightvessel to the westward of W. by N. $\frac{1}{2}$ N. The south-western edge of the bank is extremely irregular, and being steep-to should be approached with caution; it forms a complete breakwater to the channel, which affords secure anchorage everywhere in ordinary weather.

House Island, formed on the Tungsha Bank, has extended considerably, and is now a leading feature on the North. The house on the eastern part of this island bears East 9 miles from Kintoan Beacon, and N.W. $\frac{3}{4}$ N., $9\frac{1}{2}$ miles from the outer lightvessel; the bank extending from the West side is steep-to, and should be approached with great caution. The bank is evi-

dently growing to the S.E. from this island, for where the survey of 1842 gives $3\frac{1}{2}$ fathoms, there are now only 10 feet.

Block House Island is N. by W. $\frac{1}{2}$ W. $6\frac{1}{4}$ miles from Kintoan Lighthouse, and N.W. by W. $\frac{1}{2}$ W. 10 miles from House Island. It is covered with grass and low bushy trees, and is becoming larger every year. To the eastward about 3 miles is Grass Island, lately formed, and three others to the northward. It is probable that in a few years these will become united, and Grass Island and House Island become connected.

Block House Shoal.—The navigable channel between Kintoan Lighthouse and Block House Island has for some years past undergone a series of important changes, the latest formation being Block House Shoal, a middle ground of 6 ft. water, 7 miles in extent, the South point of which (marked by a buoy is N.E. by N. of the lighthouse. The channel northward of the shoal is not now navigable, whilst the fairway which lies between it and the South shore, and which in 1869 first became narrowed to less than half a mile, is reported to be filling up. There is no permanency in the chaacter of the channel at this part, mariners must therefore trust to the pilots.

A *red buoy*, 6 ft. in diameter, surmounted by a staff with a truncated, pyramidal cage, 12 ft. above the sea, has been moored on the S.E. extremity of Block House Shoal, in 16 ft. at low water. From the buoy Kintoan Lighthouse bears S.W. $\frac{3}{4}$ S., and Small Beacon W.N.W. westerly.

OUTER ANCHORAGE.—In fine weather a vessel may anchor anywhere between Gutzlaff, Amherst, and the Saddle Islands, but should always have one of them in sight, so as to take a good departure. It is recommended that an anchorage should not be taken at night under the Saddle Islands, during the N.E. monsoon, unless there are appearances of bad weather, as it will frequently take all the daylight of the next day to work up to the entrance. In the summer season, if bad weather is approaching, which the barometer usually foretells, a stranger should not attempt to run in unless certain of getting within the bar, or making the lightvessel; but either an anchorage should be sought under these islands, or the vessel kept at sea or standing off and on, as it is dangerous to enter the river when a gale is coming on. It is preferable to anchor rather than to stand out to sea, as the weather is sometimes thick and foggy, the tides strong, and the vessel's position not easily ascertainable under such circumstances.

The anchorage at the Saddle Islands is described on page 1093; the best anchorage at the Parker Group is northward of Senhouse, the south-eastern island, in 10 fathoms; or between Senhouse and Raffles in 6 to 7 fathoms, all the approaches being apparently steep-to.

TIDES.—It is high water, full and change, in the vicinity, and eastward of Gutzlaff Island, at 11^h 30^m; and springs rise about 15 ft. The highest tide occurs on the second day after full and change. At the lightvessel at the entrance of the Yangtse it is high water at noon, and springs rise 16 ft.,

neaps 11 ft., and neaps range 7 ft. At the entrance of the Wusung River it is high water at 0^h 30^m; springs rise 15 ft., neaps 10 ft. At Shanghai it is high water at 0^h 40^m; springs rise 10 ft., neaps 7 ft., and neaps range 4 ft.

The tidal streams at the entrances of the Yangtse from Gutzlaff to Shawsheishan rotate, performing one revolution (with the sun) in 12 hours. To the southward of Gutzlaff the tides are also rotatory, but not with that regularity which is observed about the Amherst Rocks. There is also reason to believe, although the fact has not yet been conclusively established, that they preserve the same character some distance to seaward, and far to the northward. During its revolution the direction of the stream changes about two points every hour, excepting when veering from N.W. to N.E. about the time of high water, and from S.E. to S.W. about the time of low water, when the change is more rapid. The northern stream for the most part makes and completes the flood, and the southern stream for the most part makes and completes the ebb, although the first part of the flood is made by the southern stream, and the first part of the ebb by the northern, called sometimes "tide and half-tide."

In the river the streams are sharp in turning, the flood making at 1^h 30^m after high water, and the ebb at 2^h 30^m after low water. There is very little slack, the ebb running 7 hours, and at springs attaining during that period a distance of 24 miles. The period of greatest velocity, 5 knots, is the 5th hour after high water. The flood runs 5 hours, and with much less strength, seldom exceeding a velocity of 4 knots, the distance attained during the whole tide being 16 miles.

TABLE showing the direction and velocity of the tidal streams at the entrance of the Yangtse-kiang.

Time of Tide.	3 Miles North of Gutzlaff.	Lightship at Springs.	Lightship at Neaps.	Outside of the outer Bar.	Between Shawsheishan and Amherst.
	Knots.	Knots.	Knots.	Knots.	Knots.
At H.W.	W. by N. 1	N.N.W. 1 $\frac{1}{2}$	N.N.W. 1 $\frac{1}{4}$	N.W. 4	N.N.W. 2 $\frac{1}{2}$
1st hour ebb	Slack	North 1 $\frac{1}{4}$	N. by W. 1	N.N.W. 3	North 1 $\frac{1}{2}$
2nd "	N.E.	N.E. by N. 1 $\frac{1}{2}$	N.N.E. 1 $\frac{1}{4}$	North 1 $\frac{1}{2}$	N.E. 2
3rd "	E. by N.	E. by S. 2	E.N.E. 1 $\frac{3}{4}$	N.E.	E.N.E. 2 $\frac{1}{2}$
4th "	East	E.S.E. 3 $\frac{1}{2}$	E. by S. 2	East	E. by S. 3
5th "	E. by S.	S.E. by E. 4	E.S.E. 2 $\frac{3}{4}$	E.S.E.	E.S.E. 2
6th "	E.S.E.	S.E. 2 $\frac{1}{2}$	S.E. by E. 2 $\frac{1}{4}$	S.E.	S.E.
At L.W.	S.E.	S.E. by S. 2	S.E. by S. 1 $\frac{3}{4}$	S.E.	South 1
1st hour flood	South	S. by E. 1 $\frac{1}{4}$	S. by W. 1	S.S.E.	S.S.W. 3
2nd "	S.W. 3	W.S.W. 2	W. by S. 1 $\frac{1}{2}$	West 1 $\frac{1}{2}$	S.W. 3 $\frac{1}{2}$
3rd "	W. by S. 3 $\frac{1}{2}$	W.N.W. 3	W. by N. 1 $\frac{3}{4}$	W. by N. 3	W.S.W. 3 $\frac{1}{2}$
4th "	West 4	N.W. by W. 3 $\frac{1}{2}$	W.N.W. 1 $\frac{3}{4}$	W.N.W. 3 $\frac{1}{2}$	West 3
5th "	W. by N. 3	N.W. 2 $\frac{1}{2}$	N.W. by W. 2	N.W. 4	W.N.W. 2 $\frac{1}{2}$
6th "	W. by N. 1 $\frac{1}{4}$	N.W. $\frac{1}{2}$ N. 2 $\frac{1}{2}$	N.W. by N. 1 $\frac{3}{4}$	N.W. 4	N.W. 2

Also at the Amherst, 1st hour flood S.E., 2nd hour South, 1 knot.

The foregoing table compiled from various sources will afford the best guide to a knowledge of these rotary tides, and will be found valuable should it be deemed desirable or necessary to stand in and make the light ship in thick weather. If a good departure be obtained before the outer islands or lights are lost sight of, the entrance may be confidently steered for, provided the course and distance run be kept corrected each hour, or oftener, by making allowance according to the table. Perfect reliance may be placed upon the direction of the stream, as given therein, which will seldom be a point in error, but the rate of the stream is a matter of judgment, and though capable of much precision, can only be correctly approximated by a careful consideration of all the attendant circumstances.

PILOTS.—Properly qualified pilots are licensed by the harbour master of Shanghai. No sailing directions can do away with their usefulness to the stranger, where the safety of the vessel depends so much upon a correct knowledge of the tides. The pilots can be obtained day or night, except when all are distributed on board vessels, when the schooners anchor near the lightvessel.

The cruising stations are: Outermost Station—between Leuconna Island, Barren Islands, and East Saddle Island; Middle Station—between North Saddle Island, Elliot Island, and Amherst Rocks; Inside Station—from the lightvessel to 8 miles outside.

The charges established under a code of regulations, by agreement between the Chinese government and the foreign ministers, and which came into force on the 1st of January, 1867, are as follows:—

For steamers or sailing vessels in tow, to or from the light-ship, for each foot of draught, 4 taels; for sailing vessels not in tow, to or from Gutzlaff, 5 taels, and to or from the light-ship, $4\frac{1}{2}$ taels. Two-thirds of the above rates respectively, shall be charged upon vessels proceeding from sea to Wusung, or *vice versa*, instead of to Shanghai.

The Shanghai Pilot Company's schooners are known by a *black ball* with number underneath in foresail and mainsail; flag *white* and *red* horizontal. The Mercantile Pilot Company's vessels have white hulls and the same flag, with the word "Pilot" on mainsail.

DIRECTIONS from the Southward.—If bound to the Yangtse during the S.W. monsoon, endeavour to make the island of Video, and having passed eastward of it at the distance of a mile or two, steer about N. by W., making some allowance for tide, which (although in this locality little is known accurately respecting it) may be taken to set westward on the flood, and eastward on the ebb. This course will lead 2 to 3 miles eastward of Beehive Rock, 13 miles distant, and a further run of 18 miles will bring a vessel up to the passage between the Saddle and Parker Groups, which is the most direct route into the Yangtse kiang. To avoid the Cairnsmore sunken rock, the only known danger in the passage, hug the Bit Rock, from which to the

Tungsha lightvessel the course is N.W. $\frac{1}{2}$ W., close along the South bank, and across the centre of the bar.

If preferring for any reason to pass outside the Saddle Islands, a N. by E. course should be steered from Video, the only danger to be avoided being Childers Rock, $4\frac{1}{2}$ miles South of the south-eastern extremity of East Saddle. The Saddles may be rounded as convenient, and after passing the North Saddle light, it may be brought to bear astern S.E. by E. $\frac{1}{4}$ E. Easterly, the opposite course to which will lead through the fairway of the bar up to the lightvessel.

During the N.E. monsoon, if not intending to call at Ning-po, vessels should pass eastward of Chusan, and enter the archipelago to the northward of that island. It is best, however, to endeavour to make the Saddle Islands as being the most weatherly land-fall, but if unable to fetch so far to the northward, and the parallel of 30° N. has been reached, the high dome-shaped island of Video, 500 ft. high, will then be a conspicuous object, for it may be seen in clear weather about 30 miles; it has a remarkable white cliff, which shows when the island bears N.W. by N., and in thick weather any cast below 30 fathoms will point out that the vessel is in the vicinity of this or the neighbouring islands, provided she be southward of the Great Yangtse Bank. The most remarkable land to the southward of Video is the island of Chukeya, on which there is a round-topped peak 1,164 ft. high, and eastward of Chukeya are several islets, of which Tongting, the outer one, is about 40 ft. high, with detached reefs S.W. of it.

If unable to turn to windward, anchorage will be found on the southern side of Ousha Island, in the entrance to the Sarah Galley Channel. If unable to weather the North end of Chukeya, the South side of Pootoo Island will be found the best stopping place; the anchorage in 12 fathoms is under the hill, with three chimneys on it; the mud bank from the shore is very steep, shoaling quickly from 12 to 2 fathoms. From this position, in a handy vessel the best route will be through Lansew Bay, and through the channel between Lansew and Tae-shan Islands; but large vessels had better pass eastward of Video, and enter the archipelago farther to the northward. If unable to fetch to windward of the Barren Islands, and should the tide or weather be unfavourable for entering the river, a convenient anchorage can be found among the Saddle Group, which, with other available anchorages, are described on pages 1093-4.

It may be here noticed that as the entrance of the Yangtse is somewhat difficult for a stranger to make even in fine weather, the difficulty is greatly increased if it be necessary to beat up against a contrary wind, especially in bad weather; no vessel should therefore attempt to do so without a pilot, or unless it be sufficiently clear to ensure keeping the islands in sight until they dip. But with a leading wind and a good departure either from Gutzlaff or

the Amherst Rocks, together with strict attention to the course and distance made good, a vessel may stand in for the lightvessel.

The In-shore Passage from Hong Kong to Shanghai during the N.E. monsoon is described on pages 96-7.

From the Northward or Eastward.—Vessels bound into the Yangtse from the Gulf of Pe-chili are recommended to make Shaweishan, not approaching the coast within the depth of 15 fathoms until within 60 miles of that island, when the water may be shoaled to 10 fathoms with safety, by which means there will be no difficulty in further making the Amherst Rocks in daylight. In N.E. winds, if strong, and the thick weather which usually accompanies them, there is a great probability of overrunning the distance owing to the strong southerly set (notwithstanding that the tides are revolving), and so getting to leeward, and having to work up from the Saddle Islands. Although it is better to do this than incur any risk, it is suggested in such a case that if the Amherst be not made before dark, especially if Shaweishan or its light be not seen, the vessel should be hove-to till dawn, sufficiently far to the northward to allow for drift and a set of a mile an hour, keeping a careful reckoning.

In N.W. winds and fine weather, the Amherst should always be made. In November and December, when these winds prevail, vessels from Japan should keep well to windward, for if they are of long continuance there is every probability of being driven to leeward of Video; in such case, should the weather be thick, the Great Yangtse Bank will be a good guide in approaching the entrance of the river, owing to the nature of the bottom, which is of clean river sand.

Whether intending to enter by the main or southern channel, Shaweishan is the best landfall to make when bound from the northward or eastward. By keeping it on a N.N.W. bearing it will lead towards the Amherst Rocks, which may be passed at half a mile on either side. These rocks bearing E.N.E. astern will lead South of the Ariadne Rock, distant 7 miles from them; when a West course may be steered till the lightvessel heaves in sight, making allowance for the state of the tide. Should a vessel in thick weather find herself being set over to the Tungsha Bank, she should immediately steer South for the channel, and anchor.

The Entrance of the Yangtse in hazy weather is somewhat embarrassing, for after the outer islands are lost sight of neither land nor marks are visible, but in clear weather the navigation is not difficult by day, and since the establishment of the three fine lights on the North Saddle, Gutzlaff, and Shaweishan Islands, it is equally easy, if not more so, at night.

Leaving the Saddle Islands, keep North Saddle bearing S.E. by E. $\frac{1}{4}$ E. easterly until Gutzlaff bears South, distant 16 to 17 miles, recollecting that if Shaweishan shows plainer than Gutzlaff, the vessel is too far to the northward, and in danger of entering a false channel through the Tungsha Banks,

5 to 7 miles northward of the fairway, and may be dangerously near to the Ariadne Rock, in which case the Amherst Rocks will also be visible. Gutzlaff, 210 ft. high, when first seen, will appear like a small round lump, and its lantern, which is mounted on a tripod, painted white, may not be visible. Shawsishan, 196 ft. high, a little larger than Gutzlaff, and surmounted by a lighthouse painted black, is not often seen when a vessel is in the right position for approaching the bar and fairway.

With Gutzlaff on the above bearing and distance, if the day be clear, the lightvessel will be visible from the mast-head (she is rarely seen beyond 7 miles from the deck), when steer for her between the bearings of W.N.W. and N.W. to cross the bar, making due allowance for tide, the channel course being N.W. by W. As long as North Saddle and Gutzlaff are in sight, the reckoning should be tested frequently by cross bearings, so as to verify the allowance made for tide, and thus give greater confidence in entering the river.

In working up from the Saddle Islands, do not bring Gutzlaff eastward of South, until 16 miles northward of it, when it may be brought to bear S. by E. The vessel will then be on the edge of the South Bank, and may now stand to the westward, nearly into her own draught, bearing in mind the direction of the streams. All vessels should keep as near as possible to the South Bank, the edge of which, from below the lightvessel up to Kintoan Beacon, appears remarkably even.

The foregoing directions are for vessels of about 18 ft. draught, and will lead over not less than 20 ft. at low water springs; small craft may close with the South Bank when Gutzlaff bears South, distant between 12 and 15 miles, and steer up with the lead for their guide, for the edge of the South Bank is very even and may be depended on nearly up to Kintoan beacon. Or, having passed Gutzlaff Island, if the weather be fine, a vessel may safely steer in with the island bearing S. by E., astern, and this will lead over the eastern edge of the South bank in about 15 ft. at low water, or 31 ft. at high water springs.

Too much attention cannot be paid to the set of the streams at the entrance of the Yangtse, and also to the lead. So long as the weather is clear, Gutzlaff forms an admirable mark, and it has only to be kept westward of South until it is distant 16 miles, when a vessel may steer N.W. by W. for the lightvessel; but in thick weather and a working breeze with a variable tide under her lee, it is difficult to ascertain when 16 miles have been made, and she will be liable to be horsed over to the Tungsha Banks, where several vessels have been wrecked. These banks should always be approached with caution, as their southern edges give no warning, unless it be by the lead indicating hard bottom; and, as the tide may be setting across and not into the river, it will be as well to ascertain the vessel's true rate over the ground

by using the deep sea lead for a ground log instead of the log-ship, and taking the opposite to the bearing of the line as the course made good.

Whenever the ground log is not used, it is recommended to allow hourly for the tides, both as to direction and velocity. Experience has shown that the lightvessel can be made by following this method, always being careful to verify the ship's position by bearings of Gutzlaff and the Saddle Islands as long as they remain in sight. The break on the head of the Tungsha banks will sometimes be seen after passing the Ariadne Rock, but in thick weather the southern side of the channel is no doubt the one to border on. At night or in thick weather the lead will be a useful guide. The bottom on the North bank is hard mud with sparkling grains of sand, but soft in a few places. On the South bank the bottom is soft mud with dark gray sand.

Mr. George Stanley, R.N., remarks that the nature of the bottom is very little guide, for after six weeks' sounding, during the survey of 1864, it was impossible to detect any difference between mid-channel and the North and South banks; the only positive difference being that sand with black specks may be found on the Tungsha Bank, but never on the South bank. A stranger taking it as an infallible rule, that sand with dark specks are to be found on the North bank, would at once be in doubt if the lead showed two or three successive casts of brown mud.

Captain Charles Gribble remarks that although there may be little or no difference in the appearance of the bottom on the North and South banks, there is a difference in the *feel* of the bottom, that on the South bank being very soft, that on the North hard.

Lightvessel to Wusung River.—The lightvessel is moored over against the North side of the channel, off a bight in the North bank, and a mile below is a 9-foot spit of the Tungsha, the extremity of which in 17 ft., is half a mile E.S.E. of her. Vessels should therefore pass to the South of the lightvessel, from which the channel course is N.W. by W.; but if beating up after passings the lightvessel, tack in $3\frac{1}{2}$ fathoms when standing towards the South bank. The deepest water is near and along the southern edge of the North bank, but in standing towards it do not wait for the second shoal cast to go about. Generally the edge of the North bank is lined with heavy fishing stakes, planted in 4 and 5 fathoms, with only a few feet water a ship's length inside them.

The house on House Island and the lightvessel are excellent marks for fixing a ship's position by cross bearings until Kintoan lighthouse (now disused, see pages 1108-9), is well in sight, which it will be when the hull of the outer lightvessel is just dipping. At night bring the lightvessel astern on a S.E. by E. bearing, and keep it so till the light dips; this will lead well over on the North side of the channel, but in the best water opposite Beacon Spit, E. $\frac{1}{2}$ S. from the Kintoan lighthouse, where the channel is much con-

tracted.* Here the South shore will be plainly in sight, and the Kintoan lightvessel (page 1109) a guide in mid-channel. When the lighthouse bears W. by S. steer W.N.W., so as to pass about half to three-quarters of a mile South of the Blockhouse shoal buoy, and then stand up channel again on a N.W. $\frac{3}{4}$ W. course, bearing in mind that the edge of the South bank is less steep than that of Blockhouse Shoal. As previously mentioned, the channel above Kintoan is reported to be shoaling, and the banks to be constantly shifting, so that a stranger must trust rather to the pilots than the chart.†

At night it is preferable to hug the South shore near the lighthouse, passing it at a mile. Blockhouse Island will soon rise after passing Kintoan lighthouse, having at first the appearance of a cluster of fishing boats, and gradually showing itself a low island covered with bushy trees. When the large house on this island bears North, the vessel will be in the narrowest part of the channel, which here is only 4 cables wide.

After passing Blockhouse, the South shore, the bank of which is steep-to, should be gradually closed to not less than a mile, and kept at that distance until the marks and buoy for Wusung Spit are seen, and should not be approached under 5 fathoms. It is then necessary to keep well out into the channel and get Paushan Pagoda, a peaked tower near the small walled town westward of the entrance, on a W. by N. $\frac{1}{2}$ N. bearing, which will lead up to the Wusung River, just clearing the dangerous shelf which borders the shore eastward of the entrance. Wusung lighthouse will also be in sight just over the point after passing the Blockhouse Shoal, but the *red* light it exhibits at night down the channel of the Yangtse is not visible more than 5 miles. If bound to Shanghai, the directions are continued on page 1120.

The **WUSUNG RIVER**, on which is situate, 12 miles from its entrance, the great commercial port of Shanghai, is about 60 miles in length, and is the lowest tributary of the Yangtse kiang. It flows from the lake Tien-shan or Miau, through which is a water communication with the Grand Canal, leading northward to the important city of Suchau, and southward to Hang-chu fu. Its real name is the Wongpu or Hwangpu, but it has taken its commonly received name from the small town of Wusung, situated about a

* In 1869. The only information subsequently received concerning the alterations of the channel is contained in the following extract:—"The first sign of land will be three remarkable trees on the South bank of the river, $7\frac{1}{2}$ miles below Kintoan lighthouse, and marked 'Clump' on the chart. To the south-westward of House Island the spit extends in a S.E. direction, the bottom on that side being hard. Blockhouse Shoal has extended in a S.E. direction, and also on its S.W. side. When close to Kintoan lighthouse, keep the South shore about three-quarters of a mile distant, and follow the trend of the land until the red buoy on Wusung outer buoy is sighted."—H.M.S. *Avon*, May, 1871.

† These directions refer to the channels as they existed in June, 1859, and as they are shown on the Admiralty charts.

mile within the entrance of the river on its left bank, and on the North side of a creek also leading to Suchau.

The **Outer Bar** of the Wusung River commences about a mile from the entrance, carrying not less than 20 ft. at low water springs, with occasional deeper soundings, over a narrow channel between the shallow and extensive mud flats which border both shores of the river at its mouth. The North side of the bar channel is marked by the *Spit* or *Wusung Buoy*, on the edge of the western shoal, about half a mile above its extremity. This is a large *red* and *black*, vertical striped, nun buoy, 8 ft. in diameter. It lies in 21 ft. at low water springs, with Paushan Point N.W. by W., and Wusung lighthouse S.W. by W.

Vessels should cross the outer bar with Wusung lighthouse bearing S.W. by W. $\frac{1}{2}$ W., westerly, so as to avoid the dangers on either side, the chief of which is the *Lismore* wreck, in 2 fathoms, on the edge of the South flats. The channel subtends an angle of about $13\frac{1}{2}^{\circ}$ from the lighthouse, so that a course on a S.W. by W. $\frac{1}{4}$ W. bearing of it will hug the northern flats, and a course on a W.S.W. bearing of it the southern.

Lismore Wreck Light.—A pile lighthouse was erected in 1875 over the *Lismore* wreck, and a fixed red light shown from it, but the water deepening around the lighthouse rendered it unsafe, and in 1878 it was decided to remove it, and mark the wreck by a small junk, moored 200 yards North of it, from which will be shown two lights, the upper one *red*, and the lower one *bright*. A fog-bell was sounded during thick weather at the pile lighthouse, and we presume is still used on the junk.

Wusung Light and Left Bank.—The western side of the mouth of the river has a grassy embankment pierced with embrasures, with a ruin at the point of entrance called Fort A. A quarter of a mile above Fort A is Wusung lighthouse, a square tower of brick, 45 ft. high, with a total height of 58 ft. It exhibits a *fixed light*, showing *bright* from the river bank N.W. of the lighthouse to N. $\frac{1}{3}$ W.; *green* on the North side of the navigable channel between N. $\frac{1}{3}$ W. and N.E. $\frac{3}{4}$ E.; *bright* over the navigable channel of the entrance between N.E. $\frac{3}{4}$ E. and E. by N. $\frac{3}{4}$ N.; and *red* over *Lismore* wreck and the South side of the navigable channel between E. by N. $\frac{3}{4}$ N., and the bank of the river. It is elevated 50 ft. above the sea, and in clear weather the white light should be seen from a distance of 12 miles, and the *red* light, which also shows over the Yangtse to seaward, about 8 miles. The illuminating apparatus is dioptric, of the fourth order, and the tower is painted black.

A yellow joss house with poles about a mile above Fort A marks the village of Wusung, situated on the northern side of the creek leading to Suchau, and another mile up is the French coal depôt and flagstaff, and just

above the latter the Chinese customs' station, a conspicuous square white building surmounted by a turret and knob, and in front of which is the mast or signal staff, from which is exhibited, by flags and balls, the depth of water on the inner bar. Abreast and just above the custom house is the best anchorage for vessels intending to remain, in which case they should moor, but quite clear of the fairway of the bar, in order to avoid the risk of collision, as the flood tide sweeps along this shore, requiring rather a sharp turn to be made to cross the bar. Vessels waiting for tide only to cross the inner bar should anchor lower down off Wusung.

The East bank of river at the entrance is very low and not approachable, being the shallow side of the river, and bordered by mud flats, which to the northward extend nearly a mile. Here several ships have been wrecked. Over these flats the Wusung light shows red. At the outer point is Fort B, a small ruin, from which upwards the margin of the shore is reedy as far as Pheasant Point, a sharp elbow, about a mile above; this point is steep-to.

The Inner Bar is above Pheasant Point, and appears to be formed by the eddy which that point causes on the flood. It presents no obstacle to vessels drawing 11 ft. water, for the passage over it, with that depth at low water springs, is two cables broad. But for another foot of depth the channel is very narrow, a matter of importance to vessels of deep draught crossing. Its entrance is abreast or immediately above the custom house, and the leading mark for the best water, 12 ft. at low-water springs, is two poles on the bank of the river, $1\frac{1}{4}$ mile above Pheasant Point, kept in line E. $\frac{3}{4}$ S. The front pole is a low one, with a pyramidal top; the back one, a little removed from the bank, is a high pole with a rectangular top. At night a *red* low light is exhibited on the river bank, with a high *white* light on the low pole behind it, indicating the same line of direction. These lights are visible 2 miles in clear weather. The bar channel shifts occasionally, and varies slightly in depth.

Any deep draught steamer requiring to cross the bar at night, may, by making application to the officer in charge of the customs' station, arrange to have a light hoisted on the signal staff, to show when there is water enough for her to cross.

Inner Bar Signals.—The depth of water on the bar is shown, during daylight, from the flagstaff, 100 ft. high, at the custom house. In clear weather these signals may be seen by vessels over the land before crossing the outer bar. The flag employed is square, half red and half white, in combination with one or more black balls, distinguishing the depth, as follows:—

* The code (coloured) can be obtained at the Harbour Master's office, Shanghai.

Red next mast, no ball	13 feet.	Red over white, black ball under	18 feet.
Same , black ball over	24 ,,	White next mast, no ball	15 ,,
Same , black ball under	14 ,,	Same , black ball over	23 ,,
Same , balls over & under	25 ,,	Same , black ball under	16 ,,
Same , two balls under	26 ,,	White over red, no ball	19 ,,
Red over white, no ball	17 ,,	Same , black ball over	21 ,,
Same , black ball over	22 ,,	Same , black ball under	20 ,,

In addition, a double cone is hoisted at the cross trees when the water is rising.

Extending from the Inner Bar 2 miles up the river is the *Middle Ground*, a shoal which divides the river into two channels, and which is rapidly increasing in height. A great portion is visible at half-tide, and a considerable patch of reeds, Gough Island, never covers. Between it and the eastern bank of the river is the narrow ship channel leading to Shanghai. *Junk Channel*, S.W. of the Middle Ground, saves half a mile in distance, but its upper end, at the tail of the Middle Ground, is very narrow, with only 6 or 8 ft. at low water, so that it should only be taken with a rising tide.

Above the Middle Ground the banks are of the same low character as at the entrance, and there is nothing deserving of more particular description than can be mentioned in the subsequent directions.

Tides.—At the entrance of the Wusung River it is high water, full and change, at 0^h 30^m; springs rise 15 ft., neaps 10½ ft., and neaps range 6 ft. At Shanghai it is high water, full and change, at 0^h 40^m; springs rise 10 ft., neaps 7 ft., and neaps range 6 ft. Vessels drawing 18 ft. can cross the Inner Bar at any high water, but if of larger draught they will generally have to wait for spring tides. The greatest draught ever brought up to Shanghai was H.M.S. *Imperieuse*, drawing 24 ft., but a vessel of that draught would have to wait for the springs to pass either up or down the river.

DIRECTIONS.—As pilots are always in attendance at the entrance, it would not be prudent for a stranger to enter Wusung River without one, for its shoals are constantly undergoing changes from the alluvial deposits. Approaching the entrance, a peaked tower or Pagoda near the small walled town of Paushan, and just seen over, will be observed to the westward, and this pagoda must be kept W. by N. ½ N. (but nothing to the northward of that bearing) to clear the shoals off the river's mouth, until the Wusung lighthouse is brought S.W. by W. ½ W. westerly, on which course vessels should steer in over the bar by day; at night the white light is visible over the channel, a change to red or green denoting that a vessel is out of the channel and in danger. In entering pass close eastward of the Wusung buoy (leaving it on the starboard hand), for the deep-water channel here is narrow, and composed of hard substances. After passing the Wusung buoy on the ebb tide, it is necessary to be careful that a vessel be not set too near the South bank, which shoals very suddenly and is rocky.

Standing into the river, keep well over to the western shore, and keep it aboard as far as Wusung Creek, when a mid-channel course may be steered rounding *Pheasant Point*. Vessels, except of very shallow draught, should never be tempted by the apparent breadth and clearness of the channel to pass on the East side of the junks, which sometimes lie thickly anchored in the fairway below Wusung, but should pass through the midst of them or by the western shore, which is steep-to.

As vessels of large draught are obliged to cross the Inner Bar at high water, whilst the flood tide is still running strongly, care must be taken to alter course in good time, say, when the beacon poles bear E. by S. $\frac{1}{2}$ S., and not to allow the high pole to come to the southward of the low pole, for they are very close together. This caution applies with peculiar force to sailing vessels, for the flood sweeps up the river and towards the Middle Ground with great strength, 4 knots at springs and 2 knots at neaps. If intending to wait for high water, be careful not to anchor too near the bar, and if the vessel is of large draught, it will be better to anchor below Wusung, so as to give plenty of time and room to turn the ship; for with a strong flood a vessel may be abreast the bar before her head is the right way. No vessel of any size should attempt to pass through the junks or across the bar in light winds if the tide is running strongly; and it should be borne in mind that both flood and ebb streams continue to run at least an hour after the time of high and low water by the shore.

To cross the Inner Bar in the deepest water, 12 ft.* at low water springs, bring the high and low beacon poles in line (or at night the white and red lights), E. $\frac{3}{4}$ S., and when over the bar close the shore to three-quarters of a cable, altering course as requisite so as to preserve the same distance along the East bank of the river up to Black Point, 3 miles above Gough Island. The narrowest part of the channel is abreast Gough Island, the dry part of the Middle Ground, but at this part the river bank is very steep.

Black Point, which is halfway to Shanghai, serves as a guide in passing up the river, to ascertain the vessel's position, the banks being exceedingly low and flat, so also does the old earthwork at the mouth of a creek a little higher up. Here the eastern shore must be kept well aboard, as a shelf stretches two-thirds across from the opposite side; the creek, however, should not be passed within a cable. Continue along the East bank at a moderate distance until the houses of the foreign settlement at Shanghai are in full view, and after passing the lower wharves, if not intending to anchor to wait for the ebb tide, edge over W. $\frac{3}{4}$ N. towards the opposite shore,

* Vessels passing Gough Island are cautioned to keep in mid-channel as a bank has been found to extend about half a cable off the mouth of a creek, 1,720 yards S.E. by E. $\frac{1}{2}$ E. from the high beacon of the Inner Bar. In mid-channel at low water the least depth obtained in November, 1877, was 25 feet.

steering for the new dock well below the American Church, distinguished by its square tower, and keep well on that side the river until Suchau Creek opens, when the course is mid-channel, round Putung Point.

In the lower part of Shanghai Reach fishing boats constantly anchor in a line across the river, but a passage is always kept clear for vessels. A vessel will generally pass southward of the shipping which lie in the upper part of this reach.

Vessels going up with the last of the flood generally anchor below the shipping, and remain till the ebb stream makes down, which does not take place till $1\frac{3}{4}$ hour after high water by the shore; the flood stream makes about an hour after low water. Steamers, therefore, or sailing vessels with a commanding breeze crossing the Inner Bar at high water or with a rising tide, will find the flood stream still strong in Shanghai Reach, which is often so crowded with shipping that it would be almost impossible to pass through without collision; and pilots are not allowed to bring a vessel up beyond the lower anchorage until they have ascertained from the harbour master where her berth is to be. Tugs are now available for hire, by the employment of which the risks of collision, before so frequent, are in a great measure averted.

The space in front of the British Consulate, at the entrance of the Suchau Creek, is generally clear of vessels, and always looks inviting, especially at slack water, but it should be avoided, as the chow-chow water, caused by the sharp bend of the river at Pootung Point, renders this locality insecure as an anchorage. The holding ground also is indifferent, the anchors are liable to come home, the water is 8 to 15 fathoms deep, and a vessel is constantly swinging round and round, so that whilst endeavouring to moor, before the swivel can be got on, she may have taken several round turns in her cables.

The best berths are abreast and above the Chinese custom house, along the West bank of the river on which the city stands. The tides here run with regularity and with less strength, and a fairway along the eastern bank is left clear. Vessels ought to be moored with at least 36 fathoms on each cable, and a mooring swivel should be invariably used. A heavy fine is imposed on vessels neglecting this precaution. It is necessary to moor taut, as the anchors are generally found to come home after some time, and great care must be taken in laying the anchors, especially in long ships, in order to ensure a clear berth.

There is a regular berth appropriated for the British senior naval officer's ship; the mooring buoy is off the custom house in $9\frac{1}{2}$ fathoms.

SHANGHAI is situate on the left bank of the Hwang-pu, 12 miles above Wusung. Vessels of 24 feet draught can sometimes be taken up to the settlement at spring tides, but there is no trade above Shanghai in foreign bottoms. The port of Shanghai extends to Wusung, and the anchorage for foreign vessels, called the harbour, extends for 4 miles down the river.

This is under the regulation of the harbour master, an officer appointed by the Chinese authorities, who retains a complete conservancy of the harbour, its dues, customs, and duties, a condition which was ratified at the Treaty of Tientsing in 1858. The harbour is divided into nine sections (from Upper Limit, about a mile above Suchau Creek, where a mark is placed defining the foreign boundary), in which vessels lie three abreast, and lettered according to their positions.*

Shanghai, it is well known, is the most important centre of foreign commerce in China. It has risen within a quarter of a century from the insignificant rank of a third-class city to the fame and wealth of one of the chief commercial emporia of the world. It was always a considerable place of trade, from the fact of its being the nearest seaport to the great city of Suchau on the Grand Canal, 45 miles to the westward. Situated on the delta of the Yangtse, and having water communication with the whole empire, its site is most commanding. Its name signifies "Upon the Sea," and although it is now 25 miles from the coast, Chinese annals state that it was once upon the seashore, and the low land which now intervenes has been gradually formed by alluvial deposits. For 50 miles around the city there is water communication with the interior in every direction by the numerous creeks which intersect the neighbouring plain.

The foreign settlement is entirely distinct from the native city in its boundaries, government, and commerce. The French concession is northward of and contiguous to the city. The British concession, which includes all the other European communities and consulates, lies between the Yang-king Pang and the Suchau Creek, and here stands the British consulate, a large square building near the bridge which crosses the latter creek.

The quay along the river side in front of the palatial residences of the foreign consuls and merchants, nearly a mile in length, is called the Bund, in the centre of which, recognisable by its Chinese architecture, is the custom house, presided over by the foreign inspectorate. In this building are the offices of the harbour master, and of the engineer who has the superintendence of all matters connected with lights, buoys, beacons, &c. The custom house possesses the only wharf at this part of the settlement where cargo boats can load or discharge at all times of tide.

The American concession, locally known as Hongkew, extends a mile up the lower bank of Suchau Creek and along the river side eastward, where are situate two of the principal docks, the Sailors' Home, and many of the leading firms of Shanghai. The Pootung side of the river opposite the settlement is also common to all foreigners. At the point is a look-out house 130 ft. high; the British cemetery is a little below, and above is the

* Thus:—S Shantung side, C centre, P Putung side, O L outside limit; a list is published daily in the *Shipping Gazette*, so that any vessel in the river can be easily found.

large engineering establishment of Messrs. Muirhead & Co., and the finest dock in Shanghai.

Time Gun.—A gun is ordinarily fired from the senior naval officer's ship at mean noon precisely, a red and white triangular flag being previously hoisted. Vessels can also have their chronometers rated by various firms on shore. The best observing place is the British Consulate, near the flagstaff, in lat. $31^{\circ} 14' 42''$ N., long. $121^{\circ} 28' 55''$ E.

Docks.—There are three large docks at Shanghai. Two of them, docks A and B, also known as the Old and New Docks, lie at Hongkew,* on the left bank of the river, about half a mile apart. They belong to the Shanghai Dock Company, and their dimensions and depth of water are as follows:—

Dock A—Length over all, 374 ft.; breadth, 60 ft.; depth over sill at springs, 18 ft.; depth over sill at neaps, 13 ft. *Dock B*—length over all, 385 ft.; breadth, 52 ft.; depth over sill at springs, 14 ft.; depth over sill at neaps, 9 ft. Every appliance for repairing iron or wood vessels and machinery is on the premises.

Muirhead's Dock is on the Pootung side, opposite the city. Its dimensions are, length over all, 380 ft.; length on blocks, 340 ft.; Width at top, 125 ft.; width of dock entrance, 75 ft.; depth on sill at springs, 21 ft.; depth on sill at neaps, 16 ft.

There is also a complete engineering establishment attached, where all repairs of vessels and machinery can be effected.

Trade, Supplies, &c.—Independently of an enormous traffic in general merchandise, the characteristic feature of Shanghai is the export of silk, for which staple this is the main entrepôt, and since the opening of the Yangtse, the trans-shipment of tea brought down from Hankow by steamer or of imports and Chinese produce for the various river and northern ports cause a great concentration of foreign shipping here.

Shanghai *water* is very impure and sometimes brackish, containing a large quantity of organic matter, and its use is a fertile source of sickness to the crews of vessels. If obliged to use it, the grosser particles may be precipitated by a small quantity of powdered alum. Water is sometimes procured from the Ta-hoo lakes and sent on board for 5s. a ton. If good water cannot be procured in the hot season, condensed water should be used if cholera is prevalent.

Provisions are plentiful and moderately cheap, and the markets are well supplied with beef, mutton, game, fish and poultry. Vegetables are considered unsafe articles of diet, in consequence of sprinkling them during cultivation with liquid manure, and the fruit is of poor quality; for these rice is the best substitute.

* Also spelt Honque.

Coals for men-of-war are sent alongside from the naval store in lighters and put aboard by coolies under contract with the Chinese.

The general hospital is on the French Bund. Seamen are received into the third class wards at a charge of $1\frac{1}{2}$ Mexican dollars per day, which covers all expenses necessary for medical treatment. For the two higher classes of wards $1\frac{1}{2}$ and 3 taels per day are charged respectively.

CLIMATE.—The advantage enjoyed by Shanghai from its position in the temperate zone of China is in a great measure neutralised by its low-lying site, scarcely raised above the level of the river, and exposed to noxious marshy exhalations.

Crews of ships stationed at Shanghai suffer both from the malarial influences of the climate and the impurity of the water, especially in the hot season, when fever, dysentery, and cholera generally prevail, at which time precautionary measures are found to be instrumental, in a great degree, in staving off fatal results. Frequently, under double awnings, the temperature rises to 95° by day, remaining above 85° during the night, and at midsummer, for a period of two to three weeks, it often rises much higher. This is the most trying period, and many cases of sunstroke then occur. In July, 1863, the native population were dying of Cholera at the rate of one thousand a day, It is therefore of the highest importance that officers in command should be prepared to adopt needful precautions. Properly filtered water is indispensable to health, and when mixed with oatmeal, for drinking purposes, has been found to be very beneficial. Rigid attention to diet should be strictly observed, excesses of every kind being in the highest degree prejudicial. There is published in the "Treaty Ports of China," page 394, from the pen of the late Dr. Henderson, an article on health, which contains most valuable reflections on that important subject, the preservation of health in China, which is well worthy the perusal of officers stationed at the ports. Without entering into particulars it may be stated that not more than half the amount of food is required to sustain the vital energies in the hot months as during the cold, that then the food cannot be too simple, and that extreme moderation in, almost abstention from, the use of fruit and vegetables in season is necessary, indulgence in them being incompatible with health, rice being quite sufficient for all purposes of nutrition. During summer and autumn the power of the digestive organs is weak, and a moderate indulgence in stimulants is requisite, but iced drinks during meals are very injurious. Tea is far too little used; it has a gently stimulating influence, and is not followed, as in the case of alcoholic drinks, by a corresponding depression. It is tonic and astringent, and its use and that of coffee excite respectively the nervous and cerebral functions. But above all things, after a lengthened stay, change to a more bracing climate is essential to the due preservation of health

Winds and Weather.—By a meteorological register kept at Shanghai, the prevailing winds from 1848 to 1854 appear to have been as follows:—

January	- N.E. to N.N.W. and generally N.N.W.	May	- - E.S.E. to S.S.E.
February	- N.E. to N.W. and generally N.W.	June	- - S.E. to S.S.E.
March	- N.E. to S.E. and vari- able.	July and August	S.S.E.
April	- E.N.E. to S.E. chiefly S.S.E. and variable.	September	- N.E. to E.
		October	- - N.E. to N.W.
		November	- N.W. and variable.
		December	- N. to N.W.

January is in general fine at Shanghai. In February, thick fogs occur. March is damp and disagreeable. April has more rainy days than any other month, except June, which is the wettest month. In May there is but little rain, and that little occurs in heavy showers. July is hot, dry, scorching, with considerable rain in the form of evening thunder-showers. July and August are the hottest months. In September the S.W. monsoon is wholly broken up, and the temperature is very changeable. In November the winter fairly sets in, the first frost appearing from the 12th to the 20th. December is the driest month of the year, and the weather clear and freezing, though fogs are of occasional occurrence. In May, June, and July fogs also occur.

The summer gales are strongest from the S.E., and generally give good notice, the barometer beginning to fall sometimes as much as 24 hours previously. The rules for judging the barometer on the Chinese coast generally hold good for the neighbourhood of Shanghai; a rapid fall betokens a gale, and a high range the continuance of northerly winds. Typhoons rarely occur. In August, 1871, one passed over travelling to the north-westward, the greatest force of wind being 9. Commencing at N.E. the wind shifted to W.N.W. and S.W. Many vessels afterwards arrived either totally or partially dismasted.

WUSUNG TO HANKOW.

The navigation of the Upper Yangtse must be manifestly conducted with much local and recent knowledge. The Admiralty directions for this portion will therefore not be given, as the changes in the river channels alone would render them of little value after any time has elapsed. Many difficulties and troubles have arisen, so that in June, 1866, the following letter was sent to Lloyds by their agents at Shanghai, Messrs. Dent and Co.—

Many disasters have occurred to tea ships that have gone to Hankow this season of 1866. These disasters are so serious that we think the attention of the underwriters and shipowners should be directed to the dangers attending the navigation of the Upper Yangtse for sea-going ships.

During the winter months the river falls so low that in some places the river steamers find only 10 feet of water; the channel is continually shifting, forming shallows and banks where a few weeks previously was deep water; thus the lightship on the Lang Shan crossing, one of the most difficult parts of the river, had recently to be moved half a mile. The water begins to rise towards the end of March, but sometimes falls again till the middle of May, and from that period till the end of July the rise goes on steadily with a very strong current. It follows, therefore, that ships can only go up and down with any degree of safety when towed by powerful steamers, adapted to take the vessels alongside, and in charge of captains and pilots continually employed on the river.

It is, however, not only the passage up and down that is attended with danger; there is also great danger to ships while at anchor off Hankow, owing to the strength and eddies of the current, caused by the proximity of the anchorage to the mouth of the River Han; this season the current has been unusually strong (6 to 7 knots) and hence the greater number of accidents.

CHAPTER XXIV.

FROM THE YANGTSE KIANG TO THE LIAU-TUNG GULF.

The great length of coast described in the present chapter, about 1,000 miles in extent, was very little known to Europeans till within the last few years. The early visits of the British embassies to China had added little to the information given by the Jesuit missionaries, and it is only since the warfare which led to the treaty of Tientsin, that hydrographical knowledge of the coasts has been obtained. The low shores of the province of Kiang-tse, the southern portion of the great delta of the Hoang-ho, is still a *terra incognita* barred from access to shipping by vast ranges of shoals, extending 80 or 90 miles off the dry land, but which, as is the case with most other diluvial areas, is probably intersected by numerous channel, which must for all time be most difficult to navigate in the absence of buoys and marks.

The Tung-hai, or *Eastern Sea* of the Chinese, although recognised by geographers, is scarcely known by that name to navigators. It comprises the space lying between the Yellow Sea and the Pacific, being separated from the former by an imaginary line joining the mouth of the Yangtse and the Korea, and from the latter by the chain of islands stretching from Kiusiu (Japan) to Luchu and Formosa. Its climate is temperate, though subject to gales and occasional snow storms in winter; the summer season is fine, and it is not within the limit of the typhoons. Its currents, beyond the influence of the Yangtse and coast tides, seem to be irregular, except in its eastern part, through which the Japan stream flows north-eastward from Formosa towards the Pacific along the southern shores of Japan, and northward with some regularity, especially in the summer season, through Korea Strait.

The Whang-hai, or *Yellow Sea*, is bounded on the West by the deep bight of the coast formed between the Yangtse and the Shantung promontory, and on the East by the coast of Korea. This sea was little frequented by foreign vessels previous to 1858, but since that year all the prominent features of its coast have been surveyed or examined, and the dangers of it are now sufficiently well known, to answer the requirements of safe navigation

between the treaty ports of China and Japan. The Korean coast and 200 miles of an unapproachable shore North of the Yangtse still remain unexplored, but they are rarely approached by the mariner, and it is to be hoped that a better knowledge of these localities may lead to the discovery of some new harbours, of which the coasts are somewhat deficient, although there are many excellent anchorages. There is a considerable coasting trade carried on principally with Shanghai, Ningpo, and Tientsin, and also with Ta-kusan in the Korea.

Gulfs of Pe-chili and Liau-tung.—The head of the Yellow Sea branches out into a double-headed gulf, one head extending to the West 150 miles, the other about the same distance to the N.E., forming a great inland sea, known to the Chinese as the Peh-hai or North sea. The southern part of this sea has received from foreigners the name of the Gulf of Pe-chili, and the north-eastern part that of the Gulf of Liau-tung. At its entrance the coasts approach within 55 miles of each other, and the space between is called Pe-chili Strait, the southern part of which is occupied by the Miautau group.

The shores of the Gulf of Liau-tung were almost a *terra incognita* to Europeans until the year 1793, when H.M.S. *Discovery* and *Alceste* navigated its southern portion and anchored in Halu-shan Bay. In August, 1855, H.M.S. *Bittern* sailed along the eastern coast and anchored in Fu-chu Bay and off the port of Newchwang. Subsequently, in July, 1859, a survey was made by Commander J. Bythesea, H.M.S. *Cruiser*, and Major A. Fisher, Royal Engineers, of part of the western coast from the Great Wall of China to the Chi ho, 25 miles South of the Pei ho. The remaining shores were surveyed in the fall of the year 1860 by Commander J. Ward, Lieut. C. Bullock, R.N., and officers of H.M.S. *Actæon*, *Dove*, and *Cruiser*.

The Gulf of Pe-chili borders the north-eastern margin of the great plain along the shores of the provinces of Shantung and Chili, receiving several rivers, chief amongst which is the Yellow River. At its head is the entrance of the Pei ho, on which river stands Peking, the capital of the empire, and also the opulent city and treaty port of Tientsin. The Gulf of Liau-tung is the continuation of a great valley of Manchuria, lying between two mountain chains in the province of Shing-king or Liau-tung, which encompasses its sides. The Liau ho falls into the head of this gulf, on which river, at its entrance, stands Yingtze, the treaty port of Newchang.

WINDS and WEATHER.—The climates of the Eastern and Yellow Seas are in most respects identical, although there is considerable variation between their remote extremes, viz., the region about Formosa and Lu-chu in the one and that of the coast of Shantung in the other.

In the Yellow Sea, near the coasts, the winds throughout the greater part of the year are local. Between Shanghai and the Korea, and almost em-

bracing the Shantung promontory, in December and January, it blows almost constantly from the N.W. (seldom ranging beyond North and W.S.W.), with gales of long duration from North to N.W., sometimes with fine, but generally with overcast, gloomy weather attended with rain. Towards the China coast the wind follows more the trend of the shore, and between Shanghai and the Gulf of Pe-chili, Captain Goodenough, of H.M.S. *Renard*, which ran the mails in that season, states that a fresh N.N.E. wind blew almost incessantly until the end of February, when it veered more to the eastward. There are, however, breaks in this regularity. Snow is rare at Shanghai, but the mountains and coasts of Shantung and the Korea are covered with it in January, February, and part of March, and high lands remain covered later.

In the Eastern Sea, in the spring and until June, moderate winds from East prevail, bringing rain and drizzle, generally when the wind veers a little to the northward, also occasional stiff N.E. breezes; S.W. winds occur but rarely, but bring fine weather for short intervals. Later in the season the winds are variable, inclining chiefly to S.E., with occasional N.W. breezes. Towards Japan it is recorded that westerly winds prevailed at the end of July. Early in September, the winds prevail between E.N.E. and South, and strong easterly gales have been known, but are very unusual.

In the Gulfs of Pechili and Liau-tung it appears that the climate is temperate and agreeable in summer, and severe and stormy in winter, but the latter is of only four months duration. The coasts are then covered with snow, which begins to melt in March, snow storms occurring as late as the end of February, and showers until the middle of March, when the winter season breaks up. At the head of the Gulf of Liau-tung the ice lasts $4\frac{1}{2}$ months, from the middle of November to the end of March.

A dry season then commences, with scarcely any rain during the summer months; light winds, exceedingly variable and of short duration in any quarter, prevailing. About the autumnal equinox, there are symptoms of unsettled weather, and westerly winds prevail, with occasional short gales.

TIDES and CURRENTS.—The tidal wave appears to come in to the Yellow Sea from the south-eastward in the form of a tongue, making high water at the Shantung promontory only 2 hours later than at Gutzlaff Island, although it is several hours later on the intermediate coasts. The rise at Gutzlaff is 15 ft., but at the promontory only 6 ft.; whilst opposite on the Korean coast it rises to 20, and in one place even 30 ft.; a phenomenon almost exactly similar to that which occurs in the English and Irish Channels.

The flood sets West, and the ebb East, along the Shantung coast, to within 100 miles of the ancient or southern outlet of the Yellow River; but the rotatory tides of the Yangtse have been observed off shore, 120 miles North of the latter. In lat. $33^{\circ} 15' N.$, long. $122^{\circ} 16' E.$, 70 miles from the coast,

and 127 miles North (true) of the Ariadne Rock, it was high water, full and change, about 1 o'clock, and the rise and fall about 9 ft. During the whole rise and fall of the afternoon tide, it set from N.N.W. to N.N.E. at a maximum of nearly 2 knots, and being nearly slack for two hours; and during the whole a.m. rise and fall, it set weakly to the southward for 13 hours; making one complete revolution in 24 hours. These tides were observed in December, and are recorded chiefly with the hope that more light may be thrown upon them by others. A stiff S.W. wind was blowing at the time, which may account for the weakness of the southerly current, as it is well known that in the northerly monsoon the southerly set predominates.

The **YELLOW RIVER** or **WHANG HO** is little inferior to the Yangtse in magnitude, being nearly 2,500 miles in length, but beyond 250 miles from the sea it is totally unnavigable, and is alike, at present, the most useless and impracticable river in the world. Flowing through the midst of a densely peopled and highly cultivated country, this remarkable river offers no facilities for navigation throughout a great extent of its course, and it has gained the apt and striking name of "China's Scrow," on account of the exposure of the great plain (which its lower course traverses) to disastrous inundations, which are a perpetual source of wasteful expenditure to the government and of peril and calamity to the people. It is but little used by the Chinese for navigation, and the cities on its banks are in constant jeopardy of being submerged. Foreign skill and science are necessary to teach the people how to restrain its fury, and western steamers alone can stem its impetuous current and make it a channel for commerce.

Between the Yangtse and Yellow Rivers the coast for 150 miles is low, and intersected by numerous streams. The Grand Canal connects the two rivers at their nearest point of approach to each other, where they are only 75 miles apart. The canal is raised considerably above the plain at Whaingan on the Yellow River, a little below the Hungtse lake, and 45 miles above the river's mouth, and thence falls to the level of the Yangtse at Chin-kiang fu.

The whole of this low coast is fronted by extensive flats and shoal banks, projecting in some places above 60 miles from the land, and rendering the approach dangerous for vessels of large draught until better known, although there may probably be channels among the banks in the neighbourhood of the coast frequented by the native trading vessels. They all lie West of the meridian of 122° E., except off the northern entrance of the Yangtse and Tsung-ming. H.M.S. *Highflyer*, July, 1859, had soundings of 12 fathoms, abreast of and 100 miles from the mouth of the Yellow River.

On various Chinese maps four hills or islands are represented at from 30 to 50 miles northward of the Yellow River entrance. Two of these were sighted by the *Dove* on making the coast in December, 1861, and their positions approximately fixed. The north-eastern one is in about 35° N., long. $119^{\circ} 40'$ E., and probably agrees with the Chinese *Ying-yu-mun*. It is about

a mile in extent, has a flat rugged top with abrupt sides, as if of sandstone formation, and is 100 or 200 ft. high.

A smaller islet or rock, of conical shape, probably the Chinese *Nai-nai-shan*, was also seen from the mast-head, about 10 miles S.W. of Ying-yu-mun. If the other two exist, they are *Mun-li-shan* lying South of Ying-yu-mun, and *Kai-shan*, S.E. of it and the more distant of the two. To the South and East of Kai-shan (probably Yu-chu of the Admiralty chart), and between it and the Ta sha, many ridges of sand are delineated on a Chinese map.

The coast North of these islands, though not steep-to, may be approached with a proper degree of caution. The water is clear (as to sedimentary matter), and the bottom gravelly to the northward of the banks above mentioned.

The southernmost point of the coast of Shantung approached by a European vessel is in lat. $35^{\circ} 10' N.$, long. $119^{\circ} 18' E.$ The shore here is low and undulating, with detached hill ranges, 1,000 to 1,500 ft. high, which recede from the coast at a point 10 miles North of this, and were also seen stretching to the southward, to within 60 miles of the Yellow River. A track survey only was made from this to Kyau-chau Bay, and many of the names on the Chinese maps could not be identified.

The character of the whole of the shore, hereabouts, is generally low at the coast line, with projecting reefs; there are sandy bays between the points; and isolated hills standing on low plains, which gradually attain toward the northward the altitude of mountains.

Tower Point, in lat. $35^{\circ} 20' N.$, is so named from a conspicuous square tower standing on a low hill. The point is low and rocky, and two reefs extend a considerable distance off it, but they may be passed at a mile in 7 fathoms. There are also reefs of considerable extent skirting the coast for 6 miles North of Tower Point. About N.W. by W. 12 miles and N. by W. 6 miles from the point are two conspicuous isolated hills, 6 miles apart, respectively 1,000 and 800 ft. in height; that nearest the coast slopes towards the sea, and terminates eastward in a bluff, which is the southern point of entrance of a large open bay 9 miles across and 7 miles deep, the north-eastern point of which is low and very rocky, with an island off it similar in character. West 3 miles from the latter point a reef was seen fully a mile in extent, and beyond it, under some low cliff-sided hills on the North shore of the bay, is a junk anchorage.

North-east of this reef point is the anchorage of *Wang-kia-tai*, a long narrow bay affording shelter from North and N.E. winds in from 3 to 5 fathoms, mud. The temple of Lung-wang, on the shore of the bay, is in lat. $35^{\circ} 39' N.$, long. $119^{\circ} 48' E.$ The shores of the headland East of Wang-kia-tai are low and rocky, except on the sea coast, where there are two hills 600 and 400 feet high, the latter or south-eastern having a nipple on it.

Pinnacle Range, 1,600 ft. in height, is on the coast, about 11 miles N. by E. of Lang-yi tau. Between this and Lang-yi tau is a large bay with sandy shores. The next 13 miles of shore to the north-eastward has not been explored, but from thence to Staunton Island the coast has been regularly surveyed, commencing from the cape northward of Tolosan. Pinnacle Range would appear to be the Chinese Lingshan. *To-lo-san Island*, lying about N.E. by E. 15 miles from Lang-yi-tau, rises to an elevation of 1,700 ft.

Tcha-lien-tau, in lat. $35^{\circ} 54\frac{1}{4}'$ N., long. $120^{\circ} 53'$ E., is S.S.E. $\frac{1}{4}$ E. $16\frac{1}{2}$ miles from Cape Ya-tau, the nearest land, and E. by S. $19\frac{1}{2}$ miles from Tai-kung tau, off the entrance of Kyau-chau Bay. The island is 1 mile in length, N.E. and S.W., and very narrow; at its centre is a small even-topped hill, 182 ft. high, and its eastern end is a detached bluff.

Tai-kung tau is an island, 341 ft. high, 10 miles E.S.E. of Cape Evelyn, the South point of entrance to Kyau-chau Bay, and S.W. $\frac{1}{3}$ S., 16 miles from Cape Ya-tau. It is of smooth and rounded outline, and from all points of view greatly resembles a haystack. W.N.W. half a mile from it is a round islet, 103 ft. high; and W.S.W. 6 cables from the islet is a rock which covers at high water, surrounded by a reef extending 4 cables to the S.S.W., which at other times of tide is partly dry and partly awash. It is recommended to give this island a berth of 2 miles when passing westward of it.

Siau-kung tau, lying 5 miles E.N.E. from Tai-kung tau, and S.W. $\frac{1}{4}$ S. $10\frac{1}{2}$ miles from Cape Ya-tau, is a large, flat, square mass of rock, rising sheer from the sea to the height of 78 ft., and apparently bold-to on all sides, with 15 fathoms water at 3 cables' distance.

Round Island, 172 ft. high, lying South of the West point of entrance to Kyau-chau Bay, at 2 miles from the shore, is of semi-circular profile, and conspicuous on that account. About a quarter of a mile West of it, and connected at low water, is another island, larger, but only 100 ft. high, having a level top, and inhabited. Off the East side of Round Islet are two low islets.

Dangerous Rock, bearing N. $\frac{3}{4}$ E. 3 miles from the summit of Round Island, and S.E. $\frac{3}{4}$ S. $1\frac{3}{4}$ mile from the West entrance point of Kyau-chau Bay, is just covered at high water springs, and has deep water on all sides. At 1 mile W.S.W. of it, and half a mile off shore, is another rock which covers at 5 ft. rise of tide. Between these two rocks there is a passage of 13 fathoms water, with the point bearing N.N.W., but it is more prudent to keep outside or eastward of Dangerous Rock.

Swallow Bank, of 26 ft. least water and half a mile in extent, lies N.E. $\frac{3}{4}$ N., 4 miles from Round Island, and E.S.E. 3 miles from the West point of entrance. This bank appears to be formed by deposits from the bay. To pass North of it, keep the summit of Sishan touching Cape Evelyn W. by N. nearly. A good mark to lead between it and Dangerous Rock is the highest

and northern summit of Chi-po-san, touching Pile Point a little eastward of Cape Evelyn, about N.W. by W.

Wei Hai or Kyau-Chau Bay, the entrance of which is on the West coast of the Yellow Sea, in lat. $36^{\circ} 2' N.$, long $120^{\circ} 18' E.$, is a spacious harbour, and one of the best sheltered on the East coast of China, its area at high tide being about 140 square miles, and the anchorage perfectly landlocked. It is partially frozen over during the severe winter season.

There will be no difficulty in recognizing the entrance to this bay in clear weather, either when approaching from North or South, for at 17 miles eastward of it, the *Loshan Mountain*, which is 3,530 ft. high, and extends North almost the same height for a mile, forms an unmistakable landmark. On a nearer approach the rugged top of the *Lungshan Mountain*, 1,146 ft. high, will appear as a prominent and singular feature, and a little farther westward, and immediately over the North side of entrance, is *Nubble Hill*, 490 feet high, with a large stone on its summit. At 11 miles westward of the entrance, the *Tamo-shan*, or *High Double Mountain*, of smooth outline, rises to the height of 2,249 ft., and is very conspicuous, showing a double summit from the eastward; this range runs North, and meets the summit of Sishan, a mountain 1,096 ft. high. At 3 miles W.N.W. from *Cape Evelyn*, the South point of entrance, is *Chi-po-san Island*, which is the first low land recognized after passing the entrance.

Bay Rock, covering at 3 ft. rise of tide, lies W. by N. $\frac{1}{2}$ N. $1\frac{1}{2}$ mile from Cape Evelyn, and S.W. $\frac{3}{4}$ W. nearly 2 miles from the South point of Yunnui-san. This rock may almost be called a hidden danger, as it is covered at low water neaps. To pass North of it, keep Tai-kung-tau well open of Cape Evelyn.

Horse-shoe Rock is the most off-lying danger on the East shore of the bay, from which it is distant half a mile. It covers at 5 ft. rise of tide, and from its N.W. horn the West extreme of Yunnui-san bears S. by W. $\frac{1}{3}$ W. 2 miles, and the summit of Chi-po-san W.S.W. $3\frac{1}{4}$ miles. The summits of Tung-lau-shan and Gau-shan in line, and open westward of Woman's Island, N.E. $\frac{1}{2}$ E., lead 3 cables to the westward of it.

Woman's Island, 15 ft. high, and on the same shore of the bay, is nearly $2\frac{1}{2}$ miles S.W. $\frac{1}{2}$ W. from Gau-shan summit, and $2\frac{3}{4}$ miles N.W. $\frac{1}{2}$ N. from Nubble Hill. Its North and West sides are fringed with rocks, which dry at low water, and it is connected with the mainland by an extensive mud flat. At 4 cables S.W. by W. $\frac{1}{2}$ W. from the centre of the island is a rock which covers at 10 ft. rise of tide.

Supplies.—Almost any necessary supplies can be obtained at the village of Ching-tau-kow, which stands in a bight on the North side of entrance of Kyau-chau Bay, 1 mile West of Nubble Hill. Clear and good water can be obtained by digging above high water mark in the sandy bay on the East side of Chi-po-san and South of its summit.

Directions.—Vessels navigating in the vicinity of Kyau-chau Bay may soon find shelter in heavy north-easterly gales. Having made out the land, it will be best to hug the shore to insure smooth water, and, if necessary, anchorage may be found in 8 to 10 fathoms, muddy bottom, anywhere between the entrance of the bay and Lo-shan Harbour, which is S.W. of Lo-shan Mountain. The low islet *Chuen-si-san*, about 15 ft. high, lying three-quarters of a mile off the shore, in a S.E. direction from the summit of the Lung-shan Mountain, and 8 miles eastward of the entrance, should always be left to the northward.

The first anchorage where junks resort is S.E. 2 miles from Tungshan, on the North side of the entrance in Ching-tau-kau Bay. Small vessels can anchor amongst the junks, but vessels of large draught should anchor in 8 or 9 fathoms, muddy bottom, with the small island on the East side of the bay bearing about N.N.E. one-third of a mile.

The large bay on the South side within the entrance, between Cape Evelyn and Chi-po-san Island, which might be considered an outer harbour, affords excellent shelter from easterly winds, round South to N.W.

The coast eastward of Kyau-chau Bay, which extends E. by N. 22 miles and terminates in *Cape Ya-tau*, is the southern face of a mountainous peninsula, which is indented with several bays, and has many off-lying islands and reefs, but there is anchorage all along at a moderate distance from the shore, the soundings for the most part decreasing gradually. During the summer months it would be highly imprudent to anchor on this exposed coast, with the chance of being caught in a S.E. or easterly gale. In the summer of 1865 the winds from E.N.E. to S.E. were very frequent, at times blowing a hard gale, but these gales are seldom of more than 12 hours' duration. In winter the winds are from N.N.E. to N.W., chiefly in the latter quarter near the land, but in the former in the offing, although a S.W. gale of a few hours' duration, veering to South, is not unknown.

Supplies can be obtained from any of the villages along the coast at moderate prices. Grapes and pears are cheap and plentiful. Good bread can also be procured, and late in the season hares and wild fowl may be obtained. Water is not good. In Loshan Bay, in August, H.M.S. *Swallow* watered at a small stream N.W. of Boulder Hill, but the supply was poor, and it had to be carried a considerable distance in barricoes. Several cases of dysentery, one terminating fatally, were ascribed to this cause.

Cape Adkins, the north-eastern point of Loshan Bay, is a steep, cliffy head, the smooth summit of which, 239 ft. high, terminates a small range or ridge of hills running eastward of Boulder Hill. On the northern part of the cape, which is rather low, is a small square tower; the southern point of the cape is an abrupt cliff, bold-to. A small round islet, connected with the mainland at low water by a spit of shingle, lies 1 mile N.N.E. from the cape.

Ka-tih-niau, an isolated island, lies off Loshan Bay, 12 miles E. by N. of Cape Yatau, and about the same distance from Cape Adkins. From the other two islands in the offing, Teha-lien-tau and Surveyor's Island, it bears respectively N. by E. $\frac{1}{2}$ E. $17\frac{1}{2}$ miles, and W. by S. 22 miles. It is a small island, 243 ft. high, with a smaller island, about 100 ft. high, lying 3 cables S. by W. from it, with a passage between carrying 12 fathoms.

Surveyor's Island, 23 miles off-shore, is in lat. $36^{\circ} 16' 30''$ N., long. $121^{\circ} 24' 15''$ E. It rises out of 17 fathoms water, and is divided into two distinct portions by a narrow neck which is perforated; the southern and higher part, which is very rugged, being 297 ft. high. In the spring months this island is often obscured by fogs, which are very prevalent in the offing, although it may be quite clear along the coast.

The coast runs N.N.E. from Cape Adkins to Ting-tsi Harbour, a distance of 11 miles. The country is hilly, the shore mostly low, and not generally approachable on account of rocky and shallow ground, and it is fronted by several off-lying islands and reefs. *Cliff Island*, 121 ft. high, is N.E. by E. 3 miles from Cape Adkins, and S.W. of it is a low island, and another of less elevation to the westward. *Long Island*, half a mile N.E. of Cliff Island, is 180 ft. high. *End Island*, off the eastern point of Long Island, and connected with it at low water, is smooth and grassy, and 68 ft. high. *Outer Island* is $1\frac{1}{2}$ mile N.E. of End Island, and S.E. $\frac{1}{2}$ E. 6 miles from Temple summit, 820 ft. high. It is narrow, smooth and grassy, and 116 ft. high. *Outer Rock*, 24 ft. high, is on the middle of a reef, 2 cables in extent, which lies half a mile South of Outer Island. E. by S. a quarter of a mile from this, with the island summit N. by W., is a sunken rock, which generally breaks at low water. *Reef Island*, N. by E. $\frac{1}{2}$ E. 3 miles from Outer Island, is 30 feet high. *Anchorage* in 3 to 4 fathoms may be obtained between Reef Island and Outer Island, with shelter from S.W. winds; but there is no part of the coast for 36 miles North of Cape Adkins where there is shelter from winds between South and N.E.

Tingtsi River.—*Bar Island*, or *Tu-shing*, 99 ft. high and 2 cables in extent, is 7 miles N.N.E. from Outer Island. It has a round, grassy summit, presenting the same aspect from every direction, with cliffy sides fringed with rocks. It lies off the entrance of the *Ting-tsi River*, and as it is inside the sand banks of its bar, it should not be approached on passing within 2 miles. Ting-tsi River entrance has the appearance of a deep inlet. It does not appear to be much frequented, as only a few small junks were seen. On some Chinese maps the river is named Lih-ho. At the head of the inlet stands the town of Kin-kia, formerly an important trading place. The entrance, 4 miles westward of Bar Island, is about 3 miles across, but the navigable channel is less than half a mile wide, and subject to changes. *Green Head*, at the South point of entrance, is 4 miles W. $\frac{1}{4}$ S. from Bar Island. *River Islet*, 30 ft. high, is on the North shore, 1 mile northward of the narrow pro-

montory extending north-westward from Green Head. The river is barred by a long spit, 2 to 4 cables in width, which stretches in an E.S.E. direction from Green Head nearly 4 miles. The depth on it at low water is 4 ft. At high water springs a direct course can be steered in, with a depth of 15 ft., across the Bar Spit, with the summit of Green Head W. by N. $\frac{1}{4}$ N., and just open to the southward of the more conspicuous hill behind it, which mark also leads clear and to the southward of the sand-patch 1 mile W.S.W. of Bar Island, and which may generally be discerned by the discoloured water. When Bar Island is E. by N. $\frac{1}{2}$ N., haul up N.W. to pass between the shoals off Green Head and the narrow sand bank, very steep-to, which commences 1 mile W.N.W. of Bar Island, and extends in the same direction for 2 miles. River Islet may then be steered for, and good anchorage, perfectly sheltered, be obtained southward of the islet in 4 to 6 fathoms. But a greater depth of water, 7 ft. at low water and 18 ft. at high water springs, may be carried in by steering direct for Bar Island on a W. by S. course, and when at 2 to 3 cables' distance from the island changing the course to S.W. until the leading mark, given above, is brought on.

The Coast now changes its direction from N.E. by N. to E. by N., and continues in the latter direction up to the Shantung Promontory, a distance of 60 miles. For the first 12 miles the shore, as far as the town of *Hai-yang*, is low and sandy, broken in three places by projecting ledges of rock, stretching out some distance, and off the western of which, at 1 mile from the shore, is a detached reef; this shore cannot be approached, for the depth is only 3 fathoms at 3 miles distance. Three miles in-shore is seen a flat-topped range, 796 ft. high, and N. by E. 9 miles from Bar Island, a spur of which stretches towards the sea.

Sutherland Rock, lat. $36^{\circ} 41' N.$, is 24 ft. high, and lies 3 miles S. by E. from *Tau-tsui Head*, E. by N. $\frac{1}{2}$ N. from it is another rock awash at low water. *Tau-tsui Head*, $4\frac{3}{4}$ miles East of Arthur Head, is a bold headland at the extremity of a hilly promontory jutting out from the mainland for about 2 miles in a North and South direction. Between the rocks and *Tau-tsui* are even depths of 8 to 10 fathoms, decreasing to 6 fathoms when the promontory is passed. Outside the rock the ground has not been sufficiently examined, and it should not therefore be passed within a mile.

Staunton Island, or *Su-shan tau*, lying S.W. by W. 15 miles from the south-eastern point of the Shantung Peninsula, is $6\frac{1}{2}$ miles S.E. by S. from *Tsing-hai-wei Point*. The island is a ridge of steep hills, about a mile in length N.W. by W. There is a fishing village and landing place on its North side, directly under the centre hill, 353 ft. high, which is its highest part. There is also a landing place in a bay formed by a rocky promontory on the South side, with the summit bearing East.

Channel Rocks lie respectively N.W. by N. $1\frac{1}{4}$ miles, and N. by W. $\frac{3}{4}$ W.

$1\frac{3}{4}$ mile from Staunton Island, and are North and South of each other three-quarters of a mile apart.

Tides.—The following observations on the tides were made in 1865, during the survey of H.M.S. *Swallow*. It is high water, full and change, at Tau-tsui Head, at 3^h 20^m, and springs rise $12\frac{1}{2}$ ft. The flood stream in the neighbourhood of Staunton Island sets West, and the ebb East, at the rate of $1\frac{1}{2}$ mile an hour, which appears to be the velocity observed all along the coast, but between Staunton Island and Channel Rocks the rate is 3 knots. It may be stated as approximately correct, that on the southern side of the Shantung peninsula the flood stream sets westward, whilst on its northern side it sets eastward.

Actæon Shoal.—A dangerous shoal, lying southward of the Shantung promontory, was sounded on by H.M.S. *Actæon*, 19th February, 1860. The least depth obtained was 22 ft. in lat. $36^{\circ} 31\frac{1}{2}'$ N., long. $122^{\circ} 28'$ E. approximately, but less water probably exists.

As there is no reasonable doubt of the existence of this shoal (which is laid down on Chinese maps S.E. of Cape Macartney, North of the parallel of Staunton Island, and called the Siau-sha or small Sand-bank, vessels, particularly those of large draught, approaching its vicinity should keep a careful lead going, and as it may exist to the East, or more probably to the N.E. of the position assigned to it, they should at present not pass West of the meridian of $122^{\circ} 48'$ E., unless they pass inside or West of the position of the shoal.

SHANTUNG PROMONTORY.—A chain of high peaked hills, 2 to 3 miles in breadth, rises eastward of the sandy plain of Yung-ching, and running 6 miles in an easterly direction, forms the Shantung promontory. These hills when first seen from N.W. or S.E. make like a number of pointed detached islets of peculiar appearance. Five of them are very prominent; the highest, called *Tu-ching-shan*, 910 ft. high (which is also the Chinese name for the promontory) is the western peak; it is very pointed and precipitous, except to the North, on which side it has a gentle slope. *Sharp Peak*, 680 ft. high, halfway between this and the extreme of the promontory, is also remarkable, with deep valleys on either side.

SHANTUNG LIGHTHOUSE, built on the N.E. extreme of the promontory, in lat. $37^{\circ} 24'$ N., long. $122^{\circ} 42'$ E., is a circular white tower, 64 feet high. The light first exhibited in the year 1875 is a *fixed light*, showing *bright* to the north-westward between N.W. by W. $\frac{1}{2}$ W. and N.N.W. $\frac{3}{4}$ W.; *red* from N.N.W. $\frac{3}{4}$ W. to N. by W. $\frac{1}{2}$ W. over and eastward of Alceste Island; *bright* from N. by W. $\frac{1}{2}$ W. through East and South to S.S.W., and *red* from S.S.W. to S.W. $\frac{1}{2}$ W., to warn vessels that they are approaching the coast. The light is obscured by hill peaks between N.W. by W. $\frac{1}{2}$ W. and N. by W. $\frac{1}{2}$ W. and also by Alceste Island between N.N.W. and

N.N.W. $\frac{1}{2}$ W. The light is elevated 200 ft., and should be visible in clear weather 20 miles off.

Rodney Rock lies 4 cables from the shore off the N.E. end of Shantung Promontory. It is awash at low water, and lies in a direct line between the centre of the lighthouse and the eastern extreme (within the reef) of Alceste Island. From it the N.E. promontory bears S.E. by S., Abrupt Bluff, West, and the western extreme of Alceste Island, N.W. by N., 16 cables distant.

Alceste Island, or *Siau-ching-shan*, 210 ft. high, triangular in shape, flat-topped, and bounded by cliffs, lies $3\frac{1}{2}$ miles N.N.W. $\frac{1}{2}$ W. from the extreme of the Shantung promontory, and $1\frac{1}{4}$ mile off shore. A cluster of reefs extends 4 cables North from its East point, the outer reef of which is awash, but the others are higher. There is also a small pinnacle rock a quarter of a mile South from the same point, with a small rock awash close to the S.E. of it. The tides are strong inside Alceste.

Anchorage at Shantung Promontory.—The following are the safest and most convenient anchorages. From S.S.W. to S. by W. of Ears Rock, in 5 to 8 fathoms, with the Temple Saddle bearing E.N.E. In 5 to 6 fathoms in the bay between Ears Rock and Flat Rocky Point, avoiding the patches and reefs. At any part of Shang-kau Bay in 4 to 6 fathoms, and under Shu-atau Head in 5 to 7 fathoms, with shelter from N.E. winds. In Aylen Bay W.S.W. to S.W. by W. of Martha Point in 4 to 5 fathoms, or in the centre of the bay in 6 to 7 fathoms. In 6 to 9 fathoms, between Martha Point and Shantung Promontory; and in the northern part of Yung-ching Bay (only partially examined) in 4 to 7 fathoms.

Small craft can also find anchorage in Litau Bay, or the inlet on the South side of Chalk Saddle in 3 to 4 fathoms. There is no good anchorage on the North side of Shantung Promontory; but anchorage can be obtained off its north-eastern face in 5 to 8 fathoms, 2 to 4 cables from the shore; and also in the bay on its S.W. face, 1 mile from the extreme of the promontory, in 5 to 10 fathoms, with a rock or islet there bearing North, and the end of the beach under the rugged hill, W. by N.

Directions for passing Shantung Promontory.—Vessels bound to the northward into the Gulf of Pe-chili in the spring, are liable to pass Shantung Promontory in foggy weather, without making it. It has been generally observed that the effect of the tides is nearly neutral, as regards being set East or West in a two or three days' run; nevertheless, in rounding at such a time, a vessel's position may be ascertained if there is any doubt about it by constant use of the lead. In regard to the Actæon Shoal, circumstances of wind and weather should be taken into account in deciding on which side of it to pass, for it is clearly a danger for large vessels. Thick weather is not of unusual occurrence here, and this, together with the strength of the tidal streams, renders it prudent to keep the vessel's position fixed by cross bearing, as the coast between the promontory and Wei-hai-wei cannot

always easily be identified, and it sometimes becomes necessary to anchor at night.

Ki-ming Island.—From the high land of the Shantung Promontory a low sandy coast, broken by rocky points, trends W. by N. 14 miles to Wei-hai-wei. The island of Ki-ming or Nan-ming tau, 9 miles W. $\frac{1}{2}$ N. of Alceste, lies 1 mile off a rocky point which projects considerably from the shore. It is 370 ft. high, flat-topped, surrounded by extensive reefs on three sides, and joined to the shore by a rocky flat, over which are not more than 3 to 4 fathoms, but the island may be passed to the northward at 2 cables in 12 fathoms. A large lagoon (salt) opens into the sea eastward of this point.

Wei-hai-wei Harbour, 23 miles westward of Alceste Island, is formed between *Leu-kung-tau*, an island 510 ft. high, and a deep bight of the coast, and is the most eastern anchorage on the North shore of the Shantung peninsula. It is easy of access, and capable of affording shelter to a considerable number of vessels of moderate draught, but the anchorage is contracted for large vessels. It has two entrances, one on the West, the other on the East side of *Leu-kung-tau*, thus affording a facility for access or departure with almost any wind. The town of Wei-hai-wei stands on the side of a hill on the West shore of the bay. The western entrance, although much narrower than the other, has the deepest water, and should be used by all vessels drawing above 18 ft. Round Island and three or four adjoining rocks lie off the northern point of the western entrance. The outer rock, 15 feet high and steep-to, is three-quarters of a mile E.N.E. from the point; between it and Round Island is a rocky patch, which covers at high water. No other hidden dangers are known. At half a mile E.S.E. from the eastern end of *Leu-kung-tau* is a reef of rocks, steep-to, but as a portion of them always shows above water, they may be easily avoided. The best anchorage is near the West point of *Leu-kung-tau*, in 5 to 7 fathoms on excellent holding ground of mud, sheltered by the island from the N.E. In Wei-hai-wei harbour it is high water, full and change, at 9^h 30^m, and springs rise about 9 ft., neaps 6 $\frac{1}{2}$ ft. In working through the eastern entrance the lead may be safely trusted, there being no hidden dangers known. The shore of the mainland may be approached to a mile, and that of *Leu-kung-tau* to 3 cables.

The land north-westward of Wei-hai-wei, and which forms the harbour on that side, is a hilly peninsula, 900 to 1,200 ft. high, with rocky shores. Its northern point is *Cape Cod*, 4 miles from *Leu-kung-tau*. *Eddy Island*, $1\frac{3}{4}$ miles W.N.W. from *Cape Cod*, is somewhat low with scarped cliffs, and lies 1 mile N.E. from the extreme of a narrow, jutting peninsula, 2 miles in length, on which is a remarkable peaked hill with even slopes. From this the coast recedes south-westward for 7 miles to the mouth of a little stream which small junks can enter, and then bends westward again, skirting a low sandy plain for 16 miles farther to *White Rock Point*, which is 6 miles E.S.E.

of Chifu Harbour. This point is the N.E. extreme of Yungmatau, a narrow island which thence extends 4 miles to the S.W. by W. Around the South end of this island is the entrance to *Lungmun Harbour*, which would safely hold a large number of small vessels moored. The course from Eddy Island to White Rock Point is W. $\frac{3}{4}$ S., 21 miles, and the shore between them should never be approached to a less depth than 9 to 10 fathoms.

Kung-kung Island and Lighthouse.—A group of islands and rocks, of moderate elevation, is spread over an extent of 7 miles, at the north-western part of the extensive bay south-eastward of Chifu, and gives shelter to the spacious harbour of the same name which it forms. *Kung-kung tau*, the largest of the group, is even-topped in character, and has on its summit, 200 ft. high, a lighthouse 45 ft. high, which bears N.W. $\frac{1}{2}$ W. $7\frac{1}{2}$ miles from White Rock Point. From this lighthouse is shown a *fixed bright light*, elevated 242 feet above the sea, and visible in clear weather at a distance of 22 miles.

East Sand-spit, which greatly shelters the anchorage from easterly winds, extends three-quarters of a mile S.W. $\frac{3}{4}$ S. from the S.W. point of Kung-kung.

The German man-of-war *Arcona*, when passing Chifu Harbour, observed a shoal about 1 mile long, on which $4\frac{1}{2}$ fathoms were obtained. From the shoal North Rock bore W. by N. $\frac{1}{4}$ N., S.E. Island W. by S. $\frac{1}{2}$ S., and White Rock S. by W. $\frac{1}{4}$ W.

North Rock, the outer and north-eastern islet of this group, bears N.E. $\frac{1}{4}$ E. $4\frac{3}{4}$ miles from Kung-kung tau lighthouse. A small rock just awash at high water, and therefore nearly always visible, lies N.E. by E. $\frac{1}{2}$ E. 3 cables from North Rock, and is steep-to, there being 9 fathoms close outside it.

Double Rock, S.W. by W., $2\frac{1}{2}$ miles from North Rock, when seen from the eastward appears, as its name denotes, to be double, the northern part like a wedge; the southern part, which is much the higher, 198 ft., is an irregular mound, rather elongated to the westward.

South-east Island, 60 ft. high, bears from North Rock S.W. $\frac{1}{2}$ S. $4\frac{1}{4}$ miles, and is $1\frac{1}{2}$ mile S.E. by E. $\frac{1}{2}$ E. from the lighthouse. Three high rocks lie between S.E. island and Kung-kung tau, but no hidden dangers near them have as yet been discovered.

Finger Rock, the shape its name denotes, is half a mile North of Kung-kung tau lighthouse. *Stick-up Rock*, of similar form, lies to the North of the western islets of the group. *Mount Islet*, where was situated from 1861 to 1867 the British Naval coal store and depôt, is the second islet from the westward. These three are useful leading marks for clearing East Sand-spit, and approaching the anchorage under the islands.

Cape Chifu, about 60 miles westward of Alceste Island, is the eastern extreme of a mountainous peninsula connected with the mainland by a low neck of land of considerable extent. This peninsula, which is 5 miles long, E.S.E. and W.N.W., and extends in a narrow ridge parallel to the coast

line, is high and steep, and when seen from the distance appears like an island. *Chifu Peak*, at the centre of the ridge, is 980 ft. high, and has a double top. One cable S.E. of Chifu Cape is *Sentry Rock*, which may be closely rounded in 9 fathoms, and the cape is equally bold.

CHIFU or **YENTAI HARBOUR**, a treaty port, and the only one between Shanghai and Tientsin, is formed in a bight of the coast between the peninsula of Chifu and the Kung-kung group of islands, which, being 3 miles in extent, constitute a magnificent natural breakwater to the harbour, sheltering the various anchorages from North and East. The anchorage space in the harbour, comprising a depth of from 5 to 7 fathoms, is 4 square miles, and for a depth exceeding 4 fathoms, 9 square miles, whilst a depth of 21 ft. can be carried up to within 300 yards of Tower Head, which bears W. $\frac{1}{2}$ S. $5\frac{1}{2}$ miles from Kung-kung lighthouse. The harbour, although affording ample depth of water for all classes of ships, is exposed to the disadvantage of violent north-westerly and northerly gales which prevail through half the year, particularly in the winter months, but its safety as well as its capacity have been now fully proved by experience. During the last China war the French squadron laid between Kung-kung tau and Tower Point during a whole winter, and not a single ship dragged her anchors.

The town of Yentai, where the foreign settlement is, stands on the sandy shore of a small interior bay westward of Tower Head.* It is built without design or regularity. On the slope of the hill, facing landward, are some European houses, the highest of which is the British consulate. The summit of Town Hill is occupied by a Chinese fort and *signal station*. There is a Chinese customs' establishment, which is in all respects similar to that at Shanghai.

Supplies.—Contractors supply excellent beef and fair mutton, and there is an abundance of vegetables of good quality. *Coal* can be obtained from contractors, the naval depôt at Mound Islet having been removed. It is now imported direct from England and Australia, as well as from Formosa and Japan. A correspondent of the North China Herald, writing from Chifu in 1877, says that there is a scheme afoot for working coal-mines. Some 120 miles West of Chifu there is a fine level plain, under which, at no great depth, is a thick seam of coal, but little worked by the natives, as they have no means of pumping the water out of the pits. There are some nearer coal-fields, it is proposed to connect with Chifu Port by tramway.

Water is the great want here, as it is along the whole of this part of the coast of Shantung. Water brought from the interior is 2 to $2\frac{1}{2}$ dollars a ton, but the water obtained near the shore is unwholesome, and produces diarrhoea and dysentery. When water is required it is customary to hoist

* Off the N.W. point of Tower Head or Yentai Hill, with the tower E. by S. $\frac{1}{2}$ S., is a sunken rock of 7 ft. at low-water springs. On it stands a beacon, an iron rod with cage.

signal-flag No. 1 at the fore. At Mound Islet there is a well, but the water is brackish, and at the village inside Chifu Cape there are wells, but the water is of very inferior quality. Accounts are kept in taels, and petty transactions in cash. The clean Mexican dollar passes current, but at a considerable discount, viz. 8 to 15 per cent. The standard of Sycee silver accepted at the Chinese custom-house is 4 per cent. higher than that prevailing at Shanghai.

The exports consist chiefly of peas, beancake, silk, prawns, drugs, dates, oil and wheat. The imports of cotton and woollen fabrics, metals, opium, seaweed, &c. The position of Chifu is highly advantageous for trade with the northern ports of Japan, Korea, and the Russian possessions. It is the only harbour open in the North of China from December to March. There is regular steam communication about two or three times a week with Tientsin and the southern ports, but chiefly with Hong Kong and Shanghai. The voyage to Shanghai occupies about three days, that to Taku about one day.

In point of climate this port is undoubtedly the most salubrious of all those open to the residence of Europeans on the coast of China. The winds in a general manner follow the courses and periods of the monsoons. The summer winds are chiefly from the south-eastward, and light but very changeable; the winter winds are from the north-westward, strong and often violent, but although they are intermittent they are more constant.

Tides.—It is high water, full and change, in Chifu Harbour at 10^h 34^m; springs rise about 8 ft., neap 6½ ft. For information concerning the tidal streams, see p. 1138.

Directions.—If bound to Chifu from the eastward, after rounding Cape and Eddy Island, the course and distance to the Kung-kung Islands is West 25 miles. The high hill over Knob Point, 3 miles eastward of Yentai, kept on a W. by S. ½ S. bearing, will lead well clear to the eastward of these islands, giving S.E. Island a berth of three-quarters of a mile. This mark should be followed, in order to clear the East sand-spit, until Stick-up Rock comes on with the eastern part of Mound Islet (the second from the West), bearing N.N.W., when the course may be altered for Mound Islet, until Finger Rock, which is conspicuous, comes on with the West extreme of Kung-kung tau, then haul up about N.E. by N. or N.N.E., if wishing to anchor close under Kung-kung tau, where the depth will be 4 fathoms, or continue N.N.W., if of light draught, or N.W. if of heavy draught, and anchor in 4 to 7 fathoms as convenient. The bottom is mud, the holding ground is good, and there is sufficient space for a large number of vessels.

If wishing to run on for the anchorage in Village Bay under Chifu Cape, when the mark for clearing the East sand spit has been reached, Chifu Peak bearing N.W. will readily be distinguished. Steer N.W. ¾ W. for the head of the bay, and anchor in 4 to 5 fathoms, mud, with the extreme

of the cape bearing about N.N.E. or N.E. by N. H.M.S. *Actæon*, in 1860, anchored here in $3\frac{3}{4}$ fathoms at low water, with Chifu Peak N.W. by N.; Sentry Rock N.E. by E. $\frac{1}{2}$ E.; the lighthouse E. by S. $\frac{1}{2}$ S.; and Knob Point S.S.E.

If working in for this harbour from the eastward, North Rock, Double and S.E. Islands may be safely approached to half a mile on the one side, and the mainland on the other, until the soundings decrease to $4\frac{1}{2}$ fathoms, the water gradually shoaling as the shore is approached. Between the islands and Knob Point is the Kung-kung Flat, having in one or two places 4 fathoms at low-water springs, rather near to the island, but a general depth of $4\frac{1}{2}$ and $4\frac{3}{4}$ fathoms.

As the East sand-spit extending from Kung-kung tau is approached, remember the bearing of the hill over Knob Point, W. by S. $\frac{1}{2}$ S., and do not go northward of that bearing until the clearing mark, Stick-up Rock and the Mound, comes on. When the spit is cleared a longer stretch may be made on the port tack, taking care not to approach the Mound nearer than to bring S.E. Island E. $\frac{3}{4}$ S., when it will be seen over the sandy flat between the two portions of the island. This line will clear the West sand-spit, the South extreme of which bears from the centre of Mound S. by E. $\frac{1}{4}$ E. nearly three-quarters of a mile, and W. $\frac{1}{4}$ N. from the lighthouse.

Approaching from the westward Chifu Peak, 980 ft. high, and the land of the peninsula will show out conspicuously, appearing from a distance like an island, the low sandy isthmus connecting it with the mainland not being visible. There are no hidden dangers known in the vicinity. Three or four detached rocks are dotted along the face of the peninsula, but they are all well within half a mile of it, and above water, so that a course a mile off and parallel to the shore clears everything. Sentry Rock, lying off the cape, may be rounded at 2 cables distance in 7 fathoms, and the anchorage steered for.

If intending to anchor under the Kung-kung Islands, after rounding Sentry Rock, steer for Knob Point until the clearing mark for the West sand spit (the lighthouse bearing East) comes on; then run in southward of that line and anchor as convenient.

The Coast westward of the bold sea face of Chifu peninsula falls back southward, forming a sandy bay, terminating at Sloping Point, 11 miles N.W. by W. $\frac{1}{4}$ W. At 11 miles farther in the same direction is Low Point, distinguished by a conspicuous nipple or small mound upon it, 250 ft. high; and between the points are two other bays. At 8 miles westward of Low Point is Teng-chau Head of about the same height, around which are steep cliffs. In 1875 a light was falsely reported to be shown on this head.

Teng-chau, a city of the second class, is commanded on three sides; the rising ground of Teng-chau Head overlooking it on the West. An opening

in the sea face of the city wall forms the entrance to a small camber, in which a fleet of small junks lie closely packed and sheltered from all winds. The little camber is a scene of bustling activity in summer, some junks taking in cargoes of grain. *Coal* is occasionally imported from Fu-chau. No supplies or water of good quality can be obtained here.

Teng-chau Bank extends in a W.N.W. direction 7 miles from Teng-chau Head, with a general depth of 2 to 4 fathoms on it. It is apparently of sand and rock, with several small knolls and large shelves of shallow water.

If intending to anchor off Teng-chau, after rounding Low Point steer W. $\frac{1}{2}$ N., and when Teng-chau Head bears W.S.W. stand in and take up anchorage in 3 to 6 fathoms. But if running westward be careful not to bring the nipple on Low Point to the eastward of E. by S. $\frac{3}{4}$ S., to avoid a dangerous rocky ledge extending nearly a mile off a low point of the shore, and the extremity of which is $2\frac{1}{4}$ miles East of Teng-chau Head.

The Miau-tau or Meih-shan Islands, in all fifteen, exclusive of small rocks, extend 35 miles in a northerly direction from Teng-chau to within 22 miles of the extremity of the Liau-ti Shan promontory on the North side of Pe-chili Strait, and they separate the Yellow Sea from the Gulf of Pe-chili. The four northern islands form a group, the peak of the northernmost being in lat. $38^{\circ} 23' 37''$ N., long. $120^{\circ} 55'$ E. The southernmost islands form a compact group, 9 miles in extent, enclosing the anchorage known as Hope Sound, where the British fleet, under Vice-Admiral Sir James Hope, K.C.B., assembled in 1860. The intervening islands and rocks are isolated and scattered.

Anchorage.—Hope Sound can only be considered as a summer anchorage, at which season ships of any draught and in almost any number may lie quite sheltered.

Charybdis Harbour, at the N.W. end of Changshan Island, may be entered from North or South; it affords a secure anchorage at all seasons of the year, and is protected from all winds by the surrounding islands and rocks. There is sufficient room for two large vessels and four small vessels to lie at single anchor. It is advisable to moor, however, as vessels are generally tide rode, and seldom swing to the wind.

In *Chief Bay*, on the South side of Toki, there is anchorage in 6 to 9 fathoms, well protected from the northward and westward.

H.M.S. *Wellesley*, in 1840, anchored in 12 fathoms under Kao-shan or Quoin Island during a strong northerly wind, with the island bearing from North to N.N.E. $\frac{1}{2}$ E. about a mile distant.

Ta-chu-shan, or Great Bamboo Island, the easternmost of the Miau-tau group, is 480 ft. high. *Chang-shan*, or *Long Island*, is the largest of the Miau-tau Islands, and divided into two parts by a narrow isthmus of shingle nearly a mile in length. Its East and North sides, bold and cliffy, are steep-

to. The southern part of Chang-shan is also hilly, its South and centre hills being each 490 ft. high. *Chang-shan Tail*, a sandy spit, extends South upwards of half a mile from Spit Point, its South extreme. *Ta-hi-shan* and *Siau-hi-shan*, or Great and Little Black Islands, are to the westward of Chang-shan, and between them is the small island *Miau tau* or *Temple Island*, 310 feet high, on the N.W. side of which is *Hope Sound*, which, as before stated, is the best and most sheltered anchorage among the *Miau-tau* group. The western point of *Ta-hi-shan* is a stupendous bluff, with cliffs 600 ft. high.

Toki-tau, 10 miles northward of Chang-shan, and readily distinguished by its peak, 613 ft. high, is in the form of a right-angled triangle. *Kao-shan* or *Quoin Island*, 650 ft. high, lies nearly 5 miles W.S.W. of Toki. *Houki Island*, on which it is proposed to build a *lighthouse*, lies 4 miles to the southward. It is 310 ft. high, has a reef extending some little distance from its northern side, and another off its eastern end.

Hesper Rock, about 30 yards in extent, dries from 4 to 6 feet at low-water springs. From the rock the West extreme of *Ta-kin* bears N.N.W. $\frac{1}{2}$ W.; the summit of *Kao-shan* West; and the highest part of *Ta-chu-san*, S. by E. Great caution should be used in approaching this locality at high water. Lieutenant Bullock remarks—"We were much struck on passing, the day being calm, with the treacherous appearance of this rock, which looked like a brown floating log, and might easily have been passed unnoticed."

Fisherman Rock, lying nearly in mid-channel between Toki and *Ta-kin* Islands, is seldom visible. From the rock, the East extreme of *Takin* appears just touching the West extreme of North *Hwangching* N.N.E. $\frac{3}{4}$ E.; *Kao-shan* is just seen over the North extreme of Toki, S.W. by W.; and the western side of *Sha-mo* is in line with the centre of *Siau-chu-shan*, S. by E. $\frac{1}{2}$ E.

Directions.—Vessels bound to the *Pehi ho* or other ports in the Gulfs of *Pe-chili* and *Liau-tung*, are recommended to use the *Chang-shan* channel on the North side of *Chang-shan*, the course and distance from 2 miles outside of *Alceste Island* to the middle of which, is W.N.W. 100 miles. The channel between Toki and *Ta-kin* cannot be recommended to a stranger on account of the *Fisherman Rock*.

There is a narrow, deep channel between North and South *Hwangching* Islands, but at its East entrance, nearly in the centre, is the rock which dries 6 ft. at low water, and is therefore nearly always visible.

From *Miau-tau Strait* the southern coast of the Gulf of *Pe-chili* trends in a south-westerly direction for 60 miles to *Lai-chau*. The coast is low, lying under a mountain range, the crests of which are from 10 to 15 miles inland. Low spurs break through the otherwise even coast-line, and, projecting at some points far from the shore, constitute dangers, which should be approached with extreme caution in bad or thick weather, more particularly in

northerly or north-westerly gales, when at night the reckoning may be in error on account of the current.

East of Lai-chau the mountains turn abruptly to the South, the coast bending westward round a large shallow bight, 30 miles across. Thence it continues in a N.W. direction for 120 miles to within 30 miles of the Pei ho. This part of the coast, the margin of the Great Plain, is low, sandy, and almost a desert. Scantly populated, its inhabitants live in small wretched hamlets, in mud hovels built on banks elevated a few feet above the plain, and in a state of extreme poverty.

The **Ta-tsing ho** or **Li-tsin ho**, the present outlet of the Yellow River, has its entrance in lat. $37^{\circ} 52' N.$, long. $118^{\circ} 35' E.$ Tsi-nan fu, the capital of Shantung, stands 4 miles South of the river, at about 135 miles from the sea and 75 miles from the canal, but there is little known concerning it. The waters of the river are laden with yellow mud or clay, caused by the irruption of the Yellow River into its bed, and that torrent now fairly occupies its channel, having established the Ta-tsing as its outlet since 1851.

The Bar, when surveyed in 1860, was 3 miles from the entrance of the river, and had a depth of from 2 to 3 ft. on it at low water springs. The depth over the bar at high-water springs would therefore be 12 to 13 feet. In 1868 the bar had only .4 feet over it at high tide, but had a channel on either side, that on the South carrying 7 ft., and that on the North 5 ft.

The **PEI HO** or White River, called also the Tientsin ho, is the great highway to Peking, the capital of China. The important city and treaty port of Tientsin also stands on this river at its junction with the Grand Canal, of which it is the northern terminus. No peculiar difficulties in its navigation, from the entrance up to Tientsin, are met by vessels drawing from $10\frac{1}{2}$ to 11 ft. In fact the navigation of the river is too simple to require directions; a mid-channel inclining into the bends and slightly avoiding the points being the best. With long vessels there are some points which will require considerable care and skill in turning. If the vessel is drawing more than 8 ft. there are two places that must be passed at high water. One of these shoal places, having only 7 ft. at low tides, is off the brick-kilns about 9 miles below Tientsin; the other, of $6\frac{1}{2}$ ft., is in the long broad reach, 3 miles below the city.

According to a recent regulation foreign vessels are only allowed to remain at anchor at the mouth of the river, and at Tientsin; they must there occupy berths assigned by the custom-house officials. Vessels anchoring on the route to Tientsin are required to anchor as close to the bank as possible, and to buoy their anchors. No foreign vessel is allowed to anchor in any narrow part of the river, nor in the bends. Persons infringing these regulations are liable to a fine.

TIENTSIN is a treaty port, and has a consular establishment. It is the

sea port of Peking, and the largest and most important city in the North of China. It has trade with Siam and Cochin China, as well as with all the ports of China. Both strategically and commercially it is the key of the capital. The river is 200 ft. wide at Tientsin; above this it soon contracts and becomes too shallow even for gun-boats.

The foreign settlement or concession is about 2 miles below the city. That of the British is at Tz-chu-lin on the South bank of the river, where is the consular establishment. It has a fine bund, where is a jetty at which steam vessels can lie and unload. About a quarter of a mile below the British concession are two large and strong earth-forts on either side the river.

The chief foreign articles of import are cotton goods, cambrics, woollens, silk, opium, metals, needles, and matches. The trade is by no means unimportant, but it is fast merging into the hands of native merchants, who avail themselves of every facility which is at the disposal of the foreigner, and procure their goods direct from Shanghai. The native imports are hemp, paper, teas, sugar, silk, sea-weed, bêche de mer, camphor, and ginger. The chief exports are cotton, soap, skins felt, wool, grain, drugs, and fruits.

The native currency is confined to taels, copper cash, and a sort of bank note current on the spot. Dollars pass at either Tientsin or Peking, but on the road copper cash are more useful. Tientsin cash are not current in Peking. The northern Chinese now accept small silver coins, such as ten and five cent pieces and sixpences.

Supplies.—At Tientsin and along the river ample supplies of bullocks, sheep, and poultry can be obtained. Sheep are cheap and plentiful, and fatten to a great size on oil cake. Vegetables are rather scarce. Water from the river, if taken sufficiently above the entrances at low tide, and cleared by alum, which may be bought at any of the villages, is wholesome. Slack lime can also be procured. Drinking water is supplied by the compradors.

Climate.—Off the river's mouth it has been found both agreeable and healthful during the summer months, the sea breezes which then prevail tempering the heat; at Tientsin the summer heat is intense, and the diseases, typhus, cholera and small pox, which are so rife, are rather attributable to want of sanitary precaution than to climatic influence.

The Bar of the Pei ho, the Chinese name of which is Lan-kiang sha, is about 2 miles in length, in a N.W. by W. and S.E. by E. direction, and consists of hard mud. Being now well buoyed there is no difficulty in crossing it, and there are also beacons on the flats near the forts which serve as leading marks. The channel is wide.

The shoalest part of the bar is three-quarters of a mile in extent, commencing at 4 miles below the outer forts. About the middle of the channel, at $2\frac{3}{4}$ miles S.E. by E. $\frac{1}{2}$ E. of the South Cavalier of the South fort, there is an elbow or bend in the fairway, at which part there are only $1\frac{1}{2}$ feet at

low tides, but the bottom is very soft mud. Farther out there are 2 feet, but the bottom is hard mud, or sand, so that vessels than can cross this can also pass the elbow, although in less than their own draught. At the entrance to the bar, the northern banks, like those of the Peh-tang, are of hard sand, and like them also tail away to the southward.

At high water springs from 11 to 13 feet may be carried over the bar, the height of the tide being much influenced by the direction and force of the winds; at neaps, there is at times as little as 6 or 7 ft. at high water. In November, the channel of the bar becomes somewhat shallower, and the river is generally frozen over early in December, and remains so till early in March. The banks are not always easily distinguished when covered, for at high springs the ripples over them are not visible.

Buoys and Beacons.—There is no light at present to mark the approach to the Pei ho, but it is proposed to erect a *lighthouse* on Sha-lui-tien Island. There are three buoys to mark the passage over the bar, and five beacons to mark the banks of the river, three on the North side and two on the South. *Entrance Buoy* is a *red* iron buoy, on the outer edge of the bar, to mark its commencement and the entrance of the channel. *South Buoy* is a *black* iron buoy, on the South side of the bar, to mark a bend in the channel. *Inner Buoy* is a *red* and *black* striped iron buoy, on the inner end of the bar, to mark the entrance to the channel. This buoy is about one mile S.S.E. of North Fort. *Mud Beacon*, painted *white*, is on the North bank at the mouth of the river. *North Bank Marks* are two 30 feet poles with cages, on the North bank at the mouth of the river. *South Bank Marks* are two poles 30 feet high with cages, on the South bank near the mouth of the river.

These buoys are removed before the river becomes frozen up, and the channel is re-buoyed every spring. They are often washed away.

Anchorage.—Vessels of large draught, say 24 feet, may lie in nearly their own depth about $8\frac{1}{2}$ miles from the forts, the mud being very soft, so that they may ground at low water. The best position is at that distance, S.E. by E. of the South Cavalier, the left and largest of the five seen. This will be about $4\frac{1}{2}$ miles from the bar. Vessels of less draught can choose their own depth upon the same bearing, finding 15 feet at $1\frac{1}{2}$ miles from the bar. A vessel anchoring in 8 feet more than her draught at half tide would have from 2 to 3 feet to spare at low water springs.

The holding ground at this anchorage is excellent. A heavy gale brings in an unpleasant sea, yet with good ground tackling and plenty of cable out it is considered that a sailing vessel ought to ride out a summer gale. The anchorage seems to be a wild one in winter; in the gales of November, some boats only were lost. At a later period ships cannot anchor there at all, owing to the ice.

⋄ Sometimes vessels anchor in their own draught of water, for the mud is

very soft, and if the wind sets in from seaward the level of the sea is raised, whilst with off-shore winds which diminish the depth of water the sea is always smooth. The difference of level between high water spring tides with a south-easterly wind, and low water springs with a north-westerly wind is $12\frac{1}{2}$ feet, the spring rise being 10 feet.

The anchorage, called officially the Outer anchorage extends from the Customs' junks to 3 miles outside the bar seaward.

Pilots certified by Her Majesty's Consul, are usually on the look out for vessels entering during the open season. The rate of pilotage to Tientsin is about 8 dollars per foot of draught.

The native divers are very skilful. They have been able to recover boxes of specie from a depth of 25 feet. As gales sometimes come on in a few minutes without the slightest warning, boats alongside are liable to be stove or damaged.

Tides.—It is high water, full and change, outside the Pei ho Bar at $3^h 30^m$; ordinary springs rise about 10 ft., neaps 7 to 8 ft. The actual time of high water sometimes varies as much as $1\frac{1}{2}$ hours from the computed time, but seldom at springs. As soon as the flats are covered, the tide sets across the bar along the coast, nearly parallel thereto, the flood running northward, the ebb southward, about 2 knots at springs, and 1 knot at neaps. On the bar the tide is always weak. The influence of the direct tides in and out is not felt on the bar except towards low water, when the stream is confined within the mud banks. Outside the bar, the flood sets North, the ebb S.S.E. The tides are subject to great irregularities. North and N.W. winds retard the flood and diminish its rise; East and S.E. winds increase the rise and retard the ebb. Slack water sometimes lasts 3 to 4 hours at the neaps. The rate of the tide in the river is 2 to $3\frac{1}{2}$ knots, its maximum $4\frac{1}{2}$ knots.

At Tientsin it is high water, full and change, about $7^h 0^m$; it is estimated to be about 4 hours later than Ta-ku, but varies very considerably. The average rise and fall is 3 to 4 ft., and the greatest range 6 ft. When the snows melt, the river is said to rise 2 to 3 ft. higher. The times of high and low water are irregular; the water will sometimes remain at its high level for 3 or 4 hours. The tide takes 6 hours to rise and the same period to fall, but at the forts which stand some miles below Tientsin, the flood stream ran only $4\frac{1}{2}$ hours at springs; the ebb therefore must have run 8 hours. At the above forts it is high water, full and change, at about 5^h . The tide ceases at Yong-tsun, 23 miles above Tientsin.

The flood tide has a velocity of about one knot and continues to flow up for an hour after high water; the ebb has a velocity of 2 knots and runs out until two hours after low water. At times when it has been blowing from the northward, there is scarcely any rise of tide and the stream is then always making down.

Tide Signals.—The following signals are made from a flagstaff with yard to

show the depth of water on the bar, the starboard yard-arm being the northern one.

At masthead:—

Ball	signifies	-	-	-	-	Slack water.
Red flag	„	-	-	-	-	Rising tide.
Two balls	„	-	-	-	-	Falling tide.

At starboard yard-arm:—

Triangle over ball	„	-	-	-	-	8½ feet on bar.
Ball over triangle	„	-	-	-	-	9½ „

Triangle hoisted alone at starboard yard-arm, in conjunction with the following signals at port yard-arm, signifies an additional half foot of depth.

At port yard-arm:—

Triangle	signifies	-	-	-	-	10 feet on bar.
Triangle over ball	„	-	-	-	-	11 „
Ball over triangle	„	-	-	-	-	12 „
One ball	„	-	-	-	-	13 „
Two balls horizontal	„	-	-	-	-	14 „
Two balls vertical	„	-	-	-	-	15 „
Three balls	„	-	-	-	-	16 „

Directions.—Having passed the entrance *red* buoy, steer to pass to the northward of the South *black* buoy at the bend of the bar channel, and thence towards the inner *striped* buoy, and from that for the mouth of the river between the forts. A steam-tug is always in readiness at Taku to tow sailing vessels up the river.

The beacons, before described, have been erected for landmarks in case of the displacement of the buoys, and are used when the buoys are removed on the approach of winter and until the channel has been re-buoied in the spring after the breaking up of the ice. The beacons are on the mud-flats below the forts. To enter, keep Mud Beacon (*white*) just open southward of the North cavalier of the North fort, and this will lead in southward of the entrance buoy and up to the South buoy; then the two South Banks marks (poles with cages, black and red), on the South beach kept in one will lead up to the inner buoy, leaving the South buoy to the southward. Pass South of the inner buoy, steering for the mouth of the river.

The river from Taku to Tientsin is not difficult to navigate, yet owing to its winding course great care is necessary. Steam vessels of nearly 12 feet draught, and 200 ft. in length, have reached Tientsin at the period of spring tides almost without a check, but some of the bends are very sharp. The most difficult portion of the passage is a bend known as Double Reach, about 20 miles below Tientsin, where many vessels have stuck fast, and on some occasions the cargoes have had to be discharged before the vessels could be floated. Conveniently placed warping posts are now erected at the worst.

places, so that check lines can be made fast. Twin screw vessels do not require these aids.

As in some parts of the river the channel is very narrow, and barely of sufficient width to allow two vessels to pass each other, it has become customary for that vessel which is proceeding against the tide to run her bow aground so as to make way for the other.

Taku Forts, commanding the entrance of the Pei ho, leading to the capital, are an important military post, and were deemed by the Chinese impregnable till they fell before the British squadron on the 20th May, 1858, and were captured a second time by the British and French allied forces on the 21st August, 1860. The land is so perfectly low and flat about them as to make it difficult for a stranger to detect the entrance of the river, and there is nothing to denote its position, except the shipping and the five elevated cavaliers of the two principal forts which, from their yellow colour, are sometimes discernible with difficulty.

A British vice-consul is stationed at Taku, who receives the papers of all British sailing vessels bound either for this port or Tientsin, those of steamers being retained on board until their arrival at the latter place. The vice-consulate is situated up the river, almost 2 miles above the forts, and about a quarter of a mile from the river's bank. Here also are the Chinese customs' establishment, pilots, &c.

Koku, 17 miles above the forts, is the port at which all the southern junks from Amoy, Swatow, &c., discharge their cargoes. *Double Reach*, about 20 miles below Tientsin, is the most difficult part of the river to navigate. Most vessels frequenting the port have, at one time or another, stuck fast in this awkward spot, and on more than one occasion have had to discharge cargo, in order to lighten sufficiently to get afloat. In the event of thus grounding, boats are despatched from Tientsin as quickly as possible.

SHA-LUI-TIEN ISLAND, distant 120 miles N.W. by W. of Teng-chau, and 30 miles E. $\frac{3}{4}$ S. of the outer anchorage off the Pei ho, stands at the S.E. extreme of an extensive group or mass of sand-banks, the outer edge of which is 20 miles in length in an E.S.E. direction, at a distance of 12 miles from the coast. These banks, some of which dry at low waters must be approached with caution, particularly in thick or foggy weather. The island is low, but it has a small joss house on it, which, standing alone and upon an elevated spot, is conspicuous. It is covered with long grass, and, unlike the banks which are of dark river sand, is of bright sea sand. It is steep-to on its South side. It is proposed to establish a *lighthouse* on the island.

Tides.—It is high water, full and change, off the western part of the Sha-lui-tien Banks, at 2^h 50^m, and neaps rise 8 ft. Near the banks the flood takes a W.N.W. direction along their edge at the rate of 4 $\frac{1}{2}$ knots at springs,

and the ebb to the S.E. at the rate of 3 knots; on their western side the flood sets to the northward, but its velocity is not so great.

A strong N.W. wind drives the water out of the head of the gulf of Pe-chili, reducing the depth a little; but a southerly wind raises the level of the water.

GULF OF LIAU-TUNG.—About 10 miles N.E. from Sha-lui-tien Island is the south-eastern point of the Province of Chili, which defines the limits of the gulfs of Pe-chili and Liau-tung; from thence the coast bends to the N.E. by N. 70 miles to the Great Wall of China, to within a few miles of which it continues to be quite low.

The *Ching ho* entrance to which is 16 miles N.E. by E. of Sha-lui-tien Island, is through a break in the extensive banks which here skirt the coast for many miles, and across a bar on which there are only 2 ft. at low water. The *Lau-mu ho* entrance, 16 miles to the N.E. of the Ching ho, has a narrow bar, with 3 ft. over it at low water. *Hsin-shai-kau*, about 2 miles S.W. of the Lau-mu, is a bar creek, into which junks sometimes run for shelter in bad weather.

MIRAGE on this coast is very deceptive, giving an appearance of water to the dry sand, and distorting the objects on shore considerably, small huts sometimes appearing, when first seen, to be large forts.

From the Lau-mu the coast runs 10 miles N.E. by N. to Sha-ti Point, where the formation of the coast changes. This point is the southern extremity of a ridge of sand hills 30 or 40 ft. high, extending to the N.N.E. in a straight line for 17 miles, as far as the Pu ho.

The *Pu ho* enters the sea through the sandhills, in lat. 39° 40' N. The bar is nearly dry at low water. The rise and fall is about 6 ft.

From the River Pu, the ridge of sand hills, 30 ft. high, continues N.E. 8 miles, and 1 mile beyond their termination is the entrance of the *River Yang*, which is very shallow, and though a few junks pass a short distance up it at high water, the greater number discharge their cargo just within the entrance, whence it is carried into the interior in carts. The depth is 1½ feet over the bar, and the rise and fall 6 ft. The small river *Tai-cho* enters the sea 1 mile eastward of the Yang. The anchorage off *Liu-sia-kwang*, 1½ mile N.E. of the *Tai-cho* entrance, is open from N.E. by E. to S.W., at a quarter of a mile from the sandy beach. The passage into the beach near *Liu-sia-kwang* is between two sand-banks, the one running out from Rocky Point, the other from the mouth of the River *Tai-cho*. Horses and bullocks are abundant. There are two wells of good water at the village near the beach. *Ning-hai* is a walled city, 2 miles from the sea, along the West side of the Great Wall. The anchorage off it, near the extremity of the Wall, is open from N.E. (round southerly) to West.

The **GREAT WALL** of CHINA abuts on the sea on the western shore of

the Gulf of Liau-tung, in lat. $39^{\circ} 58' N.$, long. $119^{\circ} 51' E.$ It originates at the edge of the beach, to which it descends in broad terraces and massive flights of steps, now much ruined, and having a masonry pier jutting out into the sea. The wall rises generally from 20 to 30 ft., in sections similar to the walls of Chinese cities, and with a thickness of 15 to 25 ft. After running round and enclosing a portion of ground close to the sea side, thus converting it into a fort, it runs obliquely inward to the West, and at a distance of about $1\frac{1}{2}$ mile from the beach embraces the city of Ning-hai.

North of the Great Wall the western coast of the gulf is mountainous. The ranges run in an E.N.E. direction far beyond the head of the gulf, and nearly parallel to those on the eastern shore, from which they are distant about 80 miles, and either can be seen in clear weather from the opposite side of the gulf. Although appearing at a distance as continuous ranges, many of them are distinct groups separated by extensive plains, whilst their marked and peculiar forms render them excellent, as they would soon become familiar, and useful landmarks, when steering an off-shore course, which would generally be the case when bound to Newchwang.

From the Great Wall, the coast trends E.N.E. 6 miles to *Temple Head*, and after bending North for 3 miles round the head, it continues in the former direction 26 miles to Sand Point, off which lie the extensive *Cruizer Shallows*. It then turns abruptly to the N.N.E. All this coast is low, along the edge of an undulating plain, 10 miles in breadth from the foot of the mountains, and broken by low headlands on the sea shore, off which are reefs.

The **LIAU HO**, at the mouth of which lies the treaty port of Newchwang (Yingtze), now open to foreign commerce, drains an enormous area of country, consisting of the western half of the Province of Shing-king or Liau-tung. It flows through a plain 70 miles in breadth, and elevated only a few feet above the sea, and about its entrance the lowland, covered with trees, is not visible at the distance of 7 or 8 miles from a ship's deck, although it may be seen from the masthead. Vessels of 18 ft. draught can cross the bar during the summer months, but after the 1st of October, in consequence of the prevalence of northerly winds, which lower the water level of the gulf, it is recommended that vessels abstain from loading over 16 ft.

The river is frozen up during four months an a half, or from the middle of November to the end of March, and the only means of communication is then overland, by couriers *via* Peking at irregular periods. The tide affects the stream for many miles. Small junks ascend to Tie-ling, 205 miles from the sea, and good sized junks to Tien-chwang-tai, 30 miles from the bar. It is 150 years since large junks went up to Newchwang.

NEWCHWANG LIGHT is exhibited from a lightvessel moored off the entrance of the river in $5\frac{1}{2}$ fathoms at 10 miles from the entrance points, and $3\frac{1}{2}$ miles outside the bar. It is a *fixed bright light*, elevated 40 ft. above the

sea, and in clear weather should be seen from a distance of 11 miles. The illuminating apparatus is catoptric. The lightvessel is painted red, with *Newchwang* in large letters on each side, has three masts, and one ball on her mainmast only.

A gun will be fired when vessels are observed running into danger, and the course that should be steered signalled by the Commercial Code. In thick weather blasts from a steam *Fog-horn* are sounded at intervals of 10 seconds. If the light is being trimmed, a small bright light will be hoisted, and a blue light burned at the half interval of time between lowering and rehoisting, that is to say, at 7 minutes after lowering and 7 minutes before rehoisting. This lightvessel is only in position from about the 1st of April to the 1st of November, on account of the ice, and her position ordinarily is, Tower Hill S. by E. $\frac{1}{2}$ E. 16 miles, Ruined Tower on Kae-chu Point S.E. $\frac{1}{2}$ E., direction into the river about N.E. by E.

BUOYS and BEACONS.—There are two buoys to mark the channel over the bar, also five beacons to mark the passage into the river. Both the buoys can be seen from the lightvessel, the entrance buoy with the naked eye, the inner buoy with a telescope.

Entrance or Outer Buoy is an iron nun buoy, painted in *black and white vertical stripes*, and surmounted by a black rod and ball, visible 4 miles; it is in 3 fathoms, oaze, on the western edge of the fairway channel of the bar. From it the lightvessel bears S.W. by W. $\frac{3}{4}$ W. $2\frac{1}{2}$ or 3 miles, and inner buoy, N.E. by E. $\frac{1}{2}$ E. $2\frac{3}{4}$ miles. Good anchorage will be found 2 cables from it, with the buoy bearing between S.S.E. and N. by E.

Inner Buoy is a spar mounted with a bamboo pole, painted *black and white in horizontal bands*, visible 3 miles. It is in 10 ft., hard sand, on the inner edge of the bar, close to the S.E. edge of West bank, and about $2\frac{1}{4}$ miles N.E. by E. $\frac{1}{2}$ E. from outer buoy. It must be left to the westward on passing.

Another small spar buoy, surmounted by a basket, is moored about a mile S.S.W. of beacon No. V., and marks the East bank and the position of Deep Hole.

Fishing Stakes at Deep Hole.—During the winter months the Liau River is closed by ice. While the navigation is open the fishermen have three sets of stakes off Deep Hole; one set on the western side, and two on the eastern, all situated below beacon No. V. As these have proved good marks for the fairway channel, it has become necessary, on their removal previous to the setting of the ice, to leave the outer stake of each set standing.

East Spit or No. V Beacon is a pole 38 ft. high, surmounted with two black balls, with the figure "V" painted in white on the lower ball. It is N.E. $\frac{1}{2}$ E 3 miles from inner buoy, and stands on the East spit, a shoal that projects to the southward from the bank of the river at its East point of

entrance, and is left dry at three-quarters ebb. This beacon marks the edge of the bank, and with the inner buoy forms one of the leading marks in going out or coming in.

Nodding Tommy or No. IV. Beacon is a white pole, 28 ft. high, mounted with a red joss-pole box, on which its number "IV" is painted in black figures. It is on the East bank of the river, at low water mark, on the South side of a small creek, and about 2 miles from beacon No. V. It marks the Whale's Back, a dangerous shoal on the opposite bank from which it bears East.

Middle Bank or No. III. Beacon is a red pole, 28 ft. high, mounted with a black joss-pole box, on which is the figure "III" in white. It is on the East bank of the river, at low water mark, about $2\frac{1}{2}$ miles from No. IV. beacon, and it marks the centre of the Middle Ground Shoal, of 9 ft. water, from which it bears East, and also points out the channel line.

Flagstaff or No. II. Beacon, mounting two trellised frames or basket balls, one above the other, is 50 ft. high; pole and frames black, lower part white with its number "II" in black figures. It is on the East bank of the river, planted on dry ground, $1\frac{1}{2}$ mile from No. III. beacon.

West Bank or No. I. Beacon, also called Fish-house beacon, is a black pole mounted with a red joss-pole box, with the figure "I" on it in black. It is on the West bank of the river, near some fishing houses, a short distance from the bend that leads to the harbour, and is used as a leading mark to No. II. beacon, on the East bank, from which it is three-quarters of a mile distant.

Pilots.—Pilot vessels, having competent licensed pilots for the Liau ho, will be met on nearing the bar. They carry the pilot flag, yellow over green, horizontal, and the words "Licensed Pilot," with number, on the head of the mainsail. There are twelve pilots, who are under the control of the harbour master, under whose direction, also, vessels are berthed, and are not allowed to shift without his permission. The pilot boats cruise within a radius of 5 miles from the lightvessel, except in bad weather, when they take shelter in Deep Hole.

Tides.—It is high water, full and change, at the Liau ho Bar, at 4^h 0^m; springs rise 11 or 12 ft., neaps 7 or 8 ft. At Yin-koa, at 5^h, and springs rise 12 ft. The rise, especially at neaps, is much influenced by the wind, a southerly breeze causing a rise above the normal height, while northerly winds cause a fall below the same.

The BAR.—The channel into the Liau ho flows through the mud flat which extends from 4 to 6 miles off the coast. The eastern point of entrance to the river is 3 or 4 miles South of the western. The bar begins at 7 miles S.W. of the eastern point, and carries for 2 miles depths of 7 to 9 ft., but in its centre is a bank 1 mile in length, of only 4 ft. Thence the channel takes a north-easterly direction towards the East point of entrance, gradually

deepening to 5 and 6 fathoms, but shoaling again to 18 ft., which depth may be carried up to Yin-koa. The bar has somewhat altered since the survey of 1860.

The bar is difficult of approach, especially in cloudy weather or when no ships or junks are lying outside, owing to the low land and the extent of the flats. A vessel should not stand nearer in than 4 fathoms. When in 6 fathoms, soft bottom, Tower Hill bearing S.S.E., she is in anchorage outside the bar, when she must wait for a pilot; or if drawing 10 to 12 ft., and it being 3 hours flood, she may follow, on a course about N.E. by E., the large five masted junks going in, which keep strictly in mid-channel. But as soon as the vessel has passed the first fishing stakes, and having $4\frac{1}{2}$ fathoms, soft bottom, good holding ground (the bar is hard sand), she is inside the bar, and ought to anchor.

Anchorage.—Vessels arriving off the port, if requiring to anchor, should bring-to near and to the eastward of the lightvessel; or, if preferred, they may proceed up to inner buoy, and anchor with the buoy bearing between S.S.E. and N. by E., at 2 cables' distance.

Caution.—Vessels that have been kept too far off shore, in order to give the Bittern Shallows a wide berth, have been run amongst the dangerous shoals, at the head of the gulf, westward of the Liau ho.

Crossing the Bar at slack water of the last of the flood, steer from the lightvessel N.E. by E. $\frac{3}{4}$ E., and pass half a cable to the north-westward of entrance buoy. From this steer N.E. by E. $\frac{3}{4}$ E., which will lead $1\frac{1}{2}$ cable eastward of inner buoy, and stand on, on the same course, until you have brought the latter buoy to bear W. by S. $\frac{1}{2}$ S. about $1\frac{1}{2}$ mile distant. Thence a N.E. course for about 1 mile will bring you to Deep Hole (between the fishing stakes), where there is good and secure anchorage in $6\frac{1}{2}$ fathoms.

The tides set obliquely across the bar, the flood about N. by E., the ebb about S. by W., at the rate of 2 to 4 knots. With this knowledge the mariner will be able to steer so as to make good the courses above given. When on the bar, to avoid the middle ground, do not bring inner buoy to bear to the northward of N.E. $\frac{1}{2}$ N.; and to avoid the dangerous spit on the western bank, do not bring it to bear to the eastward of E.N.E. When above inner buoy, in order to avoid another projection from the western bank, do not bring the same buoy to bear to the southward of S.W. by W. $\frac{1}{2}$ W. until your distance from it exceeds $1\frac{1}{4}$ mile. The western bank is steep-to; the eastern bank shelves gradually.

From Deep Hole, the Admiralty chart and a careful use of the lead will enable you to reach the Yin-koa anchorage. Feel your way along the eastern bank, passing within a cable of Nodding Tommy and Middle Bank beacons, on which side the deepest water is to be found, until Flag-staff beacon is reached, then strike across for Fish-house beacon, on the western shore, in order to clear the shoal water off Everlasting Point. Then (still guided by the

lead) follow the North shore around the bend, until you are well above Everlasting Point below Yingtze, when steer for the anchorage off the town.

At $12\frac{1}{2}$ miles South eastward of the lightvessel is *Kae-chu Point*, low, with a ruined tower on it. Some 10 and 12 ft. patches lie at 6 miles westward of the point. *Tower Hill*, 9 miles S.S.W. of *Kae-chu Point*, is 420 feet high, and has a conspicuous tower on its summit; bearing S. by E., it clears the *Kae-chu* patches to the westward. *Vansittart Saddle*, 10 miles to the S.W. of *Tower Hill*, is a group of hills on a projecting angle of a great plain. A large square tower stands to the eastward of them. *Sandy Head* is a hill 440 feet high, 5 miles S.S.W. from *Vansittart Saddle*. It is conspicuous, and a good mark for the Bittern Shallows. *Maxwell Point*, in lat. $40^{\circ} 2' N$, long. $121^{\circ} 50' E$., is 6 miles S.W. from *Sandy Point*. It is the western extreme of a hilly promontory, 4 miles in extent, rising from the extensive plains of this part of the coast in varying heights to 970 ft., whilst 12 to 13 miles inland mountains of 2,000 to 3,000 ft. run parallel to the coast for 30 miles. At 5 miles below *Maxwell Point* are the *MacGowan Cliffs*, and the same distance S.W. from them is *Schooner Rock*.

Bittern Shallows are a collection of banks of coarse sand, 22 miles in extent, fronting the coast, and marked by heavy breakers in N.W. and West winds. Their most projecting point is 9 miles N.W. $\frac{1}{4}$ W. of *Sandy Head*, where the most dangerous cluster lies. These outer banks carry 12 to 16 ft. water, several of the inner from 1 to 10 ft., and others 15 ft. The lead will be the best guide to avoid these banks. Their most projecting point, with 2 fathoms on it, has 13 and 14 fathoms close to, whilst the sea outside has an uniform depth of 12 fathoms, mud; in other parts the banks are safe to approach to 10 fathoms, mud. A very conspicuous mountain, 2,880 ft. high, in line with the small cliffs East of *Vansittart Saddle*, S.E., will lead over the North tails of the banks in $4\frac{1}{2}$ to 5 fathoms.

Glacis Point, 7 miles W.S.W. from *Schooner Rock*, is the termination of a gentle slope from a hill 500 ft. high. *Fort Head* is 5 miles S.W. from *Glacis Point*, and 4 cables off its S.W. side is the *Cocked Hat*, an islet 60 ft. high. *Fu-chu Point*, the North point of *Fu-chu Bay*, is 4 miles S. by W. of *Fort Head*, and between them is a shallow bay. Extending from it 1 mile to the westward is a reef.

Fu-chu Bay is 11 miles across between *Slaney Head* and *Fu-chu Point*. The approach has from 15 fathoms at 12 miles, to 5 fathoms at 3 to 5 miles from the head of the bay, the soundings generally regular with mud bottom, except off *Slaney Head*. The passage up to *Fu-chu*, at the head of the bay, is between *Square Island*, a flat-top isle 110 ft. in height, on the North, and *Table Point*, a projecting rocky head, on the South. The small town of *Fu-chu* commands but little trade. It produces coal of little worth.

Hulu Shan Bay, the next bay southward of *Fu-chu Bay*, affords anchorage in depths under 9 fathoms, good holding ground of sand and clay, inside

its entrance points, which are $5\frac{3}{4}$ miles apart. Small vessels can find shelter from N.W. on the North side of the bay, or from S.S.W. on the South side. There are no supplies.

Society Bay is 37 miles wide at its entrance, between the North point of Hulushan Bay on its North side and Cape Collinson on its South. To the N.N.E. of Cape Collinson, between the distances of 10 and 17 miles, are *Milne* and *Murchison Islands*, and numerous shallow patches. At the N.E. head of the bay is *Port Adams*, 18 miles in depth, which can be entered by vessels drawing 20 to 21 ft. at high-water springs. A few supplies can be obtained at the villages on its shores. *Kinchan Bay* is shallow, and forms the S.E. part of Society Bay. At its head is the small walled town of the same name.

Quang Tung Peninsula forms the South side of Society Bay. Its N.W. extreme is Cape Collinson. At 6 miles W.N.W. of Cape Collinson is *Si-hau-shan* or *Iron Island*, 750 ft. high. Between Cape Collinson and Liau-ti-shan Promontory, 13 miles to the southward, two bays are formed on the coast; the northern of these is named *Louisa Bay*, and has good anchorage in its entrance in 6 fathoms, outside the small islands. At $4\frac{1}{2}$ miles westward of the entrance of Louisa Bay is *Reef Island*, 400 ft. high, with some rocks off its western side. *Pigeon Bay*, 5 miles to the southward of Louisa Bay, has anchorage in 4 fathoms. The mountain on Liau-ti-shan promontory is 1,500 feet high. *Port Arthur*, 5 miles E.N.E. of this mountain has rocks on either side of its entrance, and a military station on its N.E. shore.

Encounter Rock, in lat. $38^{\circ} 33' 50''$ N., long. $121^{\circ} 40'$ E., is about 70 yards in length East and West, has 24 and 26 fathoms close to. From the eastern or largest rock, which is 11 ft. above high water, the Cap bears N. $\frac{1}{2}$ W.; the summit of Sanshan tau N.N.E. $\frac{3}{4}$ E.; Prominent Peak N. by W. $\frac{3}{4}$ W.; Sampson Peak, N. by E. $\frac{1}{2}$ E.; Liau-ti-shan summit, N.W. by W. $\frac{1}{2}$ W.; and Round Island, E. by N. 25 miles.

Cap Island, 17 miles eastward of Port Arthur, and 5 miles off shore, is about 400 ft. high, and slopes towards the East. *Round Island*, in lat. $38^{\circ} 40'$ N., long. $122^{\circ} 11'$ E., is small, round-topped, 200 ft. high, and is generally sighted when bound to Ta-lien-whan Bay from the southward. The soundings at half a mile from it are 25 fathoms, mud and shells.

Ta-lien-whan Bay is an extensive inlet, square in form, being 6 miles wide and 6 deep, with three smaller inlets, named Victoria, Junk, and Hand Bays, branching from its head; there is also a small bight, Odin Cove, on its eastern shore. The holding ground is excellent, the eastern side of the bay affording the best sheltered anchorage in summer. Its principal approach is 5 miles wide, between the West Entry Point and the two Sanshan Islands. There is also a passage 1 mile wide between these islands; and another 2 miles wide between the northern island and the eastern point of entrance. Both of these channels, and the main entrance, appear to be clear

of danger; but in passing between the two islands it would be prudent to steer a mid-channel W.N.W. course through, so as to clear the 6-fathom mud-banks, one lying S.E. by S. 8 cables from the North Island, and the other East 8 cables from the North hill of the South Island, which have not been examined, and on which there may be less water.

The flat country at the foot of the hills surrounding Ta-lien-whan, appears to be good arable land, well cultivated. Large quantities of a kind of dwarf Indian corn, millet, and wheat (kaouliang) are grown on it. Vegetables are scarce, and from the latter grain above mentioned a spirit is distilled.

Odin Cove lies 3 miles North of the North Sanshan Island, and just within the north-eastern entrance point of Ta-lien-whan Bay. In approaching it care should be taken to avoid a rock lying a mile off shore, and 3 miles N.E. of North Sanshan Island. The best anchorage is on the South side of Odin Cove, the northern shore being dangerous to approach. A few supplies may be obtained, and on the northern shore of the cove water may be got.

The Blonde Group, or Wai-chang shan, lying about 45 miles eastward of Ta-lien Bay, consists of one large island and four smaller islands north-eastward of it. They are all much the same in character; undulating ridges with deep ravines, bordered with high cliffs or ragged shores, but destitute of any prominent feature when seen from a distance. *Shi-siau* is a remarkable rock 40 ft. high, which appears as a junk under sail, and lies 5 miles southward of the Blonde Group. *Hai-yun tau*, 15 miles eastward of the Blonde Group, 5 miles in extent North and South, lies isolated at the S.E. part of the Blonde archipelago. The summit of this island is a gently sloping peak, 1,320 ft. high.

The Ta-hu-san or *Ta-yang ho*, has its entrance in lat. 39° 47' N., long. 123° 40' E. At 12 miles above its mouth is the town of Ta-hu san, the sea-port next in magnitude to Yingtse (Newchwang), and like that place possessing many large native warehouses.

The approaches to the river are shallow, and large vessels can only approach to within 6 miles of the entrance. About 4 miles off the entrance are two small islands, namely, Ta-lu-tan on the South side and Sian-lu-tan on the East side. The channel into the river lies between these two islands; the channel West of Ta-lu-tan is not practicable even for boats. The German vessel of war *Ariadne* was piloted to an anchorage in 4½ fathoms, 1½ mile S.E. by S. from the peak of Ta-lu-tan; shoal water extends South and West of Ta-lu-tan a distance of over 3 miles. A depth of 4 fathoms is found at 4½ miles S.W. of the island.

The boats of the *Ariadne*, in July 1876, ascended this river without difficulty as far as the town of Taku-schan. A depth of 1½ ft. was found on the bar at low water, but it is considered possible that the bar may dry at low water spring tides. Inside the bar the least water found was 7 feet, with a

general depth of 8 ft. At the anchorage off the town there is a depth of 8 feet at low water, bottom soft mud, on which vessels drawing less than 10 ft. may ground. The banks of the river from the entrance to the town of Taku-schan are low, and in some places submerged at high water; the stream is 330 yards wide at the town. Spring tides rise 20 ft.

The population of Taku-schan consists of 30,000 or 40,000. Commerce with Korea, prohibited previous to 1873, has commenced, and is at present very active. The exports consist chiefly of bean cake and timber. Silk of a coarse inferior quality is exported in small quantities.

The KOREA is separated from China on the N.W. by the *Yulu kiang*, the estuary of which river is in about lat. $39^{\circ} 50' N.$, long. $124^{\circ} 10' E.$ Some trade commenced in the year 1876 between Japan and the port of Fusan in Corea.

The coast eastward of the Yalu kiang appears to trend to the S.E. as far as Ping Yang inlet, and is skirted by numerous islands, the whole of which are as yet unexplored. Banks with shoal water on them extend a long distance to seaward of these islands, and vessels navigating in this locality should use great caution, as banks of rock and sand rise precipitously from the water.

The S.W. coast of Korea and the islands lying off it are but little known. The passages between the islands have been traversed by many vessels, and all the outer groups fixed with tolerable precision.

Quelpart Island, about 40 miles long E.N.E. and W.S.W., and 17 miles wide, is of considerable height, and detached from the islands which face the S.W. coast of Korea. Its general outline is that of an oval, with few deep indentations to affect its regularity. Its general appearance, as viewed from the sea, is inviting, there being a pleasing variety of hill and dale, and on the northern and eastern sides much cleared land, cultivation rising probably to the level of 2,000 ft. Rock reported in lat. $33^{\circ} N.$, long. $126^{\circ} 13' E.$

Quelpart, throughout its extent, has but one safe anchorage, and that is at its East end, off the southern bay of Beaufort Island, which here forms a channel with Quelpart, about 2 miles wide, and through which the current sets strong to the southward. The second temporary roadstead is off the city on the northern shore of the island, but a vessel would be compelled to seek an offing at the first symptom of a N.W. breeze.

The third anchorage, at the western extreme of Quelpart, within Eden Island, affords shelter from North (round East) to N.W., and offers an escape to leeward if requisite. A fourth temporary but dangerous anchorage is off Hooper Island, near the city on the southern shore; but this is open from West to S.E., and is too confined to admit of beating out, should wind and sea come in suddenly.

Off the *South coast of Korea*, between Maisonneuve Island and Kuper

Harbour on the West, and Castle Islands and Herschel Island on the East, are about 100 conspicuous islands, from 300 to upwards of 2,000 feet in height, more than two-thirds of which are inhabited; and including the smaller islands, the whole number, more than 200, are contained in a space of between 1,500 and 2,000 square miles. Speaking generally of this archipelago, it is bold, presenting very few hidden dangers. All these off-lying islands have been examined, but the mainland of the South coast of Korea is yet unsurveyed.

Port Hamilton, lying about N.N.E. $\frac{1}{2}$ E. 38 miles from the N.E. end of Quelpart, consists of two large islands, deeply indented, the northern points of which nearly meet, and which, with a third and smaller island, *Observatory Island*, situated between their south-eastern points, form a spacious and well-sheltered harbour, named Port Hamilton, the main entrance to which is at the S.E. part of the group. These islands may be readily distinguished from the numerous clumps of islets and rocks in the neighbourhood, by their greater size and massive bold appearance, as well as their peculiar position. Except at a great distance from the south-eastward, they invariably make as one island.

Within Observatory Island a vessel may be safely hove down for repair. Wood is scarce—fresh water is plentiful and good, and easily embarked. Fish may be caught with the seine.

On entering the port, the only danger that does not show is the Saracen Rock, with 7 ft. on it, lying at the entrance, 2 cables eastward of the East end of Observatory Island. Vessels may anchor anywhere within the port. The holding ground is so good as to render it difficult to trip the anchor after a few days.

Chosan or Tsau-liang-hai Harbour, is formed on the S.E. coast of Korea, in lat. $35^{\circ} 6' N$. The entrance is between Cape Young on the North and Cape Vashon on the South, which bear from each other N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W., and are 3 miles apart; from thence the harbour trends in a N.W. direction $4\frac{1}{2}$ miles, and is from 1 to 2 miles wide. At 3 miles within the entrance there are some rocks always above water.

No perceptible trade is carried on in the harbour. A few boats were occasionally seen moving about, but their cargoes generally consisted of fire-wood and straw. The Japanese of the garrison, some 250 or 300 men, have but little intercourse with the natives, and apparently hold them in supreme contempt.

The coast of the Korea will be found fully described in the China Pilot, published by the Admiralty. To give a full description of a coast seldom or never visited by European vessels is thought to be beyond the scope of this work. We therefore give the above brief description, and proceed to describe the coasts, &c., of the Japanese Archipelago.

The coast to the northward is described in the North Pacific Directory.

CHAPTER XXV.

THE JAPANESE ARCHIPELAGO.

THE celebrated and long mysterious traveller, Marco Polo, was the first to announce to the western world the existence of the rich and powerful island of *Xipangu*, now known to be Japan. In 1542 a Portuguese, Mendez Pinto, was cast by a storm on its shores, and a Portuguese settlement from Malacca was soon afterwards made on Kiusiu. In June, 1598, some citizens of Rotterdam fitted out a small fleet of five ships to trade in the Indian Archipelago, and injure, as much as possible, the commerce and power of Spain. Among several Englishmen in this fleet, were William Adams, of Gillingham, near Rochester, and Timothy Shoter, who had accompanied the famous Cavendish in his circumnavigation. The venture was pre-eminently unfortunate. Only one ship, and that the smallest, the *Joyous Message*, commanded by Siebold de Weert, returned to Holland. Two of the others were destroyed, and the fourth, in which were these two Englishmen, reached Japan a mere wreck. They were taken prisoners, and, after some confinement, Adams was taken into the confidence of the Emperor; the rest departed; He was raised to great honours; became of first importance in the political and commercial affairs of the empire; but did not succeed to the extent of his intentions, having gained privileges only for the Dutch, who have studiously avoided mention of his part in their establishment. Some extensive privileges were also granted, at his instigation, to the English East India Company, to establish a factory at Firando.*

As is well known, the only port allowed to be open to foreigners, and this permission was limited to the Dutch and Chinese, was the Port of Nagasaki, or rather for the Dutch, the Island of Dezima, lying before it. But the Japanese maintained a rigid exclusiveness, and but little was known to Europe about the country. Without enumerating the older authors, the principal work on Japan was the collection from the notices of the Dutch presidents, by Dr. Ph. Fr. van Siebold, who visited the country in the period between 1823-30, a magnificent work, worthy of any nation.

In the year 1853, July 8th, Commodore Perry, U.S.N., appeared off

* The first English who visited it were with Capt. Saris, who came to the relief of Adams from England, in 1611, arriving at Firando June 9th, 1613.

the entrance to Yedo Bay, with two large steam frigates and two sloops of war. He ostensibly sought at first only to abolish the barbarous Japanese laws, which consigned shipwrecked seamen to death, and their vessels to destruction. The steady resistance to any intercourse, overawed, however, by the presence of this formidable force, gradually gave way, and some concessions were granted before the departure of the fleet, which left with a promise, or menace, from Commodore Perry, that he intended to return for a more definite answer with a "larger fleet" in the following year. Accordingly, on February 12th, 1854, a squadron of nine war vessels appeared in the Bay of Yedo, and after skilful negotiation a treaty of friendship was concluded between the Tycoon and the United States, and permission was granted to locate a consul at Simoda, an insignificant place at the South extreme of the Idsu Peninsula, on the West side of Yedo Bay.

The second stage of this international negotiation was reached by Mr. Harris, the U.S. diplomat, who, by unremitting zeal, contrived to enter Yedo at the end of 1857, not to leave it till April, 1858, with the treaty of commerce framed. This great step was followed by similar concessions being granted to the principal European powers; and that with Great Britain was ratified at Yedo, July 11th, 1859. After all these apparent victories, it was discovered that these treaties were illegal, having been made with the Tycoon of the period, whereas they should have been ratified by the Mikado, but this was remedied by the appearance of the allied fleet from China and the subsequent full recognition of the rights of the external world to trade at various ports. Of the subsequent troubles nothing can be said here. The works of Sir Rutherford Alcock, Captain Sherard Osborn, R.N., &c., &c., will supply all that can be required.

The empire of Japan is composed of four large islands, Kiusiu, Sikok, Nipon,* and Yezo, and numerous smaller islands. Nipon, the largest and most important of these, and that which gives its name to the whole empire, is more than 700 miles in length N.E. and S.W., and its breadth varies from 50 to 150 miles. South of Nipon, and separated from it by a narrow channel, is Kiusiu. Lying N.E. of Kiusiu, and eastward of the South extreme of Nipon, is the island of Sikok, about 130 miles in length. It is separated from Kiusiu by the Bounjo Channel, and with Kiusiu and the western part of Nipon forms a basin or inland sea named Seto Uchi. North of Nipon, and separated from it by the Strait of Tsugar, is the large island of Yezo, a conquest and colony of Japan. Its form is that of an irregular triangle.

* *Nipon* is applied in Japan to the whole empire. In the two words of the Chinese characters which compose it, *Jih Pun*, it means the place or rising of the sun. The Japanese soften the letter into *n*, and so make it *Ni Pun*, the Dutch spelling it *Jeh Pun*, their *j* corresponding with our *y*. The English, giving the harsher sound to *j*, call it Japan; so *Jeddo* should be produced *Yedo* for the same reason, and is hereafter spelt so.

The chief towns of Japan are now all joined with each other and with Europe by electric telegraph; railways are springing up near the chief ports, and coal is being worked on European principles. A good indication of the progress made by Japan in the last few years is afforded by the rapid lighting of the coast. Of the 39 lights now exhibited not one was shown previous to the year 1869, a few coal fires only marking the coast at night. The population of the empire numbers about 33,000,000, and there are about 3,000 foreign residents in the country, nearly half of whom are English. Imports at the various treaty ports in 1876 amounted in value to about £5,000,000, and exports to £5,500,000, chiefly silk (including eggs and cocoons), tea, and miscellaneous produce.

Treaty Ports.—The following are the ports opened to British subjects by treaty, between Her Majesty the Queen of Great Britain and Ireland and the Mikado of Japan:—Kanagawa (including Yedo and Yokohama), in the Gulf of Yedo; Nagasaki, on the West coast of Kiusiu; Hiogo and Oosaka, in the Isumi nada (eastern part of the inland sea); Niigata, on the N.W. coast of Nipon; and Hakodate, on the South coast of the Island of Yezo.

Climate.—The following observations upon this subject, connected with Japan, are made by Van Siebold:—“In speaking of ice, frost, and snow, within 32° of the equator, we should consider the geographic position of the Japanese Islands, and cite an observation which has been more than once made, and at last confirmed by Alex. de Humboldt. The eastern part of Europe, and the immense continent of Asia, are vastly more cold, under the same latitude, than western Europe, making allowance for the greater or less elevation above the sea level. The climate of islands being much milder than that of continents, it can scarcely be comprehended that the temperature should be lower in Japan than those European countries under the same latitude. But the cause of this contradiction is found in the low temperature of Asia, which, surrounding the Japanese and Kurile Islands on the West and North, has a very decided influence on their climate. From the proximity of the continent, and the winds blowing off that coast during a portion of the year, the cold arises which prevails in Japan, particularly in the North and N.W. Thus in lat. 32° N. the thermometer descends on the coast to 30° and 29° Fahr. It freezes to several lines in thickness, and snow falls that remains on the ground for several days. In lat. 36° the lakes, as those of Suwa on the Sinano, are covered with a bed of ice, which, between 38° and 40°, becomes thick enough for the river to be crossed on foot. In the island of Tsusima (lat. 34° 12' N., long. 126° 55' E.) rice will not grow; near Matsmae, in the Island of Yezo, wheat returns but a very poor harvest; and on Cape Soja (lat. 45° 21' N., long. 140° 29' E.) the wild Ainos, a vigorous race, are obliged to retire into caverns, to preserve themselves from the intolerable rigour of winter. On the other hand, the S.E. and eastern sides, protected from the freezing winds of Asia by high chains of mountains,

which traverse these great Islands of Kiusiu, Sikok, and Nipon, in a direction parallel to the continent, have a more fertile and more temperate climate. In those parts of the country between lat. 31° and 34° , the palm, the banana, myrtle, and other plants of the torrid zone, are found. In some parts the sugar-cane is successfully cultivated, and they gather two rice harvests each year. The environs of Sendai, a city in lat. $38^{\circ} 16'$ N. long. $138^{\circ} 36'$ E., near Niegata, produce this grain in such abundance, that, notwithstanding their northern position, they are in reality, as they are called, the granaries of Yedo, the most populous city of the country. But it is more particularly in the rigorous season, which lasts from the commencement of January to the end of February, that this difference between the western and eastern shore of Japan becomes most remarkable. At Dezima (Nagasaki) for example, in lat. $32^{\circ} 45'$ N., long. $127^{\circ} 31'$ E., the thermometer marks 45° Fahr.; while at Yedo, in lat. $35^{\circ} 41'$, long. $137^{\circ} 22'$ E., it rises to 56° ; so that the position of the capital, more easterly by $9^{\circ} 51'$ than the factory, raises its temperature higher by 11° , although it is only 3° nearer the pole. Thus in the two months of winter in which these observations were made, the coasts facing the Asiatic continent were exposed for thirty-seven days consecutively to the freezing winds from N.W. and North. This circumstance explains, besides, why the white mountain (*Siro jama*), which is on the western coast of Nipon, in lat. 36° is covered with perpetual snow at 8,200 feet above the sea; and why *Fusi-jama*, at the eastern extremity of the island, with its summit at 12,450 feet, remains without snow for months together.

“During the hot weather in July and August, when the winds blow from South and S.E., this disproportion in the temperature disappears, and the mean height of the thermometer for this season is 79° at Dezima, and 76° at Yedo. On the South and S.E. coasts, then refreshed by these winds, it hardly exceeds 85; nevertheless in the South and S.E. parts of Kiusiu, and chiefly in the bays sheltered from the breezes, it often rises to 90 and 98° , and sometimes even to 100° .”

At Hakodadi, the climate in winter is variable. In the winter of 1859— 60° , the greatest depression of the thermometer was 12° . The character of the winter season is uneven, and acts prejudicially on the health, in consequence of the great variability of the atmosphere, thaws and sharp frosts alternating. North-westerly winds blow for four months, and snow fell in the winter of 1859 daily for six weeks. Sir R. Alcock says the winter is almost Siberian, with long continued and heavy falls of snow, the thermometer standing many degrees below zero.

Fogs are very prevalent on the coasts of Japan, especially in the northern parts, and thunderstorms are frequent. In June and July, they occur frequently in the Korea Strait; further to the North they envelope the coasts of Manchuria till the middle of July.

Earthquakes.—The whole region of the Japanese Islands is volcanic, and

many of the eruptions are fraught with extreme danger to ships. At Yedo, one occurred in August, 1783, exceeding in its horrors and wide spread desolation that of Lisbon. Another occurred at Yedo on the 10 Nov. 1855, which is said to have caused the destruction of 100,000 dwellings and 54 temples, and the death of 30,000 persons.

In 1854 the town of Simoda was reduced to ruins, and the Russian frigate *Diana* nearly wrecked in the harbour, being whirled many times round her anchors, at one time aground, at another in many fathoms depth. She was then greatly injured, and was subsequently lost in an inexplicable submarine tornado, whilst in tow of a multitude of Japanese boats which deserted her suddenly at some, to them, well known warning.

Simabara, in Kiusiu, is also a locality of terrible earthquakes, one of which is said to have altered the whole feature and coast line of the neighbouring province.

The Japanese Current, or **Kuro Siwo**, as it is called by the Japanese in one point of its course, is an immense stream which rushes part the southern coasts of the Japanese Archipelago towards the N.E. and is exactly analogous to the Gulf Stream in the North Atlantic. It has been observed by every voyager in these regions; and, like the Atlantic Stream, may be traced to a great distance to the eastward, and evidences of this drift have been frequently found on the American coast, as in the remains of junks, or of these vessels with their crews being drifted on to the American territories, as has been previously related.

But the Pacific current differs from the Atlantic Stream in not being confined in a narrow channel at its outset, and in the strongest part of its course. Hence its velocity and direction are not so constant, and some great variations in the current have been experienced, and these, too, without any apparent cause. Thus there can be no dependance placed on its rate or direction, and inshore it is certainly controlled or altered by tidal action. In the North Pacific Directory this remarkable stream will be noticed more at length, in the section specially devoted to currents.

Survey.—The Japanese Archipelago has never been properly surveyed. Some portions have been minutely examined, especially the vicinities of the treaty ports where European commerce has hitherto been allowed. In addition to the surveys made by the officers of the American squadron in 1853-4, and the British fleet in 1863, there are various portions derived from the surveys of Commander J. Ward, R.N., in the *Rifleman*; of Commander Brooker, R.N., in the *Sylvia*; and especially of Commander C. Bullock, R.N., in the *Serpent*; and of Captain St. John, in H.M.S. *Sylvia*. All these and others have been connected together by a most remarkable map. During the political negotiations this perfect representation of the empire was delivered to our representatives, and it was found to be a regular trigonometrical survey of 6 miles to an inch, and so accurate that, when tested by the

surveyors, it was found that very great reliance could be placed on it. Such a geographical work deserves especial mention.*

The Luchu, Loo Choo, or Liu Kiu Group lies to the north-eastward of the Meiaco Sima's (see pages 1048—1051, about 120 miles from the northern island of the latter group to the southern island of the former. It consists of three large islands—Okinawa sima (Great Lu-chu), to the S.W.; Kaki-rouma, in the centre; and Oho sima to the N.E., between which and in their vicinity are numerous smaller islands, some of which form clusters, the whole, with some outlying rocks, lying between the parallels of 26° N. and 28° 46' N., and the meridians of 126° 42' E. and 130° 16' E.

The inhabitants of the Liu-kiu Islands are both friendly and hospitable; their chief resides at Sheudi, the capital, and formerly paid tribute both to China and to Satsum, a powerful Japanese Daimio. They have but little commerce, except amongst the neighbouring islands of the group.

Okinawa Sima (Great Lu-chu Island, the largest of the group, is about 56 miles long, N.E. and S.W., preserves a tolerably uniform breadth of about 10 or 12 miles. *Napha-Kiang*, on its S.W. side, is the principal seaport of the island, and perhaps the only one possessing the privileges of a port of entry.

There are three passages leading into Napha-Kiang Road, viz., the South, the Oar, and the North channels. When sailing into this anchorage great care should be used to avoid the numerous reefs and rocky patches which surround it.

Heber Reef, reported as a rock about 5 feet above water, surrounded by reefs, lying 6 or 8 miles W.S.W. from Cape Yakimu, the South end of Okinawa, has been inserted on the charts in lat. 26° 2' N., long. 127° 34¼' E. Its existence is doubtful, as its description agrees in every particular with Hall's Reef.

Hall's Reef is a large, circular, rocky patch, a part of which is above water; it lies 7 miles W. by N. ½ N. from the S.W. point of Okinawa sima.

Komisang is very irregular in shape, about 6 miles long, and the same in width; its northern peak is 1,108 feet in height, and that to the southward 1,028 feet; the western side of the island being fringed with reefs. *Eliza-*

* There is a sad story in connexion with this map. It is related in Commodore Perry's "Narrative," page 88. The story is thus told by a modern writer on Japan;—"Von Siebold had been with Colonel Struler, the Dezima chief, to Yedo; the Japanese astronomer, *Takahasi Lakusaimon*, had, in violation of the law, furnished him with a copy of a recently made map of Japan. The draughtsman who made the copy having become, from some cause, offended with the astronomer, denounced him to the authorities. An investigation followed, which lasted a year. Von Siebold was banished from Japan; and Takahasi and the draughtsman who accused him, both committed suicide." This occurred prior to the commencement of the American expedition in 1853.

beth Reef, very dangerous, extends 6 miles to the eastward of Komisang. *Tu sima*, in lat. $26^{\circ} 35\frac{1}{2}'$ N., long. $126^{\circ} 51'$ E., lies N. by E. $\frac{1}{2}$ E., $13\frac{1}{4}$ miles from the North peak of Komisang. It is a rocky islet about 60 feet high, one-quarter of a mile in extent, with a reef surrounding it.

Germantown Reef.—The U.S. ship *Germantown*, in 1859, struck on a coral reef said to lie in lat. $28^{\circ} 16'$ N., long. $129^{\circ} 58'$ E. From the shoalest spot found, 6 feet, the highest terrace on Kikai sima bore N.E. $\frac{1}{4}$ E. 6 or 7 miles. The reef is about a mile long in a N.N.E. and S.S.W. direction, and half a mile wide.

Another shoal spot was found lying North 2 miles from the centre of this reef, with apparently a clear passage between. Reefs were also seen from aloft, extending from one to two miles from the S.W. and S.E. points of Kikai sima.

In the American chart Germantown Reef is placed $2\frac{1}{4}$ miles S. by W. $\frac{3}{4}$ W. from the S.W. extreme of Kikai simai, or in lat. $28^{\circ} 14\frac{3}{4}'$ N., long. $129^{\circ} 53'$ E.; and there is another danger, named Marsh Reef, $1\frac{1}{2}$ mile southward of it.

Marsh Reef, placed on the charts in lat. $28^{\circ} 14'$ N., long. $129^{\circ} 55'$ E., was reported by Mr. Marsh in 1853 as lying 7 miles S.W. of Kikai sima, extending N.N.E. and S.S.W. about 3 miles, with 12 ft. on it at high water.

Sandon Rocks, about 33 ft. above the sea, and surrounded by sunken dangers, lie in lat. $28^{\circ} 45'$ N., long. $129^{\circ} 47\frac{1}{2}'$ E.

The **LINSCHOTEN ISLANDS**, or Cecille Archipelago (so called in the French charts after Admiral Cecille, by whose directions the islands were examined), extend from lat. $28^{\circ} 49'$ N. to $30^{\circ} 6'$ N., and from long. 129° to $130^{\circ} 3'$ E. They consist of 12 islands and rocks, some of which are inhabited, and there appears to be many safe channels between them. The mariner is, however, cautioned not to place too much dependence either on their configurations or positions as shown on the chart of this part of the ocean, for they are by no means correct; they are from the Japanese as collated by Siebold, and from detached surveys and corrections by English, French, and American navigators. The French corvette *La Sabine* examined them in the year 1846. As their character will be readily understood from the chart we give only a description of a few of the islands near which dangers exist.

Yoko Sima, rising to the height of 1,700 ft. above the sea, is an extinct volcano, the highest part of which is in lat. $28^{\circ} 48'$ N., long. $129^{\circ} 2'$ E. The bank on which the Pacific mail steamship *Oregonian* is supposed to have struck is E.N.E. $\frac{1}{2}$ E. distant 300 yards from the South point of Yoko-sima.

Kutsino Sima is 4 miles long N.N.W. and S.S.E.; its peak, which is 2,230 feet above the sea, is in lat. $29^{\circ} 59'$ N., long. $129^{\circ} 56'$ E. There is probably no safe passage between Kutsino and Naka, the next island to the southward. *Breakers* are reported 7 miles N.N.W. $\frac{1}{2}$ W. from N.W. point of Kutsino.

Firase, or Blake Reef, consists of several islets and rocks, extending about 3 miles in a N.E. and S.W. direction; the highest islet, 92 feet above the sea, is in lat. $30^{\circ} 4' N.$, long $130^{\circ} 3' E.$

Henty Reef, on which the sea was seen breaking heavily, has been reported as lying N.W. $\frac{5}{8} N.$ $3\frac{3}{4}$ miles from the North point of Kutsino sima, and about $10\frac{1}{2}$ miles to the westward of Firase.

COLNETT STRAIT, which separates the Linschoten group from the group to the northward, appears preferable to Van Diemen Strait for vessels bound from China to Japan; Yakuno sima, being lofty and steep-to, is an excellent mark; besides which better weather is generally experienced in this strait than in the latter.

Medusa Reef, reported as being indicated by discoloured water and high breakers, 2 miles in extent North and South, and lying 8 miles to the northward of Firase, is inserted on the chart in lat. $30^{\circ} 13' N.$, long. $130^{\circ} 4' E.$; it has not since been noticed, but if it exists it is a dangerous impediment to the navigation of Colnett Strait.

Tanega Sima, the most eastern of this group, is 32 miles long, and off the S.E. point of the island is a conspicuous detached rock, 80 feet in height, named S.E. Rock.

A reef of rocks showing above water, and a shoal about 2 miles S.S.E. from them, are reported as lying nearly 7 miles from the S.E. point of Tanega sima. This reef has been inserted on the charts 5 miles South of the S.E. Rock, in lat. $30^{\circ} 15' N.$, long. $131^{\circ} 2\frac{1}{2}' E.$, but its position is very uncertain.

Vincennes Strait between Yakuno sima and Tanega sima is 10 miles wide in the narrowest part.

Seriphos or Omuru Rock is marked on the French charts as a rock under water, in lat. $30^{\circ} 49' N.$, long. $130^{\circ} 45' E.$

Take Sima (Apollos Island), in lat. $30^{\circ} 48\frac{1}{2}' N.$, long. $130^{\circ} 26\frac{1}{2}' E.$, is about 2 miles in circumference and 816 feet high. A rocky spit extends $2\frac{1}{2}$ cables from its East extremity, and a dangerous shoal has been reported a short distance North of the island.

Iwoga Sima (Volcano Island on French chart), is an active volcano; its highest peak, 2,469 ft. above the sea, is in lat. $30^{\circ} 47' N.$, long. $130^{\circ} 19' E.$ A pinnacle rock, marking the centre of a reef, a mile in extent, lies a mile North of the centre of Iwoga Sima. Some rocks and reefs extend about three-quarters of a mile from the East and N.E. points of the island, and about half a mile off its S.E. side lie two rocks, estimated as 50 and 40 feet high respectively.

Cowose or Powhattan Reef, a dangerous reef in lat. $30^{\circ} 41' N.$, long. $130^{\circ} 19' E.$, was discovered by the U.S. frigate *Powhattan* in January, 1860. From the centre rock, about 18 ft. above the sea, the S.W. point of Iwoga sima bore N.W.; the East point N. $\frac{1}{2}$ W., and the East point of Take sima N.E. $\frac{1}{2}$ N.

Other rocks were seen awash, or a few feet above water, stretching out about three-quarters of a mile from the centre rock.

Use or *Trio Rocks* are three distinct islets of about an equal height; the centre islet, 206 ft. above the sea, is in lat. $30^{\circ} 45' N.$, long. $130^{\circ} 7' E.$

Kuro Sima (St. Clair Island on the French chart), is about 3 miles long (East and West). It is an active volcano, and its peak rises to the height of 2,160 feet above the sea, and its centre is in lat. $30^{\circ} 50' N.$, long. $129^{\circ} 56\frac{1}{2}' E.$

Kusaki Sima (*Ingersoll* or *Morrison Rocks*) are eight in number, and extend N.E. and S.W. about $5\frac{1}{2}$ miles; the highest, in the centre, 468 ft. above the sea, is in lat. $30^{\circ} 51' N.$, long. $129^{\circ} 26' E.$, and visible in clear weather at 25 miles.

VAN DIEMEN STRAIT lies between Kiusiu Island on the North, and Iwoga sima, Take sima, Make sima, and Tanega sima on the S.W. and South. It is clear of shallows, with the exception of a shoal spot of 8 fathoms, reported about $2\frac{1}{2}$ miles to the southward of Satano misaki, the South point of Kiusiu, and consequently safe. Making this strait from the westward, Mount Horner, on Kiusiu, 3,069 ft. high, and the peak of Iwoga sima, 2,469 feet high, form two conspicuous landmarks. The only drawback to the navigation of this channel is the heavy weather and thick atmosphere usually met with off Satano misaki; the Japan stream setting strong through this strait at all times causes the latter to become a serious disadvantage, which is, however, somewhat lessened by the light now exhibited on the above cape.

SOUTH AND EAST COASTS OF KUSIU AND SIKOK.

SATANO MISAKI or Cape Chichakoff, the southern point of Kiusiu and of the Japanese empire, is situated in lat. $30^{\circ} 58' 45'' N.$, long. $130^{\circ} 40' 15'' E.$ It is about 650 ft. in height, the mountains at the back, from which it is a spur, rising to a considerable elevation, at some points between 2,000 and 3,000 ft. A small island and several small detached rocks lie off it. This cape is well known to vessels trading to Japan, and has attained celebrity from the fact that almost constant bad weather is experienced in its vicinity, violent gales with a thick murky atmosphere rendering the passage through Van Diemen Strait at times somewhat perilous. At about $2\frac{1}{2}$ miles S.S.W. from the cape a shoal spot of 8 fathoms has been reported. Heavy tide races occur off the cape.

LIGHT.—Situated on a small island about 300 yards from the cape, exhibits, at an elevation of 200 ft. above the sea, a *fixed bright light* of the first order, obscured landward between N.N.W. $\frac{1}{3}$ W. to N.E. by E. $\frac{3}{4}$ E., and is visible in clear weather from a distance of 21 miles. The lighthouse is 35

feet in height, constructed of iron, octagonal shaped, and painted white, and is in lat $30^{\circ} 58' 30''$ N., long. $130^{\circ} 40'$ E.

The **COAST** for 140 miles to the north-eastward, comprising the whole of the East coast of Kiusiu, is very little known.

Osprey Breakers (1864).—The position assigned to these breakers is lat. $31^{\circ} 27'$ N., long. $131^{\circ} 40'$ E. Captain Edmond has frequently passed this locality, but has not seen the breakers; he therefore considers that the appearance of breakers was caused by a current overfall.

Nelly Rock, reported in 1863 by the British barque of that name, was afterwards unsuccessfully searched for by Commander Bullock, in H.M.S. *Serpent*, in 1866. It has, however, again been reported 2 miles westward of its first assigned position by Captain W. B. Andrews, of the Peninsular and Oriental Company's steam-ship *Avoca*, in 1873. The rock is locally known by the name of *Ogo*, and lies 3 miles E. by N. from Cape Cochrane, in lat. $31^{\circ} 48'$ N., long. $131^{\circ} 35'$ E. It is very steep-to, and breaks in bad weather.

Numa Sima or Hosō Sima Harbour, (lat. $32^{\circ} 23'$ N., long. $131^{\circ} 43'$ approx.) is a secure and well sheltered anchorage for a large number of vessels. The entrance is open to the N.E., and thence extends in a westerly direction about a mile to the head of the harbour. During typhoons the winds at East and S.E. are usually the strongest; Hosō Sima Harbour would thus afford shelter during the season when those storms occur. At the head of the bay a vessel in distress might safely be beached. The harbour is apparently clear of danger.

The **SOUTH COAST** of **SIKOK**, from Isa saki at the eastern entrance to the Boungo Channel to I. sima at the western entrance to the Kii Channel, is also as yet unsurveyed. This coast is about 150 miles in extent, and is divided by the projecting peninsula, of which Murato saki is the extreme point, into two bights, that to the westward being the deepest, broken in outline, with several deep indentations which may, when examined, prove useful harbours of refuge; four have been mentioned, two only of which are described as good harbour.

The coast of Sikok between Ootzu saki and Ko sima no hana forms a deep bight $3\frac{1}{2}$ miles wide between these points, and $2\frac{1}{2}$ miles in depth. From it two inlets extend farther to the northward and eastward, forming the harbours of *Susaki* and *Nomi*, the latter in lat. $33^{\circ} 23' 18''$ N., long. $133^{\circ} 17' 48''$ E., in the S.E. part of the bight. Vessels entering Nomi Harbour should keep the northern shore on board.

SOUTH-EAST COAST of **NIPON**.—From Siwo Misaki, the southern point of Nipon, the coast trends to the north-eastward for 75 miles as far as Cape Sima. The whole of this coast is bold and mountainous, the high coast ranges attaining an altitude of 2,000 ft. The hills are thickly wooded and very undulating, those immediately in the vicinity of the coast being steep

and conical shaped. Several good harbours of refuge are found, which have been described as follows :—

OO-SIMA HARBOUR is formed between Oö sima and the East side of Siwo misaki, the extreme South point of Nipon, which, with its lighthouse, is described hereafter, and which is connected to the mainland by a low isthmus. The harbour has two anchorages, one in the bay on the S.W. side of Oö sima, completely sheltered, but the water rather deep; the other in 4 to 6 fathoms, muddy bottom and good holding ground, off the village of Hasingui on the mainland in the northern part of the harbour.

This very eligible harbour is largely resorted to by windbound junks, and it offers every facility for repairs and replenishing supplies. There are three villages, two on the mainland and one on the island. Water is easily obtained from the latter village.

Oo Sima Island, which forms the eastern shores of the harbour, and is about $3\frac{1}{2}$ miles long (East and West), and $1\frac{3}{4}$ mile at its widest part, is irregular in shape and outline, hilly, and the greater part under cultivation, being only thickly wooded in the ravines. Its summit is 535 ft. high.

LIGHT.—On the East point of Oö sima is exhibited, at an elevation of 130 ft. above the sea, a *revolving bright light*, which shows half a minute, and is eclipsed for half a minute, visible in clear weather from a distance of 18 miles. The position of the lighthouse is lat. $33^{\circ} 28' N.$, long. $135^{\circ} 52' E.$

Double Rocks, above water, lie 2 cables to the north-eastward of the East point of Oö sima.

Kami Seh Rock was examined by H.M.S. *Sylvia*, in 1874. It has 16 feet water over it, and 17 to 19 fathoms close-to. From the rock, Oö sima lighthouse bears S.W. $\frac{1}{4}$ W., distant 19 cables. Itsimo Sima, just touching Omi saki Rock, bearing W. $\frac{1}{2}$ N., leads well South of Kami seh Rock.

Directions.—Approaching Oö sima Harbour from the westward, a heavy tide race is often met with off Siwo misaki, which is skirted by uneven masses of rock, most of it showing at low water, with rocks awash 3 or 4 cables off shore. *Bottle Rock*, lying South a quarter of a mile from the point, has some foul ground $1\frac{1}{2}$ cable outside it; a rocky spit extends about a quarter of a mile off Wedge Head, and there is broken ground at nearly the same distance off Isumo saki.

To clear these dangers, the right extreme of Oö sima, the most southern point seen, must not be brought eastward of E.N.E. until Mioga sima comes well open of Isumo saki N.N.W., when it may be steered for, taking care not to bring it northward of that bearing until within half a mile of it, or until the East extreme of Isumo saki bears S.S.W. $\frac{1}{4}$ W., when steer N.W. $\frac{1}{4}$ N., passing mid-channel between the land and the West side of Mioga sima, which has a small ledge running off its South side; after passing Mioga sima, steer for the anchorage of Hasingui.

If compelled to work in, the Oö sima shore is the clearest, but take care

to avoid a dangerous rock lying nearly 2 cables westward of the N.W. part of Tsuya sima, an island 120 ft. high off the S.W. point of Oö sima. The S.W. bay of Oö sima is clear of danger. In making the starboard board remember the bearing of Mioga sima for clearing the foul ground off the West side of the entrance; to the northward of Mioga the lead will give warning when approaching the mainland, but Oö sima is steep-to.

Approaching the northern entrance of the harbour from the eastward, give the mainland a berth until the Kuro sima Rocks are passed, as numerous rocks, only showing at low water, lie scattered along the coast, some nearly a mile off shore, and a shoal has been reported as lying N.E. $\frac{1}{2}$ N. $1\frac{3}{4}$ mile from the lighthouse on Oö sima. The Kuro sima are two large rocks, with a group of smaller ones off their West side. The South end of the chain of rocks off Hasingui may then be steered for, passing the outer rock at half a cable, and taking up the anchorage off the village.

Koza-gawa is a small but opulent town, situated on the East side of the entrance of a river, $2\frac{1}{4}$ miles N.N.E. of the North point of Oö sima. At high water, which is about 7^h full and change, 10 ft. may be looked for on the bar. It is the seat of an important whale fishery.

Ura-Kami Harbour is an inlet running $1\frac{1}{2}$ mile in a W.S.W. direction into the land at 8 miles N.E. of Oö sima Harbour, and, although small, affords excellent shelter in 4 to 5 fathoms, over stiff muddy bottom. For steamers it offers an admirable haven, but being only a quarter of a mile wide, sailing vessels might experience difficulty. In entering, take care to avoid a spit of rocks projecting upwards of half a mile in a N.E. direction from the South point of entrance, but show sufficiently to render them easily to be avoided. The best anchorage is in 4 to 5 fathoms off the East end of Ura kami village, which stands on the South shore about half a mile from the head of the harbour.

Kada Bay.—From Ura-kami the coast trending N.E. by E. is high and thickly wooded. At a distance of 40 miles is Kada Bay. Good anchorage with from 13 to 3 fathoms, gradually shoaling, may be found at the head of the southern arm, which is perfectly landlocked, and is reported to be clear of all dangers. The entrance to the bay is marked by a rock off the northern point, about a quarter of a mile off shore.

Owasi Bay is a deep inlet on the North side of Kuki saki, about 5 miles northward of Kada Bay. This bay is formed by Kuki saki on the South, and Domakura saki on the North, and is 5 miles wide at its entrance and $4\frac{1}{2}$ miles deep, composed of four inlets, two of which are only suitable as anchorages, the remaining two being much smaller, are only frequented by junks.

Otai-yama, lat. $34^{\circ} 11' N.$, long. $136^{\circ} 7' E.$, a mountain 5,620 ft. high, is a conspicuous object when approached from the eastward, and is apparently the highest land seen from that direction.

The coast for 23 miles trends to the E.N.E., is much indented, and thickly wooded; the mountains, however, are of much less elevation than those to the southward; several islets and rocks skirt the coast, and a near approach is not recommended. At the distance above mentioned from Owasi Bay is an extensive inlet named Goza.

Mura Harbour, $2\frac{1}{2}$ miles West of Goza Harbour, is an extensive inlet, which indents the coast in a N.N.E. direction, and is 4 miles deep. The bay is divided at the head into two large inlets. Anchorage may be obtained in either of these arms, that to the westward (Hazama mura) being preferable, abreast a small village, in 10 fathoms. Mura Harbour is an excellent and sheltered anchorage.

Goza Harbour, in lat. $34^{\circ} 17' N.$, long. $136^{\circ} 46' E.$, affords shelter from all but West winds. Its entrance, which is about 1 mile wide between the two points, has 12 fathoms water. The southern point is a high bluff, and is thickly wooded, and has one or two small rocks lying to the westward of it. From the northern point a ledge of rocks extends some distance. After rounding the South bluff point, keep in mid-channel to avoid some scattered rocks lying $2\frac{1}{2}$ cables off the North shore, and stand in 2 miles to abreast the first inlet on the port hand, and anchor as convenient.

CAPE SIMA is a low wooded headland, lying 9 miles to the eastward of Goza Harbour. East, $3\frac{1}{2}$ cables from the cape, is a conspicuous rock, 35 ft. in height; a rocky ledge extends 2 cables from the point. To the south-westward from the point are the two small islands *O sima* and *Kō sima*, from which long reefs extend in all directions. *Outer Reef*, on which the sea always breaks, uncovers 8 ft. at low water, and lies S.W. $\frac{1}{2}$ W. $7\frac{1}{2}$ miles from the rock off Cape Sima; S. by W. $\frac{1}{2}$ W. 2 miles from *O sima*, and S.S.E. $\frac{1}{2}$ E. $5\frac{1}{4}$ miles from the wooded entrance to Goza Harbour. Numerous tide rips occur outside this reef, but there is no danger. The islands off Cape Sima should not be approached within 3 miles, and it would be only prudent to give this dangerous cape a still wider berth.

Matoya Harbour lies 5 miles North of Cape Sima, and is open only to the East. Its entrance is $6\frac{1}{2}$ cables wide between Tomio saki on the South, and Sungi saki on the North, but a reef of rocks which are nearly all above water, situate just within the South point, contracts the navigable channel to $3\frac{1}{2}$ cables.

Light.—On Tomio Saki, the South point of entrance to Matoya Harbour, a wooden octagonal lighthouse, 44 ft. high, is built, and painted white. From this is shown a *light revolving* every half minute, elevated 102 feet above the sea, and visible 15 miles off. It is shown between S.W. $\frac{3}{4}$ S. and W. by N. $\frac{1}{2}$ N.

The whole harbour is split up into numerous inlets, narrow channels, and bays, and safe anchorage may be obtained in nearly all of them.

Watakano sima, an island nearly three-quarters of a mile long, lies in the middle of the S.W. arm of the bay which it divides into three narrow channels. The town of Matoya is approached by the northern of the above-mentioned channels, which is little over a cable wide.

Haka se, a rocky patch which uncovers at low water, lies $6\frac{1}{2}$ cables within the North point of the entrance; and another patch, connected with Haka se, lies 3 cables to the north-westward from it, the whole surrounding the eastern point at the entrance to the bay on the North shore of Matoya Harbour.

Oki-no se, a rocky patch of considerable extent, lies N.E. $\frac{3}{4}$ E. $3\frac{1}{2}$ cables from the outer rock, seen above water off Miya-no saki (at the North entrance to the channel leading to the town), to which it is joined by a reef.

Supplies are very limited.

On entering Matoya Harbour the reef just inside the entrance projecting from Tomio saki, will be avoided by passing from about $1\frac{1}{2}$ to 2 cables from the extreme rock seen above water, after passing which, to avoid Haka se, steer West for the opening leading to the town, seen South of the cliffs of Miya no saki, and anchor as convenient.

With winds from N.E., North, or N.W., good anchorage may be had in the small bay on the northern shore of the harbour off the village of Adako; but with wind from South or East vessels should either anchor off Matoya in from 5 to 6 fathoms, or between the East side of Watakano sima and the reef which extends off the second point from the entrance on the southern shore.

Toba Harbour.—About 8 miles northward of Matoya is the small harbour of Toba, the residence of a daimio. It is said to be available as an anchorage, but is not of any great extent. The harbour is situated at the western entrance to the bay of Owari.

Light.—On the N.E. point of Suga Sima, the South entrance point of Toba Harbour, is built a brick lighthouse, 28 ft. high, painted white. From it is shown a *fixed bright* light, elevated 176 ft. and visible 15 miles off.

A *thirteen-feet rock* lies in Toba Harbour, about 3 cables distant from the North end of Suga Sima; from it Kami Sima bears N. 61° E., the outer rock, near Suga Sima lighthouse, S. 77° E., and the North end of the small island in the inner part of the harbour, S. 68° W.

OWARI BAY.—This extensive inlet, the entrance to which is between Momotori (an island North of Toba) on the West and Irako saki on the East, is about 35 miles long (North and South) and divided into three separate arms, that to the westward being the largest. The western side shows a high mountain range broken opposite Yokaichi. The eastern coast is low; from Moro-saki to Noma Saki are hills of moderate elevation; North of Noma Saki the land appears level and wooded. Mr. Pendered, in the *Thabor*, 1875, proceeding in a nearly direct line from Kama Sima at the entrance

to Yokaichi on the West shore of the gulf, obtained soundings of 13 to 25 fathoms, at $2\frac{1}{2}$ or 3 miles from the East shore.

According to an examination recently made by the German vessel of war *Elizabeth*, Owari Bay has a general depth of 17 to 22 fathoms, decreasing to 7 or 8 fathoms on the East, West, and S.W. sides of the bay at distances of 2 to $3\frac{1}{2}$ miles from the shore. Large vessels, without local knowledge, should not shoal less than 8 fathoms. Near the mouths of various small rivers mud banks have formed, on which the water shoals to 3 fathoms; in few cases can these banks be discovered by the discolouration of the water.

A shoal of $2\frac{1}{2}$ fathoms, mud, lies about 2 miles from the eastern shore, with Onia Saki village bearing N.N.E., Noma Saki S. by E., Tokoname village E.N.E.

Vessels can anchor in any part of the bay, having due regard to the prevailing wind, for the bay is large enough to produce an inconvenient swell with a strong breeze.

Yokaichi, at the mouth of a small river on the western shore, at the head of Owari Bay, is in lat. $34^{\circ} 58' N.$, long. $139^{\circ} 36' E.$ (approx.). It is the port where all produce from the interior is shipped. Native steam vessels call regularly there, and the place is of rising importance. At the head of the bay, about 8 miles N.E. from Yohaichi, is *Kuwana*. The head of the bay is formed by the delta of the large river Kiso.

The N.E. head of the bay is known as *Miya Bay*, and at its N.E. point is the seaport of *Miwa*, which it is proposed to connect with *Nagoya*, one of the largest and most opulent cities of the empire, by a railway about 4 miles long. This railway is thence to be extended till it is joined with the system described with Hiago hereafter.

Entering this bay, Kami Sima should be left on the port hand; the southern passage, having many dangers on it, should not be attempted. Off Irako-Saki are some detached rocks, and when approaching from the eastward the cape should not be passed too closely. Inside of and to the northward of Irako-Saki, H.M.S. *Frolic* found a safe anchorage in from 7 to 8 fathoms, mud, with perfectly smooth water, though a considerable swell was running outside.

The coast from Irako saki takes an easterly direction for 60 miles as far as Omae saki, *Hamana Inlet* lying midway between. It is fronted by a sandy beach with low sandhills and occasional patches of trees, the whole being steep-to, with no known off-lying dangers.

OMAE SAKI and LIGHTHOUSE, the West point of entrance to Suruga Gulf, is a dark wooded bluff 150 ft. in height. The lighthouse, 57 ft. high, is erected on the sandhill at the South part of the cape. It is painted white. From it is shown a *revolving bright light*, attaining its greatest brilliancy every

half minute, elevated 172 ft., and visible 19 miles off. The light is shown eastward and southward between W. by N. $\frac{1}{2}$ N. and N.E.

Lady Inglis Rocks, half a mile in extent, and covered at high water, lie 2 miles E. $\frac{2}{3}$ S. from the lighthouse.

Portsmouth Breakers, S. $\frac{1}{2}$ E. 25 miles from Omae Saki, were reported by the U.S. frigate of that name. They have since been looked for without success, but a good look-out should be kept while in their locality. Irregularities have been found in the depth hereabout, and the water appeared discoloured. In a S.W. gale good shelter may be obtained under the lee of Omae saki in 7 to 4 fathoms, but no closer in.

Gulf of Suruga (named Tutomi Gulf in former charts) is 34 miles deep and 23 miles wide at entrance.

The western side of the gulf is not so well known as the eastern. It appears less precipitous, but, judging from the soundings obtained off Simidzu, is equally steep-to. At the head of the gulf is *Fusi Yama*, the highest mountain of Japan (p. 1181). *Simidzu* and *Eno ura* are two excellent harbours, one on each side at the head of the gulf.

The four bays *Ena Uru*, *Heda*, *Arari*, and *Tago*, on the eastern side of the Gulf of Suruga will serve as a refuge from S.W. winds, which cause a great swell. Their coasts are wooded and mountainous, attaining the height of 1,000 ft. The entrances may be approached fearlessly, for the high coast conceals them, and the bays only open when within a mile. The whole of the western coast of the Idsu Peninsula is shelving, and may be safely approached to 2 miles. Islands lie off it, but not beyond the distance of a mile. The current is stronger along the shores than in the middle of the gulf.

IRO-O SAKI (Cape Idsu), a fine, bold, rocky headland which cannot be mistaken, is the southern extremity of the mountainous peninsula of Idsu. It will be recognized by a conspicuous white cliff, $3\frac{1}{2}$ miles to the N.W. of it. To the E.N.E. the coast for 3 miles is very broken, and fronted with numerous sunken rocks.

LIGHT.—On the point, elevated 185 feet above the sea, is exhibited a *fixed red light* of the sixth order, visible in clear weather from a distance of 8 miles. The tower is 20 feet high, octagonal shaped, built of wood, and painted white.

Rock Island and Lighthouse.—Mikomoto or Rock Island, about 104 ft. high and a third of a mile of length, with precipitous shores and an uneven outline, bears E. by S. $\frac{3}{4}$ S. about 5 miles from Iro-o Saki lighthouse.

On Mikomoto, at an elevation of 164 ft. above the sea, is exhibited a *fixed bright light* of the first order, visible in clear weather at a distance of 21 miles. A *red ray* is shown between N.W. and N. $\frac{2}{3}$ E., over all the dangers between Mikomoto and the shore; the eastern edge of the ray leading into Simoda

harbour. The tower is 75 ft. high, built of white stone, and is in lat. $34^{\circ} 34' 20''$ N., long. $138^{\circ} 57' 10''$ E.

Between Rock Island and the main land are the Ucona and four other rocks, among which the junks freely pass; but a vessel should not attempt to run inside Rock Island at night unless her distance from it can be accurately estimated, for some of the rocks about Ucona are small ledges and only 2 miles distant from Mikomoto.

Tides.—Regular tides have been observed, the flood setting W.S.W., $1\frac{1}{2}$ mile an hour, the ebb E.N.E., from 2 to 3 miles per hour; thus with the ebb tide the north-easterly current is considerably augmented in force, whilst the flood tide overruns the current close to the shore. To the N.W. and North of Mikomoto there are overfalls caused by the tides passing over a very uneven bottom. The Japanese fishermen deny the existence of any danger there.

The channel between Mikomoto and Ucona Rocks carries irregular soundings of 14 to 30 fathoms, with the exception of a patch of 9 fathoms 3 cables North of the island. An additional reason for not using this channel at night is, that by crossing on a more southerly course towards Cape Sagami, the influence of the indraught on the eastern side of Odawara Bay is not so likely to be felt.

Ucona Rocks, two in number, though they generally appear as one, bear N. by W., distant 2 miles from Mikomoto; the largest is about 25 ft. high. Four other rocks occupy a triangular space of a mile from W.S.W. to N.N.W. of the Ucona. The northern and southern of these are small ledges nearly awash. A reef also extends $3\frac{1}{2}$ cables towards them from Tohadgi Point to the N.W. of the Ucona. There is deep water between all these rocks.

SIMODA HARBOUR, is on the eastern side of the peninsula of Idsu, 6 miles N.E. of the cape. *Vandalia Bluff*, the East point of entrance to the harbour, will be known by a grove of pine trees on the summit of the bluff, and the village of Susaki, which is about a third of the way between it and Sumegi Saki. The town of Simoda stands on the West shore of the harbour, and Kaki-saki village on the East. There is good landing for boats in Simoda creek, and also at the village.

Wood, water, fish, fowls, and eggs, also sweet potatoes and other vegetables, may be procured.

Centre Island, lying nearly in the middle of Simoda Harbour, bears N. $\frac{3}{4}$ E., $5\frac{1}{2}$ miles from Rock Island, and N. by E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the Ucona Rocks. It is high, conical, covered with trees, and a cave passes entirely through it. *Buisaco Islet*, a quarter of a mile N.N.E. from Centre Island, is about 40 ft. high, and covered with trees and shrubs.

There are but two hidden dangers in Simoda Harbour; the first is *Southampton Rock*, which is in mid-channel, S. by E. $\frac{3}{4}$ E., 2 cables from South

point of Centre Island. It has 2 fathoms water on it, and was formerly marked by a *white* spar buoy. The other is the *Supply Rock*, lying S. by W. a short distance from Buisaco or Misana Islet; it is a sharp rock, with 11 ft. water on it, and is marked by a *red* spar buoy.

Anchorage.—In the outer road, or mouth of the harbour, a disagreeable swell is experienced; but inside Southampton Rock and Centre Island vessels are well sheltered. Moor with open hawse to the S. W. It is an unsafe and exposed bay, being open to South and S.S.W., the direction from which the heaviest winds blow.

If intending to anchor at Simoda, pass Mikomoto at a mile, when the harbour will be in full view to the northward. Standing in from this island, a vessel will probably pass through a number of tide rips, but no soundings will be obtained with the hand lead until near the entrance, when the depth will be 14 to 27 fathoms. Should the wind be from the northward and fresh, she should anchor at the mouth of the harbour until it lulls or shifts, or until she can conveniently warp in, as the wind is usually flawy and always baffling.

The Coast from Iro-o saki rounds in a N.E. direction 26 miles to *Futo saki*, its general features being high, rocky, and even, having near Simoda a few sandy beaches. Between Simoda and Futo saki the coast is bold of approach. Over it, the *Amagi Yama* rises to 4,700 ft., and on the N.E. ridge is a conspicuous dome-shaped hill.

From Futo saki the coast trends more to the northward, forming the western coast of Awatsu Bay.

Macedonian Reef lies off the East side of Awatsu Bay, at 4 miles N.N.W. of the lighthouse on the West end of Joka Sima. It dries in many places at low tide. To avoid its western side, do not bring the lighthouse to the southward of S,S.E. $\frac{1}{2}$ E. until the South end of the first range of hills, 700 feet high, North of Cape Sagami, bears E. $\frac{1}{2}$ N.

Vessels embarrassed in the vicinity of the Macedonian reef may find an anchorage about $1\frac{1}{2}$ mile N.E. of it in *Asina Bay*, in 4 to 8 fathoms, good holding ground.

Rocky ground extends from the reef to the South extreme of the bay. There are also some rocks off the North side of the bay, but they show, and are easily avoided by keeping mid-channel.

There are two or three excellent havens for small craft and junks on the West shore of Sagami Peninsula, to the southward of Macedonian Reef.

JOKA SIMA and Lighthouse.—Joka Sima lies off the S.W. point of Cape Sagami, with a channel about 2 cables wide, and encumbered with rocks, between it and the shore. Off its southern shore is a rocky patch of 2 fathoms, 2 cables from the island. The light is a *fixed green light* shown on the western end of the island at an elevation of 106 ft., visible 9 miles off. It is obscured to the eastward between E. by N. and S.E. $\frac{1}{2}$ E. by the land.

In navigating the south-eastern coast of Japan, after passing Satano misaki, in Van Diemen Strait, if the weather be thick, the vessel's position should be well ascertained before she is hauled to the E.N.E., as her course is parallel to the high land for about 20 miles from the pitch of the cape. It should also be borne in mind that the current on this coast (*Kuro siwo*) runs to the E.N.E. at the rate of from 40 to 100 miles a day.

Vessels therefore bound to the eastward must allow for this current, and should keep not more than 30 miles off shore, taking every opportunity of verifying their reckoning, if working up inshore the north-easterly set will be lost, and the ship will be influenced by the tides. Many vessels have under these circumstances reported the current as setting in various directions in the vicinity of the Kii and Boungo Channels, indraughts, and vice versâ, resulting from the ebb or flood tide being experienced at the time. In the summer season the north-easterly current is not to be expected in the vicinity of Iro-o saki (Cape Idsu).

Vessels from the Gulf of Yedo bound for the Kii Channel, after passing Mikomoto (Rock Island), should take an inshore passage, steering for Omae saki, and thence for O sima, thus avoiding the strength of the Japan stream. Following this course, a vessel may carry a favourable current (on the flood), and it has been often observed that there is a back set to the S.W. in the bights between Rock Island and O sima. In following this route, take care to avoid the rocks off Cape Sima.

In approaching the Gulf of Yedo, the remarkable high mountain *Fusi Yama*, a lofty and symmetrical truncated cone of 12,450 ft. elevation, and so different in form from any other land in its vicinity, cannot fail to be of great service in directing vessels either to Simoda or Yedo. In clear weather it is the first distant land seen, and generally to the north-eastward, visible at times upwards of 100 miles. Iro-o saki (Cape Idsu) is in line with it when bearing North. When bound from the southward and westward endeavour to make Iro-o saki, and if the weather is at all clear, the chain of islands off the Gulf of Yedo will at the same time be plainly visible. Omae saki, the West point of entrance to Suruga Gulf, cannot be mistaken for Iro-o saki, the former being low, with a sandy beach and low sand hills, with occasional patches of trees, and the coast is said to preserve this character for 30 or 40 miles to the westward; whereas the cape is high and rocky, has a lighthouse at its foot, its summit being generally hidden in the clouds. Mikomoto (Rock Island) being low, unless the weather is clear, or at night when the light is visible, will not be seen until long after this cape and Vries Island are made.

Between the Kii Channel and Mikomoto, westerly winds are most frequently met with, falling light when the latter place is passed; and often on rounding Cape Sagami a strong N.E. wind is encountered.

THE BAY OF YEDO.

The entrance to the Bay of Yedo, named the Uraga Channel, lies between Cape Sagami on the West, and Cape King, in the province of Awa, on the East, is 15 miles wide between these points, and 35 miles deep. Situated on the N.W. shore at its head is the city of Yedo, now known as Tokei (eastern capital) the commercial as well as political capital of the empire, and on the western shore is the principal seaport and treaty port of Japan, viz. Yokohama. In the year 1876, there were 2,554 foreign residents at the treaty port (p. 1187) of Kanagawa (including those at Yedo). Of these 635 were British, 240 Americans, 161 French, 160 German, and 1,033 Chinese. There were 176 firms, of which 54 were British.

Pilots.—Every master of a vessel entering the port who may engage a pilot is to see that he holds a certificate qualifying him for the pursuit of his vocation as pilot. The following are the signals for a pilot in the day time:—

1. The jack or other national colour of the ship hoisted at the fore. 2. The International Code pilot signal P.T.

At night, the following signals, when used together or separately, are deemed to be signals for a pilot:—

1. A blue light every fifteen minutes, or 2. A bright white light flashed or shown at short intervals just above the bulwarks for about a minute at a time.

URAGA CHANNEL, leading into the Gulf of Yedo, appears remarkably clear of hidden danger. On its West side are the *Ashika sima* or *Plymouth Rocks*, which are always uncovered and easily seen; there are some sunken rocks close around them. In their vicinity, off Senda saki and Uraga, are several rocky patches extending some distance from the shore. The mariner should bear this in mind, and as Kaneda Bay has also some foul ground in it at nearly a mile from the shore, it would be prudent to give this locality a good berth in passing.

Sagami Misaki, the western cape at the entrance to the Uraga Channel is comparatively low, the hills forming in a table flat about 150 ft. in height, and rising, about one mile from the shore, to a saddle peak, having on it two conspicuous clumps of trees elevated 354 ft. above the sea. The shore is clear at less than half a mile, except off the eastern part of the cape, where there is a patch of $4\frac{3}{4}$ fathoms at that distance lying S.E., 7 cables from the North extreme of the cape.

TSURUGA SAKI AND LIGHT.—On the south-eastern point of Cape Sagami, at an elevation of 110 ft. above the sea, is exhibited a *flashing light* of the second order, showing a flash every ten seconds, visible in clear weather from a distance of 16 miles. This light is shown *bright* to the

southward and eastward between W. by S. and N.E. $\frac{1}{4}$ E. To the northward over, and to nearly a mile outside the Plymouth Rocks, a red sector is shown between N.E. $\frac{1}{4}$ E. and N.N.E. $\frac{3}{4}$ E. The tower, 36 ft. in height, is in lat. $35^{\circ} 8' N.$, long. $139^{\circ} 41' E.$

Kaneda Bay, contained between Sagami misaki and Senda saki, affords excellent anchorage with winds from South, round by West and North to N.E., in from 10 to 3 fathoms, as convenient; sandy bottom, good holding ground. *Oki-no sima*, 3 feet above high water, is a black rock in the S.W. portion of the bay, steep-to on the North side, but having foul ground between it and the shore on the South and West sides. *Mits iso* form a cluster of rocks in the centre of the bay that cover at high water. *A shoal* having 6 ft. on it at low water lies W. by S. $\frac{1}{4}$ S. 7 cables from the southern and highest of these rocks; *another shoal*, of 9 ft., lies W. by S. $\frac{3}{4}$ S. nearly one mile from the same rock.

Ashika Sima, or *Plymouth Rocks*, are two dark rocks 5 ft. above high water, lying N.E. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles from Sagami misaki, and S. by W. $\frac{1}{4}$ W. $3\frac{3}{4}$ miles from the lighthouse on Kanon saki. *Kata sima*, a rock awash, lies S.E. by E. $\frac{3}{4}$ E. nearly one mile from the eastern of the two rocks, and is marked by a *red beacon*, surmounted by a ball about 20 ft. above high water.

Senda Saki shows in steep white cliffs the termination of the range from Take yama. It has a dismantled fort at the summit of the cliffs, and is surrounded by detached rocks. The eastern portion of these runs out in a spit, the outer edge, of 21 ft., lying E. by S. $\frac{1}{4}$ S. 6 cables from the point, and leaving only a passage of 3 cables between it and Ashika sima. The outer detached rock awash, steep-to on the South side, lies S.S.W. $9\frac{1}{4}$ cables from Senda saki. On entering Kaneda Bay from the northward, Ashika sima should not be brought to the eastward of N.E. $\frac{1}{2}$ N. until Take yama bears N.W. by W.

Kurihama, the bay North of Senda saki, has a sandy beach at its head, the end of a long plain that is drained by a river running into a lagoon that enters the sea at the North end of the beach. This bay should not be used as an anchorage, the ground being foul in all directions.

Kadzusa Saki, the North point of this bay, is terminated by a conical mound, *Shendora*, 69 ft. above high water, from which a ledge of rocks extends S.E. $\frac{1}{2}$ S. $4\frac{1}{4}$ cables to the outer depth of 5 fathoms. From this to Tomio saki the ground is foul nearly 4 cables from the shore.

Uraga, a thriving village, and clearance port of the junk trade to Yedo, is a capital harbour for vessels drawing less than 9 feet, but should not be entered without a chart.

Tomio saki, the South point of entrance to Uraga is a low point with a Japanese lighthouse and a memorial stone near its extreme. These have been erroneously called beacons; when in line they clear Ka yama. *A shoal* of 12 ft. lies E. $\frac{1}{4}$ S. 3 cables from the light, and there is less than 3

fathoms, three-quarters of a cable S.E. from it. *Miojin saki*, the North point of entrance to Uraga, is a bold bluff surmounted by a battery. From it to Kanon saki the land is undulating, with villages in sandy bays. The whole of this coast is foul for half a mile from the shore, having depths of $1\frac{3}{4}$ to $4\frac{3}{4}$ fathoms on the outer margin. *Ka Yama* or *Elmstone Rock* has only 12 ft. on it at low water, with 4 fathoms, 2 cables to the eastward and southward. It lies S. by W. $\frac{3}{4}$ W., nearly 1 mile from Kanon saki lighthouse. Ashika sima kept S.S.W. $\frac{1}{2}$ W. until Kanon saki light bears N.N.W. will clear all the foul ground.

Kanon Saki and Lighthouse.—Kanon saki is a steep and partially wooded point, within which, 1 cable from the shore, is a conical hill, 272 ft. above high water. On the slope of this hill, at an elevation of 170 ft. above high water, is exhibited a *fixed bright light*, visible 14 miles off. The tower is square, built of stone, and rises from the centre of the keeper's dwelling.

The point immediately East of the lighthouse is steep-to, but the S.E. extreme of Kanon saki has a reef off it, terminated by a rock awash, steep-to, $1\frac{1}{4}$ cable from the shore. From this to Rubicon Point the coast is slightly indented, having sandy bays between the points. From Rubicon Point rocks extend 1 cable, with deep water close to the outer.

O Tsu-no ura is a deep bay with a sandy beach, having numerous villages from the largest of which it takes its name. This bay has shallow water in the eastern portion, the outer shoal of 12 ft. lying N.W. by W. $\frac{1}{2}$ W. $8\frac{3}{4}$ cables from Rubicon Point. In the centre of the bay is a shoal $4\frac{1}{4}$ cables long by 3 cables broad, having 9 ft. on the North and 13 ft. on the South edge, with uneven depths of $2\frac{1}{4}$ to $4\frac{1}{4}$ fathoms between. The North edgelies S. $\frac{3}{4}$ E. 5 cables from the South end of Saru sima, and N.W. by W. $\frac{3}{4}$ W. nearly 2 miles from Rubicon Point.

Saru Sima, 198 ft. high, is clifty, with a wooded flat summit. The S.E. point has a conspicuous single tree; and from the South extreme a sandy spit extends half a cable. This island has shoal water all round, except off the North end.

From the South point, E by S. $\frac{3}{4}$ S. $3\frac{3}{4}$ cables, lies *Kitsne no se*, a rock that covers at high water; and West, 3 cables from the same, lie three rocks awash at high water. Between these and Kitsne no se there is shallow water. No vessel should go between Hana rete and Saru sima.

Hana-rete, 94 ft. high, is a grass-covered conical mound, sloping down to dark rugged rocks. Between it and the western end of O-tsu-no ura the coast is a series of white cliffs, with shingly beaches intervening. Immediately South of Hana-rete is a deep bay, off the South point of which there is a conical islet 78 ft. high, from which, S.S.E. $\frac{1}{2}$ E. $3\frac{1}{2}$ cables, lies a rock that dries at low water, with foul ground between it and the shore.

Beacon.—A rock, awash at low water, having on it an iron beacon surmounted by a cage, and painted *red*, lies N.E. by E. $3\frac{1}{2}$ cables from Hana-

rete; East, 1 mile nearly from Ha sima, at the entrance to Yokoska; and N.W. 4 miles from Kanon saki extreme. It may be approached to a quarter of a mile on the North side, but vessels should not attempt to pass inside it.

YOKOSKA HARBOUR, 11 cables in depth, and with a general breadth of $3\frac{1}{2}$ cables, is the eastern of two inlets, and may be easily recognized by Ha sima, the islet that lies off its N.E. point, and by a remarkable clump of trees, 355 feet above the sea, known as *Azuma*, on the highest hill of the promontory that separates it from Ura-no-go ura, the western bay. It has a series of cliffs and indentations, the points generally being marked by white stone beacons. At the head of the harbour is a dock, with large smith and boiler factories, and all the necessary works for thoroughly repairing and building ships, with houses for the officials, built on a plain that joins O-tsu-no ura. On one of these factories is a clock tower, that may be seen from that bay. The inner harbour is formed by two breakwaters, and is of considerable width at the entrance.

The Dock is 395 ft. in length, 82 ft. broad, and 26 ft. deep. It has no lock, and vessels can pass from the anchorage through the inner harbour direct to the dock. There are three other slips for building purposes.

Off the eastern points of Yokoska there are spits, having 10 to 12 ft. on their outer edges; those off Susu-ga saki extending N.N.E. $2\frac{1}{2}$ cables, and N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ cable. The outer end of the latter is marked by a small *red cask buoy*. Vessels should not bring Ha sima to the northward of N.E. by N.

Anchorage may be had in 6 to 8 fathoms in any part of the bay, but large ships should not go inside the red buoy, as there the anchorage space has only 2 cables breadth.

Across the promontory that separates Yokoska from Ura-no-go ura, a canal has been cut, through which boats may go, when the tide has risen 1 foot above low water. Hako saki, the N.W. extreme of this promontory, has rocks that show at low water, and shoals off it for $1\frac{1}{2}$ cable. For the better protection of Yokoska Harbour, a breakwater is being constructed, which will be about 600 ft. in length when completed.

Ura-no-goura, 8 cables long, with a general breadth of 4 cables, has excellent anchorage in 7 to $4\frac{1}{2}$ fathoms, mud, as convenient; the water shoaling gradually as the bay is entered. There is no danger in mid-channel. *Yeno-kido* is a deep inlet on the western shore of this bay, with too narrow an entrance for ships, but a fine harbour for junks, running inland 4 cables, and having a general width of 1 cable. From its North point, E. by N. $\frac{3}{4}$ N. $1\frac{1}{2}$ cable, lies *Yabama*, a reef that just shows at high water, steep-to on the outer edge. *Matsu Sima* is a partially wooded island, 300 ft. high, that stands between Ura-no-go ura and the entrance no Kanasawa Inlet. It has a spit of shoal water, with 4 fathoms on its outer edge, extending East 3 cables,

and shoaling gradually towards the shore. *Yeboshi yama* is a conical rocky islet, joined to the shore near Yenokido at low water, and separated by a channel of 1 cable from the S.W. point of Matsu sima.

On passing Matsu sima a creek is seen, which, on entering, winds round in a northerly direction, and at about half a mile from the entrance the channel contracts, passing which it opens into a large shallow lagoon. A narrow channel, marked by stakes and bushes, leads up to the village of *Kanasawa*, situated in the N.W. corner. From this village there is a good road (which lies through a remarkable narrow pass) to the town of Kamakura, celebrated in the history of Japan as being a former opulent town, and also at this time for its ancient temples. Continuing this road for some distance about 2 or 3 miles from Kamakura is the celebrated bronze statue of Daibutsu sama, situated in a beautiful grove at the foot of a valley.

From Matsui sima the coast takes a northerly direction for 3 miles to *Graham Bluff*, is shallow for some distance, and at 2 miles off-shore is skirted by banks of from $4\frac{1}{2}$ to 5 fathoms, with deep water between them and the coast.

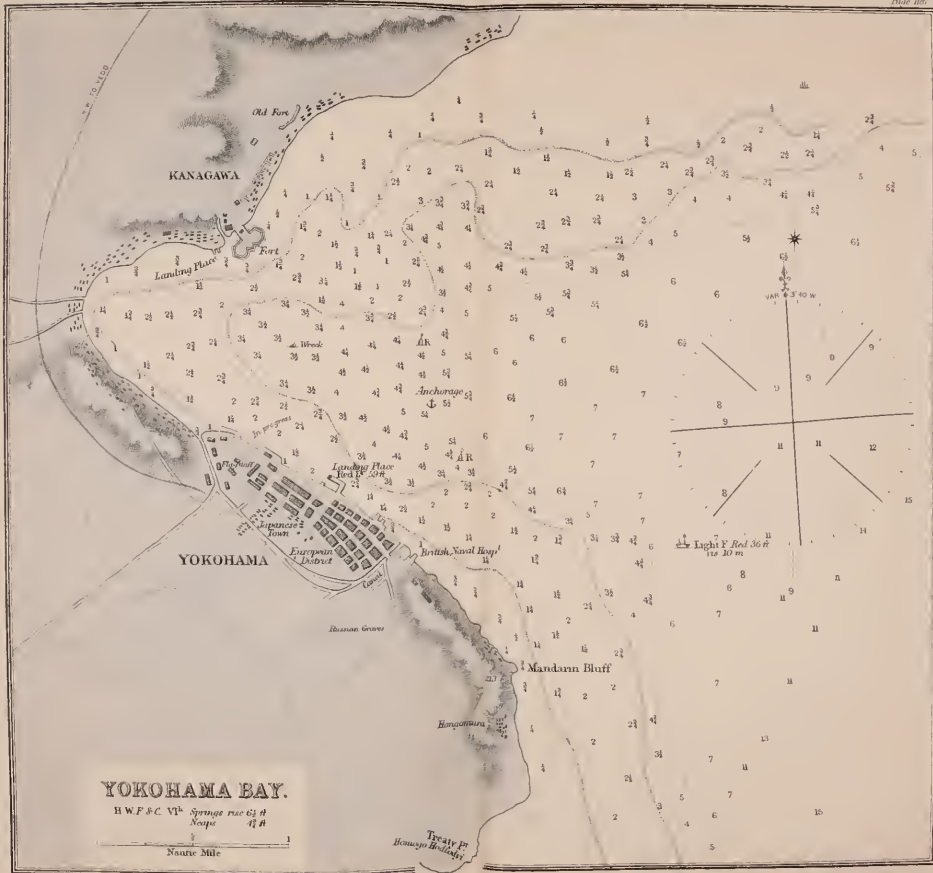
Mississippi Bay (Nigisi), formed between Graham Bluff to the southward and Treaty Point on the North (between which it is 3 miles in width), is well sheltered from the prevailing winds. In anchoring, give the shore a wide berth to avoid a shoal which extends half to three-quarters of a mile from it. Between Matsu sima and Treaty Point the soundings are irregular, shoaling suddenly from 12 to 5 fathoms on banks of hard sand.

Treaty Point, the termination of a ridge of low hills extending into the Gulf of Yedo, about $10\frac{1}{2}$ miles N.N.W. of Kanon saki, forms the southern point of the Bay of Yokohama. The point is formed of a long line of cliffs of a conspicuous yellow colour, the northern bluff of which is called Mandarin Bluff. These bluffs, and a bank which fronts them to the distance of $1\frac{1}{4}$ mile in some places, and which is rather steep-to, protects the anchorage from south-westerly winds, the only ones which blow with sufficient force to send a heavy sea into the bay.

A LIGHTVESSEL, with two masts, carrying a ball at her foremost head, is placed at the extremity of the shoal off Treaty Point and Mandarin Bluff, and lies in 7 fathoms, with the following bearings:—Treaty Point, S.W. $\frac{3}{4}$ S.; Mandarin Bluff, S.W. by W.; and the mouth of the Canal (just northward of the English sick quarters), W. $\frac{1}{4}$ N. The vessel exhibits a *fixed red light*, elevated 36 ft. above the sea, and visible in clear weather from a distance of 10 miles.

A *buoy*, with a cage painted *red*, is moored in 4 fathoms on the northern extreme of the shoal off Mandarin Bluff, southward of the anchorage off Yokohama, with the following bearings:—Mandarin Bluff, S. by E. $\frac{1}{4}$ E.; Mouth of the Canal, S.W. by S. $\frac{1}{2}$ S.; and the centre of the English hatoba (landing place), W. by S.





YOKOHAMA BAY.

H.W.F.S.C. Vth Springs rec'd 6/3/77
Naupic 4/7/77

1
Nautical Mile

Treaty of Commerce and Consular Rights between Great Britain and Japan

YOKOHAMA on a plain surrounded by low hills, is environed by a canal which entirely isolates it. It is connected with Yedo by a railway, which forms part of the system described with Hiogo hereafter. The residences of the foreign community occupy the East, and those of the Japanese merchants the N. W. of the town, and the bluff on the South side, on which is situated the camp and British Legation, is being rapidly built over. The English sick quarters are on the northern face of the bluff at the southern end of the town; boats can land there at high water in the canal above mentioned. The position of the square in the sick quarters is lat. $35^{\circ} 26' 30''$ N., long. $139^{\circ} 39' 24''$ E. Yokohama exports tea, raw and manufactured silk, lacquered goods, vegetable wax, oil, antlers, cotton, and rice in small quantities. For the Chinese market, paper, camphor, flour, peas, beans, seaweed, isinglass, beche-de-mer, and dried shell-fish.

At the head of the bay, and on its North side, stands the town of *Kanagawa*,* one of the ports opened to foreigners, but this being an inconvenient situation for a settlement it was changed to Yokohama on the South side, it being a more eligible position for business communication. The water also is deeper for anchorage, and more convenient for the landing of boats and merchandise than at Kanagawa, where it is so shallow that at low tide the sea retreats to a considerable distance from the shore.

Kanagawa is subject to frequent shocks of earthquakes. It is situated on the Tokaido or imperial highway to Yedo. All persons (excepting officers in uniform) passing between Yokohama and Yedo must produce a passport.

A *red buoy*, with staff and cage, is moored in 4 fathoms at low water springs on the point of the spit extending from Kanagawa Fort to the northern side of Yokohama anchorage, and lies S.E. by E. easterly, 1 mile from Kanagawa Fort.

A good *anchorage* for large ships is with Kanon saki just open of Mandaria Bluff, the latter bearing S. by E., and the British Consulate S.W. by W. $\frac{1}{2}$ W., mud bottom. Vessels of lighter draught may, if desirable, take up a position much nearer the town.

All *supplies*, provisions, water, coal, &c., are to be procured in abundance, and ordinary repairs both to ships and engines can be easily executed.

* The limits of the Treaty Port Kanagawa to the North lies along the course of the Logo River, which, after pursuing an easterly direction, enters the sea midway between Yedo and Yokohama. At 25 miles above the mouth of this river the treaty boundary leaves the river and pursues a southerly direction to the coast, which it joins just eastward of Odiwara, in long. $139^{\circ} 10'$ E. The extent of territory open to foreigners is thus, roughly speaking, 25 miles square. There is a strip of land on the western side of Uruga Channel not open to foreigners; its boundary line runs from Susquehanna Bay on the East to Asina Bay on the West.

Tides.—It is high water, full and change, in Yokohama Bay, at 6^h, and springs rise 6½ ft., neaps 4¾ ft. ; with southerly winds the tide rises about 2 feet higher.

The streams in this bay are scarcely felt, but they run strong in the middle of Yedo Bay, and their velocity is much increased off Saratoga Spit, Sarusima, and Kanon saki, particularly off the latter, round which they sweep with great rapidity.

KAWA SAKI, bearing N.E. ½ N. from the lightvessel off Treaty Point, is low and wooded, with shoal water extending 1½ mile from the shore, its edge being marked by Haneda pile lighthouse and two buoys. The southernmost, a *red buoy*, with cage, is moored in 6 fathoms, with Treaty Point S.W. ½ W., Kawa saki N. ½ W., and Bansu hana E.S.E. southerly. The northernmost, a *black buoy*, with cage, is moored in 6 fathoms, with Kawa saki bearing West, Noko gawa entrance N. ¾ E., Bansu hana S.E. ½ E., and the southern buoy S.W. ¾ S.

Haneda Point Lighthouse.—At the extremity of the spit which extends to the eastward of Kawa saki a pile lighthouse was completed in 1875. The lighthouse is 60 ft. high, of iron, painted white, and stands in 7 ft. water, 500 yards in-shore of the black buoy. From it is shown a *fixed green light*, elevated 40 ft. above high water, and visible to South, East, and North, between S.W. by W. ⅔ W. and N.N.W. ⅓ W., 8 miles off.

YEDO, which has lately been named *Takei*, is situated at the N.W. angle of Yedo Bay, along the shore of which it extends, with its suburbs, for 8 miles. Its aspect is not imposing, as large stacks of timber and elevated ground conceal by far the larger part of the city. The suburb of Sinagawa stands on the South of the city, where are seen the low wooded heights of Goten yama, extending 2 miles along the shore. The landing place is on the North side of these and West of the five forts, close to which is the temple occupied by the British legation.

The small River Sdogawa, which flows through the very centre of Yedo, disembogues at the northernmost part of the bay on which the city stands, thence splitting into two streams, up which boats and small junks can pass.

Light.—On the third fort (commencing with the extreme eastern fort) before the city, at the East entrance to the Tsikiji channel leading to the foreign concession at Tsikiji and the city, elevated 53 ft. above high water, is exhibited a *fixed red light* of the fourth order, visible in clear weather from a distance of 9 miles.

Anchorage.—This bay is so shoal all along the shore where the city stands that at low water even a ship's boat cannot approach within a mile. The best anchorage for a large ship is in 5 to 6 fathoms, soft mud, good holding ground, with the south-western of the five forts bearing N.W. ; but recollect that on this bearing the water shoals rather suddenly from 4 to 2½ fathoms. It is better, therefore, to anchor a smaller vessel on a N.W. by N. bearing

of the fort. H.M.S. *Furious*, in 1858, anchored in 15 ft. at low water, with the five forts bearing from N. $\frac{1}{2}$ W. to N.W., Beacon house S. $\frac{1}{2}$ W., and the peak of Fusi yama W. by S.

The Coast from Tonegawa Point round the head of the Gulf of Yedo is low, with shoal water extending a considerable distance from the shore, forming a deep bay with from 6 to 8 fathoms water between the above point and *Bansu hana*, which lies on the eastern shore of the gulf about S.E. by E. 8 miles from Kawa saki; it is very low, and is fronted by shoal water extending 2 miles from the shore in a westerly direction. From *Bansu hana* the coast takes a southerly and then a south-westerly direction for 12 miles, and is low and shoal from $1\frac{1}{2}$ to 2 miles off shore.

Futsu Saki is a low sandy point, having a fort at its high water line, and stretching out in a narrow tongue that forms *Saratoga Spit*. West from this tongue, in 9 fathoms, is moored a *red buoy*, with staff and cage, 13 ft. above the water. East from the buoy there are only 5 fathoms at 3 cables, and 1 fathom at three-quarters of a mile. The bank of 5 fathoms trends N.E. $\frac{1}{2}$ N. and S.E. by E., deepening rapidly to 10 fathoms.

The coast from *Futsu saki* takes an easterly and southerly direction, forming a deep bay, the northern shore of which is sandy and low, but the southern is the termination of the slopes from the high range *Noko-gheri yama*, and is rocky and steep-to. Shoal water extends from $1\frac{1}{2}$ to 2 miles from the shore in the centre of the bay.

Kanaya Point, the south-western extreme of these slopes, is steep-to, and bears nearly East of the *Tree Saddle* on *Sagami Peninsula*; it is at the termination of the sharp well-defined ridge of the *Miogani yama*, a fine dome-shaped mountain, elevated 1,096 ft. The coast from this point takes a southerly direction for $7\frac{1}{2}$ miles as far as *Daibo saki*, between which there are three small bays, the southern of which has several rocky patches.

Ghibu Isi (*Black Rock*), about 20 ft. high, lies three-quarters of a mile West of the latter bay, having several reefs in its vicinity which only uncover at low water. The lofty mountains *Miogani yama*, *Sveno yama*, and *Double Hill*, are very conspicuous, towering above this coast.

The *Peninsula of Awa*, although mountainous, is less so than *Idsu*, and possesses much larger tracts of arable land, all of which is carefully cultivated. Its West coast is more sinuous than the opposite shore of the gulf, but only one of the bays, *Tati yama*, formed in it, affords fair anchorage.

To the northward of these hills the country (*Kadsusa*) becomes much lower, and a few miles north-eastward of *Futsu saki*, the point off which runs the *Saratoga Spit*, it becomes an uninteresting dead flat, encircling the head of *Yedo Bay*.

Tati-yama Bay, formed between *Daibo saki* and *Su saki*, has shelter and good holding ground in southerly and easterly gales, but it is exposed to the westward.

SU SAKI, the East point of entrance of the Gulf of Yedo, when seen from the southward, appears as a block of small hills, rather conical in profile, the highest, *Hazama*, being elevated 650 ft. The point is low, with the exception of a small elevation at the N.W. corner, on which is an old fort. There is a heavy *tide rip* off it, but no dangers at a greater distance than half a mile from the shore, and the point may be safely rounded at a mile.

Mela Head, S.E. $\frac{1}{4}$ S. nearly 5 miles from Su saki, forms the eastern point of entrance to the Uraga Channel and Gulf of Yedo. It is 456 ft. above the sea, the general height of the coast range in its vicinity being comparatively low. An extremely dangerous ledge (*Mela Ledge*) lies $1\frac{1}{2}$ mile off Mela Head, about 5 miles S.E. of Su saki. Extending 3 miles from this ledge in a south-westerly direction is a rocky bank.

NO SIMA LIGHT.—On No sima Point, at an elevation of 134 ft. above high water, is exhibited a *fixed bright light* of the first order, visible in clear weather from a distance of 20 miles. The tower is octagonal shaped, and painted white.

Approaching the Gulf of Yedo from the southward or westward, in clear weather, the chain of islands running southward from it are unmistakeable landmarks, and Cape Idsu can scarcely be mistaken. Omae saki, the point 25 miles westward of the cape, is low, while the cape, as before stated, is high, bold, and rocky. From $1\frac{1}{2}$ mile eastward of Mikomoto (Rock Island) a N.E. $\frac{1}{4}$ E. course will lead 4 miles N.W. of Vries Island, from which position the centre of the entrance of the Uraga Channel bears N.E. by E., distant 22 miles. Care must, however, be observed when approaching Cape Sagami not to be drawn into Odawara Bay by the indraught mentioned. Should Vries Island be visible, this danger is easily guarded against by not bringing that island southward of S.W. by S.

Vessels approaching the gulf from the eastward are recommended not to hug the shore of the South end of Awa too closely, as dangerous shoals are known to exist in that neighbourhood.

To avoid the Mela Ledge and all other *known* danger when rounding from the eastward, do not bring the eastern extreme of land *seen* to bear eastward of E.N.E. until the extreme of Su saki bears N. by W.; and when rounding from the westward do not bring the extreme of Su saki westward of N. by W. until the eastern extreme of land is E.N.E. At night, or in thick weather, when the light on No-sima Point is not seen, soundings of 40 fathoms may be considered as indicating close proximity to these dangers.

In steering for the Uraga Channel the Tree Saddle Hill on the South end of Sagami Peninsula will be readily recognized; and on nearing the channel the Ashika sima (Plymouth Rocks) will be plainly seen on its western side. Give these rocks and the Ka yama a berth of half a mile in passing, or at night keep without the red rays of the lights, and after rounding Kanon saki at a little less than that distance, steer N. by W. $\frac{1}{4}$ W., which will lead

to the westward of the buoy off the Saratoga Spit, and continuing this course when the lightvessel of Treaty Point is seen steer to pass to the eastward of her, taking care not to bring the light to the northward of N. $\frac{1}{2}$ W. The elevated ground above Mandarin Bluff, at one mile northward of Treaty Point, showing to seaward in brown cliffs well wooded to the summit, will be readily recognised; the bluff being the most eastern.

The lightvessel may be passed within a cable's length, after rounding which steer to pass northward of the red buoy with staff and cage moored on the northern edge of the bank off Mandarin Bluff, and anchor as convenient.

A sailing ship will have to make short tacks when working into Yokohama Bay with a westerly wind, as North of Mandarin bluff the deep water channel is narrowed to $1\frac{1}{2}$ miles; the lead here, however, as is the case round nearly the whole shores of Yedo Bay, gives fair warning.

Working through the Uraga Channel.—With a northerly wind a vessel after passing Cape Sagami may stand across and tack close to the opposite shore, as there are no rocks at any distance off it to the northward of Kanaya Point, and to the southward of the point the dangers show. If unable to fetch this point it would not be prudent to stand into the bay between the point and Uki sima, a small rocky island 150 ft. high to the southward, as foul ground exists there. This bay will be readily recognised from a distance, as it is the sea shore of a valley between the Miogani yama and Sveno yama ranges, and two small hills are in the centre of it.

In making the western board, the foul ground in Kaneda Bay, as well as off Senda saki, and along the shore between it and Kanon saki, must be remembered. The shore of Kadsusa Bay, northward of the Miogani yama range, may be approached by the lead, tacking in 5 fathoms.

If unable to fetch Kanon saki on the starboard board, be careful to tack short of the bearing for clearing the Ka yama. Short tacks should be made when to windward of Kanon saki, not shoaling towards the opposite or Kadsusa shore to less than 9 fathoms. When Saru sima bears W. by S., stand no farther eastward than to bring Kanon saki to bear S. $\frac{1}{4}$ E. until Saru sima is S.W. $\frac{1}{2}$ W., when the spit will have been weathered. At night do not bring the light off Treaty Point to bear West of N. by W. $\frac{1}{4}$ W. until Kanon saki light bears S. $\frac{1}{2}$ E. Long boards may now be again made, but do not shoal on either tack to less than 5 fathoms, nor off Yokohama Bluff to less than 7 fathoms. There are some shoal patches of $3\frac{1}{2}$ to 5 fathoms, sand and mud, off the western side of the bay between Saru sima and Mississippi Bay, but none are known at a greater distance off than 2 miles, and they may be avoided by not bringing Saru sima eastward of South.

The Tides are much affected by the winds, but both flood and ebb sweep with great velocity round Saratoga Spit. The flood runs N.W. by W. and

the ebb S.W. by S., about $3\frac{1}{2}$ knots an hour at springs. Generally the flood stream sets a vessel on to the western shore.

VOLCANIC ISLETS, SOUTH-EAST OF JAPAN.

A very remarkable range of detached islets and rocks extends for nearly 300 miles in a S.S.E. direction from the entrance of the Gulf of Yedo. There is no portion of the ocean which has been more misrepresented than this in our older works, and the great number of supposed discoveries rendered the charts so confused that no adequate idea could be gained of their number or arrangement. The author endeavoured, in 1858, to reconcile these vague surmises and great discrepancies, so as to give a more correct representation of their real character.*

This geographical confusion has arisen no doubt from the unsuspected influence of the great Japanese current, which rushes through the group with exaggerated and uncertain velocity, and thus affecting the dead reckoning of many or most of the ships which announced discoveries, most of which are to the *eastward* of the true positions. It will be unnecessary to discuss these varying accounts, since they are now in a great measure reconciled by exact observations; and this is of the greatest importance, seeing that an increasing commerce between China, Japan, and North-Western America, passes through these channels. What follows will, therefore, be confined to a brief description of what is well ascertained, connected with an identification, when possible, with what has been but vaguely surmised.

These islands are all bold-to, some appearing to rise like a wall from the depths of the ocean, and they have but few outlying hidden dangers. The lead therefore in foggy weather will give little or no warning, as in some cases no soundings will be obtained with 150 fathoms line within half a mile of the shore.

The Currents also in this part of the Japan stream are influenced by the prevailing winds at the different seasons, and capricious, heavy current rips being of very common occurrence, have often been mistaken for *shoals*. These rips are more constantly met with *close* to the islands and rocks than otherwise, and in the event of getting into one at night or in a fog, it may be assumed, when the vessel's position is not accurately known, that danger is near. It may be well to bear in mind that in calms, although the stream may appear to be hurrying the vessel on to an island, if the island be steep, it will always turn to the right or left on approaching within a certain distance of the rocks; not so, however, should shallow water extend any distance, when the anchor must be depended on.

* See Transactions of the British Association, 1858.

The usual set of the current through these islands is north-easterly, and the rate ranges from $1\frac{1}{2}$ to 3 knots, but the islands frequently deflect it from its course, and the eddies always found on the margin of great currents are here particularly numerous and active, so that it is not unusual, especially among the northernmost of the islands and in the vicinity of the coast of Nipon, to encounter a set precisely in the opposite direction to that anticipated. Close to Fatsizio and Vries Islands, at less than one-third of a mile off, a regular change of tidal stream was observed, and also between these islands and the coast.

Lot's Wife or Black Rock, in lat. $29^{\circ} 47' N.$, long. $140^{\circ} 22\frac{1}{2}' E.$, is a tall pinnacle rising about 300 ft. above the sea; in clear weather it can be seen at a distance of 25 miles, and bears a remarkable resemblance to a ship under all sail. A cast of the lead within 8 miles of this rock gave no soundings with 160 fathoms of line.

Ponafidin or St. Peter Island, 1,328 feet in height and $1\frac{1}{4}$ mile in length East and West, was discovered in 1820 by Lieutenant Ponafidin of the Russian Navy, and named by him *Three Hills Island*. Lat. $30^{\circ} 33' N.$, long. $140^{\circ} 15' E.$

Smith Island.—H.M.S. *Tribune* passed this island in 1859, and describes it as a high pinnacle-looking rock, in lat. $31^{\circ} 15' N.$, long. $139^{\circ} 52' E.$, about 250 feet in height, three-quarters of a mile in circumference, with heavy breakers extending apparently a quarter of a mile from it, and a small rock close to its North side. A *volcanic disturbance* was noticed in 1870 at 4 miles N.E. by N. from this island.

Bayonnaise, in lat. $32^{\circ} 0' 40'' N.$, long. $140^{\circ} 0' E.$, forms a curve a cable long North and South, with several hummocks on it, its northern summit being about 26 ft. in height; several rocks extend a quarter of a mile off its N.W. and N.E. sides.

Aoga Sima, in lat. $32^{\circ} 37\frac{1}{2}' N.$, long. $139^{\circ} 47\frac{1}{2}' E.$, is 3 miles long, and visible 36 miles off in clear weather. Its coasts are steep, and the only landing place is on the East side, where there is a rock level with the water at a little distance from the land. It is inhabited and cultivated on the North and N.W. sides.

FATSIZIO ISLAND, the most southern of the islands visited by the *Actæon* in 1861, is $8\frac{1}{3}$ miles long, N.W. by N. and S.E. by S., and 4 miles wide at its broadest part. In shape it is nearly an oblong, rounded at the N.W. end, while at its S.E. end a slight curve forms a bay, the spot of observation which (close to some small huts) is in lat. $33^{\circ} 4' 24' N.$, long. $139^{\circ} 50' 24' E.$ Anchorage was obtained off this bay in 16 fathoms, sand and gravel, at less than a mile from the shore, but exposed from S.S.W. to N.N.E., and a vessel would always be liable to experience a heavy swell. There were 30 fathoms, dark sand, at about 2 miles off this shore, but the rest of the coast line

appeared to share the bold features and to be as steep-to as the generality of these islands.

This island is a penal settlement of Japan. Its highest part is the northern, where a mountain reaches an elevation of 2,840 ft. Approaching from the eastward the island appears as two.

At the S.E. end of Fatsizio are two or three small streams of delicious water falling down the rocks, and in fine weather and smooth water, boats may readily obtain an abundant supply.

Kodsine is a small and nearly oval-shaped island 1,820 ft. high, $1\frac{1}{2}$ mile long, and nearly 1 mile broad; it lies westward of the highest part of Fatsizio.

Broughton Rock (Kanawa), in lat. $33^{\circ} 39' N.$, long. $139^{\circ} 18' E.$, is a small inaccessible islet, about 60 ft. high, flat-topped, and so bold that at about a third of a mile from its N.E. side no soundings could be obtained with 180 fathoms line. The north-easterly current in the neighbourhood of this islet was found to be particularly strong, running nearly 4 knots an hour.

Miaki and Mikura.—*Miaki Sima* is 2,690 ft. high, and has a flat summit; the N.E. end of the island is a little more elevated than the S.W. end. The highest part of Miaki is in lat. $34^{\circ} 5' N.$, long. $139^{\circ} 35' E.$, and the highest part of Mikura in $33^{\circ} 52' N.$, $139^{\circ} 37' E.$; the latter lies about 17 miles to the N.E. of Broughton Rock. Mikura is called Prince Island; and Miaki, Volcano Island in former charts.

Dangers.—There is a cluster of rocks about $2\frac{1}{2}$ miles to the S.W. of Miaki, and Broughton says, “there are, in addition, some black rocks 2 or 3 miles from the eastern point of the island.” A cluster of rocks is also marked on some charts at 8 miles S.E. of the East end of Miaki.

Onohara is a small islet W.S.W. 5 miles distant from Miaki, composed of a cluster of high detached rocky pinnacles, the centre one being perforated in two places.

Redfield Rocks (Sanbon-take) are the most western of the chain of islands and rocks South of the Gulf of Yedo, and the most dangerous of the whole group. They consist of two patches of black rocks extending nearly 3 miles N.N.E. and S.S.W. The southern rocks, in lat. $33^{\circ} 56' N.$, long. $138^{\circ} 48\frac{1}{4}' E.$, are the highest, about 20 feet above high water, while the northern are only about half that height. The hand lead will afford no warning until close upon this dangerous cluster.

Kosu Sima, in lat. $34^{\circ} 12\frac{1}{4}' N.$, long. $139^{\circ} 8\frac{1}{4}' E.$ (centre), and elevated 2,000 ft. above the sea, is $3\frac{1}{2}$ miles long N.E. and S.W., and may be recognized by a remarkable snow-white cliff on its western side, and a white patch on its summit, to the northward of the cliff. There is a safe channel 15 miles wide between Kosu sima and Miaki. Two small rocky islets lie close together, about half a mile off the centre of the eastern shore of Kosu sima. About 2 miles southward of the S.W. point of Kosu sima are the *Onghashi*

Rocks, which should be given a safe berth, as their jagged appearance would lead to the belief that there are many hidden dangers in their immediate neighbourhood.

Sikine Sima is low, with a small islet off its North end. It is $1\frac{1}{2}$ mile long N.N.E. and S.S.W., and lies 5 miles N.E. of Kosu Sima. One of the vessels of the American squadron passed between these islands and saw no danger; there is therefore reason to believe that the channel is safe.

Nii Sima is about $1\frac{1}{2}$ mile N.E. of Sikine, and from its broken outline appears from a distance as several islands. Its extent is 5 miles, North and South, and its most elevated part 1,490 ft. above the sea. There is a small low islet a short distance off its S.E. point.

Utone is a conical islet, 660 ft. high, lying N. $\frac{1}{2}$ E., about $2\frac{1}{2}$ miles from Nii sima; detached rocks lie near its shores.

To Sima, bearing N. $\frac{1}{2}$ W. 2 miles from Utone, is 1 mile in diameter, pyramidal shaped, and its summit 1,730 ft. above the sea.

VRIES ILAND (O sima) the largest and most northern of the chain fronting the Gulf of Yedo, is 10 miles N.N.E. of To sima, its south-eastern point being in lat. $34^{\circ} 40' N.$ long. $139^{\circ} 27' E.$ The island is oval-shaped, about 8 miles in extent N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{3}$ E., and 5 miles wide, and its summit attains an elevation of 2,550 ft. At its centre is an active volcano, over which a white vapour cloud is generally floating, and frequently, at night, it brightly reflects the glare of the subterranean fires at work in the crater beneath, forming, in clear weather, a conspicuous landmark, visible by night or day for many leagues. *Observation Point*, a bluff forming the N.W. end of the island, is 350 ft. high, and, when seen from the N.E. or S.W., at a distance appears as an island.

There are several villages on the island. On the North side a narrow bank of soundings affords a precarious anchorage in from 12 to 18 fathoms. A junk harbour is situated at the S.E. point of the island. Landing may be effected at the North village, or in the junk harbour. The inhabitants were civil and hospitable, but averse to strangers visiting the volcano.

THE EAST COAST OF NIPON.

Mela Head to Cape Erratatsi and Ohigasi Saki (King and Blanco) is a wild and dangerous coast, skirted by off-lying rocks; the projecting points are generally rugged cliffs of yellow clay or gravel. It is well wooded; the high land ends about Ohigasi saki in a long backed hill, terminating in a couple of thumb-shaped pinnacles, and is fronted by a bold chalky cliff.

The coast, when partially obscured by fog, is difficult to identify when coming from the eastward; a ship thus approaching Yedo Bay is liable to be set considerably out of her reckoning by the Japan stream. The tempe-

perature of the sea is a useful guide, and the soundings will give good warning if attended to. Mela Head sometimes shows out in relief when all the coast eastward is obscured by fog.

INABOYE SAKI and LIGHTHOUSE.—From Ohigasi saki north-eastward to Nakuno saki, a distance of 100 miles, the coast is low, and for the most part sandy. Inaboye saki is a projecting rocky cape, on which is a smooth, bare, and conspicuous hill, about 200 ft. high; reefs extend from the cape fully a mile, but it may be rounded in safety in 40 fathoms water. Shipwrecks are frequent on the sandy beach North of the cape, caused, it is believed, by the effects of the currents, which meet here and set a vessel towards the shore.

The lighthouse on Inaboye saki, completed in November, 1874, is a circular brick building, painted white, 105 feet high. From it is shown a *revolving bright light*, attaining its greatest brilliancy every half minute, elevated 168 ft. above the sea, and visible 19 miles off.

Arkold Rock, originally reported by the Russian frigate *Arkold* in 1859, was considered to lie in lat. $36^{\circ} 15' N.$, long. $141^{\circ} 28' E.$; again reported in thick weather, by the Russian vessel of war *Sibole* in 1870, was said to be 20 feet high, about 11 miles to the southward of the spot in which it was first reported.

H.M.S. *Thistle* on two occasions in 1873 passed close to the last-named position, but saw nothing of the rock, although from the state of the weather a rock 20 ft. high must have been visible. H.M.S. *Ringdove*, in 1874, made a search for this danger under favourable conditions of wind and weather, but without success; good observations had previously been obtained, and the adjacent land, 35 miles distant, was visible. H.M.S. *Modeste*, in 1877, passed over the assigned position of the rock, but without seeing any signs of the danger; good observations had been obtained an hour previously. Arkold Rock has in consequence of these searches and reports been expunged from the charts.

Choosi Point is on the North side of Inaboye promontory. The *Tone Gawa*, a rapid river, flows into the sea on the South side of the point, but owing to the heavy swell from the Pacific its bar can seldom be crossed by ships' boats, and at times native craft cannot attempt it. There is anchorage in 6 fathoms, sand, 1 mile off the bar, but it is not recommended. The soundings deepen gradually to 20 fathoms at 4 miles from the shore.

North from Chöosi Point for 45 miles the shore is wooded; it may be passed along at a distance of a mile, in 9 fathoms. From Machama the shore is bounded by low cliffs, and North of Kawajiri (a populous fishing town) hill ranges commence.

SENDAI BAY lies on the East coast of Nipon, in lat. $38^{\circ} 20' N.$, the land North of it is deeply indented, high, and steep, and apparently thinly

populated, fishing boats being seen only off Simidzu. Most of the bays are open to seaward.

At 10 miles from the coast inland there is a high, easily recognisable mountain, about 4,600 ft. high, in lat. $39^{\circ} 28' N.$, long. $141^{\circ} 41' E.$, approximately.

The group of islands in the N.W. corner of Sendai Bay should not be approached nearer than 2 miles, as reefs and rocks extend off them to a considerable distance, and there is no anchorage even for a small vessel on the western shore of the bay.

Cape Amitsihama, the East point of Sendai Bay, has deep water close-to, and may be passed within 2 cables. Soundings in from 16 to 19 fathoms will be found between the cape and Nagasima Island, and anchorage for the largest ships may be obtained in from 12 to 9 fathoms, sand, off the North end of the island.

On the shore of the mainland, abreast the North end of Nagasima Island, there is a bay half a mile wide, which affords anchorage in from 7 to 9 fathoms, mud. The bay may be recognised by its having the only white sandy beach in the vicinity, and from a wooded islet lying off its northern point.

A single rock, which dries, lies East 2 cables from the southern extreme of Nagasima Island.

Both the above anchorages afford shelter from North and East winds, but a heavy sea is thrown in by winds from East round northerly to N.W.

Matsu Sima Bay.—The southern entrance of this extensive but shallow harbour, in $38^{\circ} 20' N.$, and $141^{\circ} 5' E.$, appeared completely obstructed by low reefs, and according to the fishermen, no channel exists between the sunken rocks. The northern entrance (4 miles to the northward) is very shallow, there being only 4 ft. water over a rocky bar in a narrow channel, but good shelter for two or three vessels may be obtained off it in 5 or 6 fathoms, mud, open only to the East.

Ichinomaki River, of considerable importance, falls into the sea at the North part of Sendai Bay. It is reported to be navigable by junks for 70 miles, and boats can reach *Morioka*, the capital of Nambu, situated 120 miles from its mouth. The town of Ichinomaki at the entrance was not seen in passing. The anchorage is a roadstead, open to the South and S.E., but it is believed that with the wind from those quarters good shelter could be found in the East part of the bay.

Kitakami River enters the bay in lat. $38^{\circ} 26' N.$, long. $141^{\circ} 15' E.$ Kitakami light consists of a lantern similar to a ship's masthead light, and being in front of the town, it can with difficulty be distinguished from the lights of the houses and junks. It is shown from a mast on the East bank of the river, and elevated 52 ft.

Kingkasan, or **Goldmine Island**, dedicated to religious purposes, is resorted to by pilgrims from all parts of Japan; a peak 1,000 ft. high and wooded to the summit, is conspicuous. The deer on the island are numerous and considered sacred. Mica in large quantities is found in the soil.

Between this island and the main a depth of 3 fathoms can be carried by passing at one-third the distance from the island. There is anchorage on the South side of the narrows.

LIGHT.—A granite tower, 28 feet high, was completed in 1876, on the East side of Kingkasan Island, in lat. $38^{\circ} 19' N.$, long. $141^{\circ} 36' E.$ From it is shown a *fixed bright light* seaward between N. by E. and S.W. $\frac{1}{2}$ W. It is elevated 178 ft. and visible 19 miles off.

Aikawa, near Kingkasan, is a safe anchorage, and is the first sheltered spot for vessels bound to the northward from Yedo Gulf. It is easy of access, and the light now shown from Kingkasan Island will guide to its position. The reef projecting 3 cables from the southern cape is dangerous. It breaks only when the wind blows hard, or when there is a heavy swell.

It is not recommended to pass inside Hira Sima, Asi Sima, and their contiguous groups.

The coast to the northward is at present little known to navigators; it presents a deeply indented outline, probably concealing some fine harbours. The shores appear bold.

Kamaishi Harbour, in lat. $39^{\circ} 18' N.$, long. $142^{\circ} E.$ (approximate), is more easy of access to a sailing vessel than Yamada Harbour, which is situated 10 miles to the northward. On the S.W. part of Sangan Sima are some white quartz bolders, and also on the cape N.N.W. of the island. Sangan is steep, well wooded, not distinguishable from the coast at a distance of 6 or 7 miles, excepting when approached from the northward.

There are two rocks near the centre of the harbour, lying North and South of each other, and about a third of a cable apart. On the northern rock there is 6 ft. at low water, and on the southern rock 2 ft. The northern rock is marked by a *black buoy*, surmounted by a circular cage, the top of which is 8 ft. above water; the buoy is moored to the North of the rock in 11 fathoms at low water. The southern rock is marked by a *red beacon*, consisting of a massive stone foundation, on which stands an iron post, surmounted by a cage, which is 19 ft. above high water. Vessel must not pass between the buoy and the beacon.

Kamaishi is not an open port, and at present there is no traffic whatever. At about 10 miles inland is a district abounding in iron ore of good quality, which will probably soon be worked by the Government. A *railway* is in course of construction, also a pier in connection therewith.

Yamada Harbour is a large circular basin surrounded by mountains upwards of 1,000 ft. in height, and is entered by a broad pass or strait running

S.W. between high bold shores, in which there is a depth of from 20 to 50 fathoms. A reef extends nearly 1 cable South from Miojin Saki, the inner North point of the entrance to be avoided by keeping in mid-channel; after rounding this point haul up N.W., and passing a quarter of a mile North of O sima, the larger of the two wooded islands, anchor off the centre of the town of Yama in 6 fathoms. When standing in for the anchorage the water shoals to 7 fathoms, and then deepens to 10, after which it decreases gradually. The eastern part of the bay is deep, rocky, and exposed, therefore not recommended as an anchorage. It is shallow between the two islands at the head of the harbour. The small island Ko Sima is in lat. $39^{\circ} 27' 17''$ N., long. $141^{\circ} 59'$ E.

The town or village of Yamada is populous, and inhabited almost exclusively by fishermen, who appear ignorant, uncouth, and dishonest. The high land on the North may be easily recognized when coming from the northward or southward, in following the coast of which, it forms the most salient point. Outside the port the water changes its colour, but there is no bottom in 38 fathoms at 2 miles from the shore. Yamada is the best anchorage at present known on the N.E. coast of Japan.

It is high water, full and change, in Yamada Harbour at $6^h 30^m$; springs rise 4 ft.

Miyako Port opens at 8 miles North of Yamada, and is a place of considerable trade, situated on the western shore of an inlet about 3 miles deep junks anchor outside in from 7 to 4 fathoms, mud. The anchorage is open to the eastward. About the time of the equinoxes strong N.E. winds occasionally blow, and in the winter strong westerly winds. The point of Tayo-mani that forms it is surmounted by a conical hill.

The coast North of Miyako takes a N.N.E. direction, and is a shelving table land, bordered by broken cliff and backed by high flat ranges, which rise to about 2,000 ft., but the land gradually decreases in elevation towards the North until about *Sanemuva Point*, where it becomes low. *Kuro Saki* stands well out, and may be recognized by its small range of hills about 700 feet high. North of Kuro Saki the cliffs get lower, and the long flat slopes run out into fine tapering points.

Two isolated mountains can be seen behind Hon-na-mi. The land is densely wooded.

Cape de Vries is low and flat, about 330 feet high, and is remarkable from the way it stands out between two bays. The *Dupleix* sailed along this coast from Cape Kiori to Cape Vries, at a distance of from 2 to 4 miles, and saw no danger except close to the shore.

SIRIYA SAKI and LIGHTHOUSE.—At Siriya Saki, the N.E. point of Nipon Island, the coast slopes towards the cape from an elevation of 1,265

feet, and appears like an island at a distance. The lighthouse, completed on the cape in 1876, is a circular tower 94 ft. high, painted white. From the tower, at an elevation of 150 ft., is shown a *fixed bright light*, visible 18 miles off.

A *fog bell* is sounded by machinery in thick weather, 15 strokes in every minute.

Off the cape, at the distance of 3 cables, is a small white rock, 70 ft. high, and at 2 miles to the south-westward is another rather larger than the former, lying 1 cable from the shore. The coast within 4 miles of the cape is studded with rocks, and very foul.

Rattler Rock lies E. by N. $\frac{3}{4}$ N., $1\frac{1}{4}$ mile from Siriya Saki lighthouse, and is a ledge having 5 ft. least water. It rarely breaks, and when it does it is hard to distinguish between the break and the tide rip.

Anchorage.—The *Thabor* anchored 2 miles South of Siriya Saki. This anchorage would be useful to vessels bound West through Tsugar Strait during the winter season, and obliged to anchor. The lead is a safe guide. The bottom at 23 fathoms is fine black volcanic sand, gradually changing to coarse brown, with a few shells. At a depth of 3 fathoms and less the bottom is stony. From a vessel at anchor in 7 to 9 fathoms the light at Siriya Saki is visible. A small vessel might anchor in 4 or 5 fathoms with good shelter. The rise and fall of tide appears to be about 3 ft.

DIRECTIONS.—Vessels bound from the Gulf of Yedo to the eastern entrance of the Strait of Tsugar, will, after passing Su Saki and Cape Erratatsi (C. King) experience the full force of the current setting them to the E.N.E. The land about this cape is high and wooded, and the coast in its locality should be given a good berth, as heavy breakers have been seen some distance off shore.

Caution is requisite in doubling Ohigasi Saki (Cape Blanco), as the American squadron passed over the edge of a reef in 22 fathoms water S.S.E., distant about 5 miles from this cape, and from the heavy overfalls, in which fishing boats were anchored, there is probably much less water upon its shoalest part. As it was near nightfall it was impossible to examine this reef, but its position is about lat. $35^{\circ} 8' N.$, long. $140^{\circ} 34' E.$, and Cape Blanco in lat. $35^{\circ} 13' N.$, long. $140^{\circ} 32\frac{1}{2}' E.$

From this cape to Tsugar Strait, as far as is known, the coast may be approached within from 2 to 3 miles. The Oya Siwo flows to the southward along the N.E. coast as far South as Inaboye Saki, and its average width is from 100 to 200 miles, outside of which the Kuro Siwo flows to the north-eastward. This coast is known to be subject to strong gales and much heavy weather. On nearing the entrance of Tsugar Strait the American squadron experienced a sudden fall in the temperature of the sea of 15°

to 20°, as the squadron ran from the north-easterly current into the cold current setting to the southward.

THE SETO UCHI, OR INLAND SEA.

The great inland sea of Japan, called by the Japanese Seto Uchi (inner strait), is enclosed between the S.W. coast of Nipon, which entirely bounds it on the North and East; and the islands of Kiusiu and Sikok, which bound it on the West and South. It extends somewhat in an East and West direction, in length 240 miles, with a breadth varying from 3 to 30 miles. It has six divisions, called *nadas* or seas, taking their names generally from the provinces, the coasts of which they wash. There is a great maritime trade along its populous shores, as well as the through traffic to Osaka, one of the chief seats of commerce of the empire, and the seaport of its capital, Kioto.

The Seto Uchi can be navigated with safety at all seasons of the year, and even under favourable circumstances during the night, the more particularly now that a correct chart of it has been published from the Japanese manuscript survey, to which has been added the surveys of Commanders Ward, Bullock, Brooker, and St. John, and Navigating-Lieutenant Maxwell. In the winter months, too, when the westerly gales are so prevalent, sailing vessels would probably gain time by tiding through this sea, rather than by endeavouring to beat round Satano misaki (Cape Chichakoff), against the Kuro Siwo or Japan Stream. As an instance of this, a fine clipper ship was nearly three weeks getting round Cape Chichakoff, whilst the *Actæon* sailed through the inland sea in nine days, meeting with one westerly gale, and anchoring every night.

A very destructive species of Mollusk inhabits the Seto Uchi, and might prove very injurious to ships' bottoms. Specimens of new timber were found at Awa sima, the perforations in which were a third of an inch in diameter.

Supplies.—Water of excellent quality can be procured almost at any anchorage in the Seto Uchi or Kii Channel, and is brought off in boats, in buckets, at a very small cost. About 70 tons of charcoal were purchased at the various harbours in the Kii Channel, for fuel for steaming, at from 4 to 11 dollars per ton, superior for such purpose to the best Welsh coal.

Tides.—The tides and currents of the Seto Uchi are as yet but imperfectly known, but are found to be regular at its East entrance; those of the Boungo Channel are quite unknown. The tide wave comes from the Pacific Ocean by the Kii and Boungo Channels; from the latter it branches East and West, meeting the Kii Channel tide at about Awa sima, in long.

133° 38' E., at the eastern entrance of the Bingo nada. The tides run strongly in the narrow channels, especially on the western stream, and whirl about very considerably, so as to render steering difficult.

We first describe the Boungo Channel, then the Kii Channel, and after that the Isumi nada and the different nadas to the westward as far as Simonoseki Strait, by which the Sea of Japan is joined to the Seto Uchi or Inland Sea.

The **BOUNGO CHANNEL**, the western of the two entrances on the East coast to the Seto Uchi, is quite safe to navigate as far as it is at present known, and the projecting points and islands were found correctly marked on the Admiralty chart by the allied squadron under the command of Vice-Admiral Sir A. L. Kuper, K.C.B., which entered the Seto Uchi by it in September, 1864. No dangers were seen in the route they adopted, in addition to those marked on the chart. The western points of the different islands and capes on the eastern shore, from Okino sima on the South to Cape Okanaba on the North, are well defined, and apparently steep-to; so is also the land on the western shore in the vicinity of the town of Kitsiku and along the N.E. coast of Kiusiu.

Okino Sima, forming the eastern point of the South entrance to this channel, is 1,150 ft. high, conspicuous, and may be seen in clear weather from a distance of 35 miles. To the northward of it the space appears to be rocky foul ground.

Euryalus Rock, named after H.M.S. *Euryalus*, is a small rocky islet, 50 ft. high, lying in the middle of the Boungo Channel, 26 miles N.W. of Okino sima. It is surrounded by rocky shoals, some above water, to the distance of half a mile. It occupies a most excellent position for a lighthouse.

Takanaba, the island lying nearly in the middle of the northern entrance of the channel, has two small rocks above water at 2 cables N.W. of it. There appears to be a good passage on either side of this island. The current is not strong.

The **KII CHANNEL**, lying between Sikok and Nipon, is 80 miles across at its entrance from the Pacific, decreasing to 15 miles at 30 or 40 miles within, which width it preserves for 20 miles farther, or up to Awadji sima. The coast of Awa to the West from Muroto saki to Naruto is as yet unknown; but the coast of Kii from Oö sima to Kata, along which vessels pass to and from the Seto Uchi and Yedo, has been surveyed or explored. The fairway from the Kii Channel into the Seto Uchi is by Isumi Strait, but there is a more direct route, by taking which (if not bound to Osaka or Hiogo) a saving of 35 miles is effected, viz., the Naruto Passage, West of Awadji, but this channel should not be attempted excepting under the most favourable circumstances, that is, at slack water or within half an hour of it,

and at neap tides, and even then it is highly dangerous. The coast on the western side of the Kii Channel from Murato saki to the rocky point O-iso at the western entrance to the Naruto Passage is from the Japanese manuscript.

Muroto Saki, the western entrance point to Kii Channel, is a steep headland, 400 ft. high, and when first seen in clear weather from the eastward or westward appears as an island. Another hill, 2 miles to the northward, and 770 ft. high, also makes an island, but may be distinguished from Muroto Saki by the scarcity of trees.

I Sima lies nearly in the centre of the western shore of the Kii Channel at its narrowest part; its southern peak is visible 30 miles. The channels between the reefs westward of I sima should not be attempted.

A rock was reported in 1873, by the steam-ship *Alexander*, at 9 miles S.S.E. of I sima, 10 ft. high. Lat. $33^{\circ} 30' N.$, $134^{\circ} 30' E.$

Wada Sima Harbour, in lat. $34^{\circ} 0' N.$, long. $134^{\circ} 39' E.$, has a good anchorage in from 4 to 6 fathoms water, just inside a low point with trees on it on the East side of the harbour. The South and West parts of the harbour are very shoal.

O-Iso, the projecting sandy point N.E. of Sikok, slopes down from a hill named Shiro-muné yama, 290 ft. high, ending in a bare conical mound. East, 3 cables from O-iso, are some rocks awash, with deep water 1 cable outside them.

NARUTO PASSAGE (literally, gate of the sea which makes a great roaring) has hitherto been considered to be a whirlpool, and not without cause. In its narrowest part it is only 7 cables wide, and this is further narrowed to 3 cables by a reef on its eastern side.

The passage may be taken at the first and second hour before and after change of stream, with the tide, and for the first three-quarters of an hour before or after change, against the tide, in fine weather; but in bad weather it should not be attempted, as the passage then breaks right across, and it is difficult to distinguish the channel.

Vessels must be careful to have the passage well open before approaching it, and at all times great caution must be observed.

Tobi Sima, 93 ft. high, is a conical wooded islet, lying S. by W. nearly three-quarters of a mile from the narrowest part of Naruto Passage. It has shoal water off its North end for $1\frac{1}{2}$ cable, but may be approached on the eastern side to 1 cable. A rock, 1 cable in extent, East and West, with from 4 to 5 fathoms on it, and steep-to, lies S.W. 4 cables from Tobi sima.

Tides.—The tide sweeps through Naruto in about a N. by W. and S. by E. direction, with a velocity at springs of from 10 to 11 knots, but slackening about an hour before and after change either way to from 7 to 8 knots. At springs there is scarcely any slack water, but at neaps about a quarter of an hour.

It is high water, full and change, at Fuk ura, at 6^h 17^m, springs rise 7 ft., neaps (probably) 4½ ft. The north-western stream makes at 2¼ hours before high water at Fuk ura, changing every 6 hours nearly. North of the Naruto Passage the tides are anomalous.

Anchorage—If wishing to wait for slack water, or change of stream, anchorage may be found on the Awadji shore, at Maru yama, on the North side of the Naruto; and at Fuk ura on the South, in 4 to 8 fathoms. There is also excellent anchorage in Minotoye Bay, 5 miles to the westward.

Yura is a town on the S.E. side of Awadji. A low island, 1½ mile in length, with a bluff hill on its North point, and a large granite fort on its South, lies like a breakwater fronting a bay, and forms the harbour, which has narrow entrances North and South. The North entrance has from 10 to 11 ft. at low water springs, and is 120 yards wide; the South is a narrow opening, with 2 to 3 ft. water. The broadest part of the harbour is half a mile, with anchorage in 4 to 6 fathoms, mud. A vessel drawing 16 ft. could enter at high water springs, and lie secure in smooth water for repair. The junks anchor somewhere to the northward of this to wait for tide.

Anchorage may also be obtained in 2 to 5 fathoms outside the island on the sand-bank off it, with the outer extreme of the bluff N.W., or of the fort S.S.W.; but it is very steep on the edge, and the holding ground is probably not good.

Kata is a town on the eastern side of Isumi Strait, on the South side of a bay North of Takura saki, and where there is anchorage in 5 to 8 fathoms. There is a fine landing pier here, 200 yards in length, for the use of the Daimio, who resides at Wakayama, and to whom Kata belongs. Off Takura saki, and in Kata Bay as far as Diyi Island, reefs covering at high water extend about 3 cables off the shore.

It is high water, full and change, at Yura and at Kata, at 6^h 5^m. Springs rise 6½ ft.; neaps, 4½ ft.

Osaki Bay is 1½ mile deep, and open to the W.N.W. The village of Osaki stands on the shore of a narrow inlet on its North side, where small vessels can find good shelter in 5 to 2 fathoms, which they can also obtain in Smotz ura, the innermost bay on the South side of the inlet. The only danger is a rocky patch of 1 fathom 2 cables S.E. of the North entrance head. The South point of Tree Islet should be given a berth of more than 1 cable. Over the village of Osaki is Takadoösi yama, 591 ft. high, a smooth-topped hill, with two stunted trees on its summit, conspicuous from off shore. The South shore is hilly, the South entrance bluff, being about 400 ft. high. Fresh water and small supplies can be readily obtained.

Okino Sima, W. by S. ½ S. 2 miles from the entrance of Osaki, has a round hill, 275 ft. high, and is bare of trees. *Djino Sima*, 1 mile East of it, is 400 feet high, has high cliffs towards the sea, and is wooded. A rock awash lies about 2 cables South of it, and some islets further South.

Miya Saki, 220 ft. high, lies 2 miles South of Okino sima, and may be passed at 3 cables.

Tskahara Bay is 5 miles deep and 6 miles across, between *Miya saki* and *Sirasai saki*, its North and South points of entrance. At its head is the *Bay of Hirowatali*, with anchorage in 7 to 8 fathoms, even bottom and mud, and well sheltered from all winds except W. by S. A pier at the South end of the sandy beach at its head and off a small town, protects small craft in a shallow inner harbour.

Two islands, *Kura sima* and *Taka sima*, lie off the southern shore of *Tskahara Bay*. The *Karamo Group* of small islands, with reefs about their North sides, lie N.N.E. of *Taka sima* and West of *Hirowatali Bay*, with a cluster of rocks E.N.E. of them half way to the shore, the ground about which has not been examined.

Golden Rock, so named from the large amount of property lost there, is a very small patch, nearly awash at low water, and so steep that the lead gives but little warning, there being 17 fathoms at 100 yards on the outside. It lies 3 miles N.N.E. $\frac{1}{4}$ E. of *Sirasai saki*, N.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ mile from *Taka sima Hill*, and S. by E. $\frac{2}{3}$ E. from *Miya saki*.

Sunq-ami, three-quarters of a mile North of the West point of *Karamo*, is a sunken rock, with 6 ft. over it, and equally steep-to; it is also $1\frac{1}{2}$ mile N. by E. of *Taka sima*, and S.E. $\frac{1}{2}$ E. $2\frac{1}{3}$ miles from the point S.E. of *Miya saki*.

Unless desiring anchorage, or working to windward against tide, *Tskahara Bay* should not be entered within a line joining its points, as the two dangerous rocks above mentioned lie in the centre and northern parts of the bay.

Shirasai Saki, or *White Rock Point*, derives its name from the large masses of quartz in its cliffs, and which, with the white pinnacle rock, 200 ft. high, 4 cables E.S.E. of it, show very distinctly from the South.

Fisherman Rock, a small, narrow rock, 4 ft. above high water, and steep-to on the outside, lies 4 cables West of *Shirasai saki*. Some rocks awash extend a cable's length to the N.E. of it. The passage inside the rock carries 14 fathoms in mid-channel.

Oobiki ura is a bay between *Shirasai saki* and *Yura no uchi*, where a vessel might anchor for the night with the wind off shore, in 6 fathoms, at 2 or 3 cables from the beach. The steep little island *Hijiki sima*, 120 ft. high, off its South point, marks the North point of entrance to *Yura no uchi*, a harbour 4 to 7 cables in breadth and 2 miles deep, and being sheltered by the sharp peaked island *Ali sima* and the extensive reefs off the South point of entrance, always above water, and only open to two points, viz., W. by S. and S.W. by W. Winds from these directions cause some swell inside in a gale, but it is nevertheless a secure anchorage. Anchor near the head of the bay in 6 to 7 fathoms, mud.

Hino Misaki, being at the turn of the coast, is the most prominent cape in the Kii Channel. Its terminal hill, *Hino yama*, is smooth-sloped, 675 feet high, and the islet off it may be passed at 2 cables. It is steep-to, but the tide sweeping out of the bay South of it causes an appearance of broken water, especially with a North wind. Thence the coast runs south-eastward for 19 miles to Tanabe, and parallel to the line of the outer capes, but falls back within them from 2 to 4 miles. The shore is hilly, with a strip of low land along the beach; the interior is mountainous.

The *Hidaka kawa*, sometimes entered by small junks, has its entrance 5 miles E. by S. from Hino Misaki. A reef of rocks extends a mile off shore at a mile to the southward from this. Anchorage will be found abreast the sandy beach northward of the river.

The coast to the S.E. has several outlying reefs, the largest of which extends 4 cables off Arari Point. Eastward of Arari Point, $33^{\circ} 45\frac{1}{2}'$ N., is a bay, affording good anchorage in from 5 to 8 fathoms. Reefs extend 4 cables from the cliffs on the northern shore of the bay. North of Arari Point is a round hill, on the summit of which are three spike-shaped monuments; and 3 and 4 miles inland, North and N.E. of this, are two large hill clumps, which are very conspicuous from the offing.

Tanabe Bay is formed in a bight of the coast, 22 miles S.W. of Hino Misaki, its outer parts exposed only to West and N.W. When approaching from the south-eastward, *Itsive misaki*, the most projecting point of the coast, will first be made, and being very similar to Cape Tanabé, the bay between them, in thick weather, may be mistaken for that of Tanabé. *Itsiye misaki* is a sloping point with a low terminating cliff, but the hills over it are much higher than those of Cape Tanabé, and rise to a sharp peak, the outer of a continuous high range. The summit of *Cape Tanabé*, which has a single conspicuous tree on it, is only 539 ft. high, and falls abruptly inland. Outwards a long ridge slopes gently toward the sea, with a dark clump of trees on the brow, from which it falls steeply.

The cliffs which border the cape are bold of approach, but Isaki Point, North of the cape, is very dangerous to three-quarters of a mile off.

In the north-western point of entrance of Tanabé Bay are the *Saito* and *North Bay Reefs*, 4 cables apart, with a deep water channel between them. These reefs are low and quite flat. At 2 cables distance S.E. and North of Saito, the southern of them, are sunken rocks, and off North Bay Reef is a small rock like a boulder. There is also a deep water channel between these reefs and Maruyama Point, off which shoal water extends 3 or 4 cables. Within these dangers there is safe approach for a mile, but farther in is a mass of reefs, rocks, and islets, which must be approached with great caution. In bad weather, with the wind in, all the known dangers would break.

The best anchorage is in the south-eastern arm of the bay, South of

Anchorage Island. This island may be recognised by the dark trees dotted over it, and a tree islet West of it, from which a long uncovered reef extends. The end of this reef may be passed at a cable; then steer to pass the same distance off the N.E. point of Anchorage Island, between it and the sunken rocks of Passage Reef in 6 to 10 fathoms, irregular bottom. Having passed along the East side of the island, stand in S.W. $\frac{1}{2}$ S., anchoring in 10 to 8 fathoms, in a secure and thoroughly sheltered position. There is moderately deep water in the arm to the South, as also in Hosono Bay, but they are too contracted for good anchorage.

Binzli Reef, lying in the centre of the bay, is an extensive reef with several rocks on it, dry and awash at low water. The north-eastern part of Tanabé Bay (only partially surveyed) has many shoals. On the North shore a small river discharges itself, running close under the white loop-holed wall surrounding a residence of the Daimio, the imperial Prince of Kiisiu, hidden among the trees on the left bank at entrance. The village of Tanabé stands on the shore of the sandy bay to the westward of the river, and to the North is a mountain range, the highest part of which rises to the height of 2,650 ft., the ridge curving round to the range which terminates in Itsiye misaki.

SIWO MISAKI.—The shore from Itsiye misaki to Siwo misaki, a distance of 21 miles E.S.E., is very bold, and under a high mountainous coast, terminating in a promontory of table land, which is the extreme South point of Nipon. There is a great tide race and overfalls off Siwo misaki, both on the flood and ebb; they are, however, heaviest on the flood. After a south-easterly gale the sea comes in round this point in immense rollers, such as are rarely seen on any coast.

Bottle Rock lies $2\frac{1}{2}$ cables South of the cape, and foul ground extends $1\frac{1}{2}$ cable further southward.

LIGHT.—On the top of the cape, at an elevation of 163 ft. above the sea, is exhibited a *fixed bright light*, visible in clear weather from a distance of 20 miles. The lighthouse, completed in 1878, is 63 ft. high, built of stone, and painted white. Previous to this there was a wooden tower, now removed.

Passing through the Kii Channel, it is recommended to steer always for Hino misaki.

The coast to the eastward of Siwo misaki is previously described.

ISUMI STRAIT, between the S.E. point of Awadji and Nipon, is divided into three channels by the islands Tomangai and Diyi. The West or main channel is 2 miles wide, but contracted by a sand-bank which extends half a mile off the large fort of Yura, and by reefs stretching 3 cables off the S.W. part of Tomangai. The centre passage is only 1 cable wide, and full of rocks. The eastern channel is a quarter of a mile wide, and said to be clear and safe between the reefs which extend $1\frac{1}{2}$ cable off both shore and island.

LIGHT.—On the western extreme of Tomangai sima, at an elevation of

208 ft. above the sea, is exhibited a *fixed bright light*, visible in clear weather a distance of 19 miles. It is obscured to the eastward between S. $\frac{1}{2}$ E. and N.E. by E. The tower, 21 ft. high, of granite, is in lat. $34^{\circ} 16' 40''$ N., long. $135^{\circ} 0' 30''$ E.

The **ISUMI NADA** at the N.E. extreme of the inland sea, and 35 miles in extent N.E. and S.W., is bounded on the South by a promontory of Nipon, and on the West by the large mountainous island of Awadji. Its shores are in general high and thickly wooded; in some places, however, they are low and sandy. It is singular in having neither an island nor a danger. On the East shore of Awadji the water is deep, with no convenient anchorages except in small bays close in. The coast of Nipon, on the contrary, affords good anchorage along its whole extent, reefs only extending off it 1 or 2 cables.

OSAKA, the place of greatest commercial importance in Japan, stands on the N.E. shore of the sea, on the left bank of the Yodo Gawa, which at the N.W. corner of the city divides into two branches—the Aji Kawa, as the Yodo is here called, continuing directly towards the sea; the other branch, the Kishun Gawa, takes a southerly course, and discharges its waters 3 miles lower down the gulf; these two branches are navigable by junks of moderate size. Osaka is the seaport of Kioto, the capital of Japan, which is situate 20 miles to the N.E., on a branch of the Sedo Gawa.

The Foreign concession, named Ebisu Jimà or Kawa Guchi, occupies the angle formed by the Aji and Kishu branches; its position is indicated by lofty trees; the right of building is confined to this site, but the right of residence extends over the contiguous suburb westward. It is $2\frac{3}{4}$ miles above Temposan, the fort at the river's mouth, and 2 miles below the castle. The population of Osaka is about 400,000.

The River Aji is shallow, but may be navigated by ships' boats as far as the castle; it has a bar, which at unusually low tides would be nearly dry; at exceptionally high tides, 7 ft. might be carried over.

The roadstead of Osaka is open to the West and South. The depths in the roadstead are extremely regular, diminishing gradually over a soft mud bottom; the holding ground is so good that it is considered a vessel could ride out any gale in safety. The shores are everywhere of clean sand (as are the river bars), but it constitutes a fringe only, mud being found at a cable from the low-water line.

Anchorage.—It is not advisable to anchor in less than 4 fathoms, as S.W. winds cause much sea. There are 4 fathoms at 7 cables from the lighthouse, and 7 fathoms at $1\frac{1}{2}$ mile. To the southward it is much shoaler. The best anchorage is West of the Temposan or Osaka lighthouse.

Temposan Fort and Light.—The large Temposan Fort stands on the South point, and commands the entrance of the river; it is a high turfed earthwork, scarpèd with masonry, and is a conspicuous landmark, the shores

being very low. On the parapet of the western salient angle of Temposan Fort, 53 ft. above the sea, is exhibited a *fixed bright light*, shown seaward between the bearing of N.E. by E. $\frac{3}{4}$ E. (round by North and West) to S.W. by W., and is visible in clear weather from a distance of 12 miles. The tower is a square-shaped white wooden building. 30 ft. high.

The Kishu Gawa.—Two miles S.S.E. of Osaka Bar is the bar of the Kishu, at the North point of entrance of which river a small star fort is being constructed at low-water mark a mile from the shore. This bar has not been closely examined, but it is probably a little deeper than that of the Aji, as a larger class of junks ascend this branch to Osaka.

Sakai.—**Light.**—S. by E. 4 miles from Temposan is the mouth of the Sakai River, which enters the sea between two short moles extending from two green batteries; it has no bar, and has 2 ft. at entrance. A light is exhibited from a wooden turret on the North fort.

HIOGO and KOBE.—A treaty port, 14 miles West of Osaka, is a better and more convenient anchorage than the roadstead of Osaka, having slight protection from the South, and being thoroughly sheltered from the westerly or prevailing winds. The shores of Hiogo Bay are steep-to, but low, and rise in a gentle slope from the beach to the abrupt range of hills 2 miles inland, which are of 800 to 2,000 ft. elevation, running parallel to the coast. The bay has an even depth of $4\frac{1}{4}$ fathoms, with good holding ground in a very stiff mud. A *patent slip* is established at Hiogo to receive a vessel 190 feet long, with 13 feet draught forward. A sea-wall and piers, which will also form quays, are also proposed.

The Foreign Settlement is beautifully situated at the head of the northern bay of Kobé. This bay is somewhat smaller than that of Hiogo, but the shores of it are steep, and there is about the same depth of water as in the former, and if less sheltered in S.W. winds it is less exposed to easterly winds.

The railway pier at Kobé was completed in 1876, so that vessels can moor alongside and load from the railway trucks. Moorings are laid down. There is also the old accommodation, which entirely shelters junks of considerable size.

British subjects are free to go wherever they please within 10 *ri* (21 miles)

* A RAILWAY, $21\frac{1}{4}$ miles long, was opened in May, 1874, between Kobé and Osaka (Agi Kawa). From Osaka it is continued in a N.E. direction for nearly 30 miles to Kioto, at the South end of Lake Biwa. It is proposed to extend this railway, so that all the chief parts of Nipon shall be in communication, including Tsuruga and Niigata, on the West coast, and Nagoya, at the head of Owari Bay, and Yokohama on the South coast. Mr. R. Vicars Boyle, C.S.I., has surveyed most of the routes for the intended railways.

A dock was commenced in 1876 at the Osaka station for the accommodation of waterborne traffic, which, when completed, will enable goods to be transported by boat direct to and from that station in place of Ajikawa as heretofore.

of Hiogo in any direction, that of Miako (Kioto) excepted, which city shall not be approached nearer than 10 *ri*. The crews of vessels resorting to Hiogo shall not cross the River Ena Gawa, which flows into the bay between Hiogo and Osaka. During the autumn and winter months small-pox is very prevalent here. The railway borders the bay to the eastward of Kobe.

LIGHTS.—At Kobé a *fixed green light* is shown from a white staff, 34 feet high, on the eastern pier-head of the Foreign Concession. The light is elevated 42 ft., and visible 6 miles off.

On *Wada Misaki*, the S.W. point of Hiogo Bay, elevated 52 ft. above the sea, is exhibited a *fixed red light*, showing seaward between the bearings of N.N.W. (round by East and South) to W. by S. $\frac{1}{2}$ S., visible in clear weather from a distance of 12 miles. The tower is an octagonal-shaped white wooden building, 46 ft. in height.

It must be borne in mind that the ebb tide sets to the westward towards Akashi Strait, and the flood to the eastward towards Osaka, 2 knots an hour at springs, increasing as Akashi Strait is approached. In the bay directly East of Kobé, there is a sandbank of less than 2 fathoms, extending half a mile off shore.

Supplies of all descriptions may be procured in abundance at tolerably cheap rates. Government coal is stored here in charge of a contractor, who also supplies fresh meat, vegetables, and water. Large timber, chiefly cedar (*Sungi*) is also procurable.

Tides.—It is high water, full and change, at Hiogo at 7^h 15^m. Springs rise 5 ft. 8 in.; neaps 4 ft. 3 in.; neaps range 2 ft. 6 in. The range of any day seldom exceeds 5 ft. at springs or 1 ft. 6 in. at neaps.

Taka iso, a rock with 9 ft. on it at low water, lies nearly a cable off shore, 5 $\frac{1}{2}$ cables to the westward of the village of Shiwoya.

Hira iso are the highest pinnacles of a bank of rock and shingle, 4 cables from the shore, having 6 ft. on them at low water. The eastern lies E. $\frac{3}{4}$ N. 3 $\frac{1}{4}$ miles from Matsu-wo-ga hana (the North point of Awadjii sima). South from it, and quite close to, is the wreck of a Satsuma steamer, having 2 ft. on it at low water. To clear them the light on Matsu-wo-ga hana must be kept West, until Ichi-no-tani yama bears N.E. The stone fort at Maiko in sight, N.W. $\frac{1}{2}$ W., clear of the trees on Kara saki, leads to the westward of Hira iso.

AKASHI NO SETO (Akashi Strait), between the North point of Awadjii sima and the coast of Nipon, is nearly 2 $\frac{1}{2}$ miles wide, the above rocks, Taka iso and Hira iso, being the only known dangers when approaching it.

Akashi town, on the North shore of the strait, contains the residence of the Daimio, the four white towers of which show out plainly against the surrounding dark foliage.

In the bay of Yamata ura, between the dark wooded point of Kara saki and the conspicuous granite fort at Maiko to the eastward, and the town of

Akashi to the westward, there is good anchorage, with winds from N.W. round by North to East, in 9 fathoms, sand, good holding ground.

Yamata iso, a rock in the strait having 2 ft. on it at low water, lies N.W. by W. $\frac{1}{2}$ W. $3\frac{1}{2}$ cables from Maiko Fort. Care should be taken not to anchor within 5 cables of the fort. The tides take the line of the coast, and have at springs a velocity of $2\frac{3}{4}$ knots.

From the West end of the town of Ahashi a series of shoals extends to the W.S.W. for 11 miles, the outermost composed of rock covered with sand and shingle, being named *Shika no se*. The South sides of these shoals being steep-to are very dangerous. The South side of the *Shika no se* is marked by a red buoy.

Murozu no se, on the southern side of the West entrance to Akashi no seto, has been thoroughly examined by H.M.Ss. *Serpent* and *Sylvia*, and nothing less than $5\frac{3}{4}$ fathoms has been found.

Directions.—On approaching Akashi Strait from the westward a clear course may be made between the above shoal and *Shika no se*, by keeping the summit of *Ichi-no-tani yama* in line with the lighthouse on the North extreme of *Awadji sima* E. by N. $\frac{1}{2}$ N. or at night by keeping the light on that bearing.

Matsu-wo-ga Hana and Light.—The North point of *Awadji sima* is terminated by a white stone fort, with seven guns “en barbette,” is steep-to, and has a lighthouse erected on it, from which is shown, at an elevation of 158 feet above the sea, a fixed light of the first order, from East round by North and West to S.W. by W. $\frac{3}{4}$ W., visible 18 miles off. The tower is 15 feet high, built of stone.

HARIMA NADA is a comparatively shoal expanse, lying between *Awadji sima* and *Sozu sima*, having about 20 fathoms deepest water, the southern portion of the sea being clear of dangers. The northern portion, however, is said to be encumbered with shoals and dangerous covered rocks, extending from *Ukado Point*, the S.E. point of *Sozu sima* to *Shika no se*, before described. In navigating the *Harima nada* the dotted track should be as closely as possible adhered to, as the northern portion of this sea has not been closely examined. Its southern shore from the *Naruto* passage westward for about 17 miles, as far as *Taka sima*, is also as yet unsurveyed. *Ichi-no-tani yama* (end hill) just seen open of the lighthouse on *Awadji sima* leads between the *Shika no se* and *Murozo-no se*, for the South point of *Sozu sim*.

Sozu Sima, a large island in the western part of the *Harima nada*, is 2,560 ft. high. On its South side the high promontory of *Yosino*, terminating in a bluff 980 ft. high, stretches to the southward, forming a conspicuous landmark throughout the *Harima nada*, and the narrow sea to the westward. There are large bays on either side of it, but they are considered not to afford good anchorage.

Hana Mura, on the Kiusiu shore, S.S.W. 5 miles from Yosino Bluff, is said to be the best anchorage in the neighbourhood, and a fine harbour. A bank, carrying 19 ft. water, lies in the middle of the entrance.

Westward of Sozu Sima the Seto Uchi is studded with numbers of islands, for miles forming numerous channels, of which the most central and southern only have been examined; these, however, are sufficiently clear of dangers to be with ordinary caution quite safe of navigation, the surveys of these narrows having rendered the navigation of the Seto Uchi comparatively easy.

Galatea Shoal, on which H.M.S. *Galatea*, Capt. H.R.H. the Duke of Edinburgh, grounded in 1869, has from 1 to 3 fathoms on it. Its eastern extreme lies $1\frac{1}{2}$ mile W. $\frac{2}{3}$ S. the South point of Kasiwa, and its eastern extreme approaches Odutsi within 11 cables.

Nabae Sima Light.—On the summit of Nabae Sima, it lat. $34^{\circ} 23' N.$, long. $133^{\circ} 49' E.$, at an elevation of 85 ft. above the sea, is exhibited a *fixed bright light*, of the third order, seen between N. $\frac{1}{2}$ E. round by South to W. $\frac{1}{2}$ N.; visible in clear weather from a distance of 15 miles. It is very useful in assisting vessels to avoid the 3-fathom shoal to the southward.

Siyako lies West from Nabae Sima, with a deep channel between. A rocky ledge extends $1\frac{1}{2}$ cable off its South point. *Ushi Sima* lies to the southward of Siyako, between which is a deep channel, 5 cables wide. *Rocks*, which dry towards low water, extend 1 cable off the North point of Usi Sima. They are steep-to.

The Conqueror Bank, steep-to, from the S.W. point of Usi Sima extends $2\frac{1}{2}$ miles in a W.S.W. direction.

Anchorage.—*Hiro Sima* lies to the W.S.W. of Siyako. On its South shore is *Ino Ura*, a small bay, on the shores of which are several small villages. *Ino Ura* is a convenient anchorage for vessels passing through the Seto Uchi, and is generally chosen as a night anchorage, especially when bound from Hiogo to the westward, it being within convenient distance, and can be arrived at before nightfall. Care must be taken not to approach the shore too closely, as the head of the bay shoals very suddenly.

Ten-feet Rock, or *Habushi Iwa*, lies $5\frac{1}{2}$ cables S. by E. $\frac{1}{2}$ E. from the South point of *Ino Ura*; it is 20 ft. high and whitened, and may be passed quite safely on either side at 1 cable distance.

Takami, a very conspicuous island on the South side of the route, is nearly $1\frac{1}{2}$ mile long. A shoal bank extends from the eastern side of *Takami* in an E.N.E. direction, and nearly joins the S.W. extreme of the *Conqueror Bank*.

Sanagi Sima lies 3 miles W.S.W. from *Hiro Sima*. From its eastern shore extending 3 miles in an easterly direction, is an extensive bank of sand, with from half to 2 fathoms upon it.

Nezumi Sima lies $1\frac{3}{4}$ mile to the southward of *Sanagi Sima*, between

which is the channel recommended. Rocks project on its northern side to nearly 3 cables. The channel South of Conqueror Bank is now seldom used.

Anchorage.—*Awa Sima*, on the South side of the western entrance to the channel, joining the Bingo and Harima Nadas, is triangular in shape, having bays on its North, South, and West sides. Anchorage may be had in either of the above bays, that to the South having the deeper water; but in using it *Awa Rock* must be avoided. It lies S.W. by S. $3\frac{1}{2}$ cables from the S.E. point of *Awa Sima*. The northern bay is more convenient for vessels anchoring for the night. Care must be taken not to anchor too near the head of the bay as it shoals a long way out. The bay on the West side of the island is shoal.

The **BINGO NADA** from the channels just described across to the channels leading into the Misima nada is about 80 miles wide, and about 38 miles long in a N.N.E. direction. It is comparatively clear, having only a chain of six islands stretching across it in a N.W. and S.E. direction, and a few others lying near the Kurusima Strait.

Directions.—On passing *Nezumi sima*, steer to pass in mid-channel between *Mutsu sima* and *Akeno misaki*, from whence, if wishing to take the northern route through the channels between the Bingo nada and the Misima nada, a course W. by N. will lead up to mid-channel between the islands of *Hyaku Kuan* and *Yoko*, at the entrance to the *Mekari seto*.

If intending to take the southern route through the Kurusima Strait, a course W.S.W. from *Mutsu sima* will lead up to *Takaikami*, the loftiest of the islands lying in the Bingo nada, and, passing in mid-channel between it and *Oki sima*, continue the same course passing about one mile North of *Kadji*, the northern island of the next group, and when the islands of the South point of *O sima* are seen, haul up and steer to pass them at about a mile, for the Kurusima Strait.

KURUSIMA NO SETO (Kurusima Strait.—The northern shore of the province of *Iyo* forming the southern coast of the approach to *Kurusima no seto*, may be known by two curiously shaped hills, one with a double summit; on one of which is a clump of trees 1,202 feet above high water; the other hill has a lower clump, 363 feet above high water, close to the shore, $2\frac{3}{4}$ miles South of *Imabari*, the coast being a series of sandy beaches between *Imabari* and the spurs from the double hill just mentioned. The large town of *Imabari* is also very conspicuous on this shore, and the islets off the South point of *O sima* on the northern shore of the strait are also easily recognized.

Rocks that cover at high water, and stretch $1\frac{1}{2}$ cables from the shore, lie off this coast N.N.W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from the pier at *Imabari*.

Tori ishi, a rock with a temple gate, 13 feet above high water, lies nearly four miles south-eastward from *Imabari Pier*, $1\frac{1}{2}$ cable from the shore.

Obama is a large village $2\frac{1}{4}$ miles to the N.W. of Imabari, having a bluff point at the North extreme, and a conspicuous temple gate near the centre.

Shiroi iwa, 13 ft., is a white topped rock, lying $2\frac{1}{2}$ cables N. by E. $\frac{1}{2}$ E. from the rocky point just northward of the village of Obama, and may be approached to half a cable on the East side.

Amaze, a rock that dries at low water, lies N. by W. $\frac{1}{2}$ W., $3\frac{1}{2}$ cables from Shiroi iwa; and *Hirose*, a patch of rocks that dry, lies S. by E. $\frac{1}{2}$ E. $2\frac{1}{2}$ cables from the same place.

O sima, a large island on the North side of Kurusima no seto, bears evidence of volcanic origin in the remarkable features of its innumerable peaks, deep valleys, and off-lying pinnacle rocks.

Anchorage.—There is a good anchorage off Hangata in 7 fathoms, with the left extreme of the village bearing W. by S. $\frac{3}{4}$ S. distant $2\frac{1}{2}$ cables. There is no really safe anchorage off Obama, the tides being especially strong there. Anchorage, though in a strong tideway, may be had with off-shore winds in from 11 to 13 fathoms, sand, good holding ground, with the pier of Imabari bearing S.S.W. $2\frac{1}{2}$ cables.

From Hashi hama the coast trends to the N.W. to Ozumi no hana, and about midway between is the village of Hangata, near the North end of which is a temple gate, the tide pole datum.

Maru iso lies S.E. $\frac{1}{2}$ S. half a mile from Ozumi no hana and $1\frac{1}{2}$ cables from the shore, and uncovers 5 ft. at low water.

Birose is a ledge of rocks covered at high water, lying off Hangata. Both this and Maru iso are occasionally marked by tree beacons.

Directions.—The channel from the eastward, formerly used between Nezumi sima and Uma sima, is the best; that now frequently taken, known as the Kuru sima or Junk Channel is not recommended. After rounding Uma sima care should be taken to clear the *Perseus Rock* by keeping in mid-channel, with the eastern point of the entrance to Hashi hama Harbour open of Nezumi sima, until a remarkable single tree in the first gap right of the highest sharp hill of O sima, is in line with the North extreme of Mushi sima S.E. by E. $\frac{1}{2}$ E. The northerly stream sets on to the S.E. point of Nezumi sima, and also towards the Perseus Rock.

Approaching from the westward, after passing Kadjitori saki, a course should be steered to pass a quarter of a mile North of the flat rock of Ozumi no hana, when the conspicuous tree in the first gap right of Kiro yama will be seen in line with the North extreme of Mushi sima, S.E. by E. $\frac{1}{2}$ E. This mark should be kept on until the West extreme of the N.E. point of Hashi hama is open East of Nezumi sima S.W. $\frac{1}{4}$ W.; this clears the Perseus Rock (Ko no se). A course may then be steered to pass West of Uma sima, borrowing rather nearer to that island than the mainland, to avoid the Amaze.

Uma sima may be rounded at 2 cables, or continuing the leading mark a

little farther on a course may be steered to pass between Uma and Nagato sima, keeping the latter island close on board.

The other channels should not be attempted.

Tides.—In the Kurusima no seto, from Ozumi no hana, the flood runs towards Nezumi sima and Tsu sima, sweeping over the Perseus Rock (Ko no se) towards the North point of Uma sima, then taking the direction of the channels, diverging into the Hi-uchi nada. The ebb converges from the last-named place to the channels, running with great velocity from Imabari to the North, so that a vessel leaving that place should guard against being swept on to the More no iso. From the South point of Uma sima it runs for the S.W. point of Nezumi sima, and diverges through the channels. The ebb sweeps directly through the channel between Uma and Negato sima, causing on the North side heavy whirls that must be guarded against, their tendency being to turn the vessel's head towards Ko no se. The velocity at springs is from 4 to 6 knots.

It is high water, full and change, at Hangata, at 10^h 36^m; springs range 11½, neaps 5 ft., after superior transit of moon, and at 9^h 52^m. springs range 9, neaps 3½ ft., after inferior transit.

The Northern Route through the Mekari seto and Aogi seto is but little greater distance than through Kurusima Strait, if when off Mutsu sima a course be at once steered for its entrance through the Mekari seto; and it has the advantage of the Kurusima Strait from the fact that the tides are of much less velocity here than in the latter.

Passing westward of Hyaku kuan at about 7 cables, a course N.W. by W. ¼ W., with the bluff fall of Hachi gaune yama (which will be seen ahead 1,405 ft. high), in line with the right extreme of Hosu sima, will lead into the Mekari seto clear of Jarrad Bank, which lies to the northward off the S.E. point of Mukai sima. On passing Hosu sima at about 2 cables distance borrow on the northern shore, which is steep-to, until abreast Ko saki sima, when keep in mid-channel between Saki sima and the coast of Nipon until within half a mile of Ko-ne sima, when the Aogi seto will open, then haul up S.W. by W. ½ W. and bring the distant high peak Higashi on Osaki sima in line with the extreme point of O-mi sima; this mark will lead in mid-channel between Admiral and Captain Banks. On nearing the dark wooded island Kuno sima a rocky islet will be seen off O-mi sima, which may be passed at 1½ cable. Keep in mid-channel between Matsu sima and O-mi sima, rounding Kodono sima at half a mile, when steer to pass in mid-channel between Yoko sima, Niwatori jima, and the shore of Osaki until abreast Noka no hana the S.E. point of Osaki, when haul up and pass in mid-channel between Oge and Ko Oge sima into the Misima nada.

The entrance to Aogi seto from the westward may be readily distinguished by the conical hill and white quartz-faced boulders of Ko-oge sima and the

dark wooded Oge sima, care being taken not to mistake the S.W. point of Okamura, that has also some white rocks at the base.

Mitarai sima, a high wooded island to the westward of the entrance to the Aogi seto, has a flat-topped summit 1,443 ft. above high water, sloping gradually to its West end, when it falls abruptly, has a slightly indented coast line, and an apparently bare double peak at its eastern end, sloping down to a considerable village, with a remarkable white wall at the eastern extreme. South of the village is a Japanese *lighthouse*, merely a lantern, and rarely lit.

Tides.—The tides in the Aogi seto appear to take the line of the channel, running with a velocity of $2\frac{1}{2}$ knots round Noko no hana, 3 to 4 knots in the channel between Kuno sima and O-mi sima, and with an average velocity of 3 knots to the narrows between Mukai sima and In-no sima (Mekari no seto), where they increase their rate to $3\frac{1}{2}$ knots. The flood runs to the eastward and the ebb to the westward.

It is high water, full and change, at Miwara, at 10^h 37^m. Springs range 11 ft., neaps 9 ft. The stream changes to flood at low water, and to ebb three-quarters of an hour after high water.

Directions for Kuruma no Seto.—The directions for Aogi seto should be followed until clearing the channel between Kuno and O-mi sima, when the latter should be rounded at three-quarters of a mile, and a S.E. course steered to pass a quarter of a mile East of Hiotan jima, and the same distance West of the S.W. point of Seto-da jima, bearing in mind that the ebb sweeps strongly towards the beacon on the West side of the channel.

The Seto-da jima shore should be kept about a quarter of a mile off until the islet off the East point of Hakata sima opens of the N.E. point S.E. $\frac{1}{4}$ E., when a course should be steered to pass the latter point at a quarter of a mile, and then for mid-channel between the islets off the East point and Mu sima, taking care to keep the S.W. point of Seto-da jima open of the N.E. point of Hakata sima N.W. $\frac{3}{4}$ W., to avoid the foul ground in the bay between the East and N.E. points.

In the Kuruma no seto the flood runs to the S.E. and the ebb to N.W., with a velocity of $2\frac{1}{2}$ to 3 knots, in the direction of the channel, except off the S.W. point of Seto-da jima, where the ebb sweeps partly across the channel towards the stone beacon on the West side.

MISIMA NADA.—This portion of the Seto uchi is 30 miles East and West, about the same distance North and South, and is studded with numerous groups of islands, islets, and rocks, of which as yet little is known. At its North extreme is the large town of Hiro sima, on the shore of Nipon. Its southern boundary is an extensive chain of islands stretching across the Seto uchi in an East and West direction, of which Yayo sima, Numa sima, Nnku sima, Mosuki, Nokona, and Kosii sima are the largest. The

route recommended lies through the south-eastern part of the Misima Nada, within 2 to 3 miles from the mainland of Sikok.

Tsuri Sima and Lighthouse marks the eastern side of the channel which joins the Misima Nada with the Iyo Nada. Tsuri Sima is highest at its southern end, where the elevation is 150 feet, gradually decreasing to the North and West. The island is wooded. The lighthouse, 21 feet high, is built of granite, and stands 400 yards inshore of the N.W. point of the island. The *fixed bright light*, elevated 186 feet and visible 20 miles off, is obscured to South and East between S. $\frac{3}{4}$ W. and E.N.E.

Anchorage.—Cape Simonamba, $13\frac{1}{2}$ miles north-eastward of Tsuri Sima, is a bluff point of about 250 ft. in height, from which the land rises to the eastward or inland in irregular slopes to three conspicuously sharpened peaks of about 1,000 feet. The bay South of Simonamba Point affords good anchorage in 6 to 9 fathoms with the North point of Kosii bearing W. by S. $\frac{1}{2}$ S., but one mile South of this position is a sandbank, on which there is only 9 ft. water. A sandbank on which there are 14 ft. water, lies in the same bay, about midway between Ka sima and Kosii sima, with the western-most of the two largest elevated rocks which are seen West of Ka sima in line with Cape Simonamba.

Directions.—After rounding Ozumi no hana, Itsuki sima, a comparatively low island with bare ridges of a reddish colour should be steered for W. by S. $\frac{1}{2}$ S., until Kajitori saki bears about S.W. by S., when alter course to S.W. $\frac{1}{4}$ S. for the S.E. point of Nokona, and passing it at about half a mile keep in mid-channel between Mosuki and Kosii sima. Cape Simonamba should not be approached nearer than one mile.

IYO NADA.—This portion of the Seto uchi lies westward of Tsuri Sima, between which and Hime sima its western boundary is about 55 miles. The whole of its shores are as yet unsurveyed, but that to the South appears clear, with no off-lying islands or indications of danger; its northern shore, however, is skirted by groups of islands and rocks. Great caution should always be observed when approaching any of the coast which has been inserted in the charts from the Japanese manuscript only, as the sunken dangers are not often shown on that document. At the S.W. of the sea is a deep bight on the North shore of the island of Kiusiu, which from this, westward, forms the southern shore of the Seto uchi. In this bight are several deep indentations, which are probably good anchorages; several large rivers also flow into this part of the Iyo nada. About 20 miles to the eastward is the northern entrance to the Boungo Channel described on page 1202.

Anchorage can be obtained at Oemura, about E. by S. of the South point of Kosii. There is a large town (Sinhama) in this bay with forts on the shore, and a Japanese man-of-war was seen lying at anchor with a large

number of junks; the bay is open to the westward. In passing through between Kosii sima and the main, where not less than 9 fathoms were obtained, there appeared to be good anchorage in the southern bay on the East side of Kosii; junks were lying there. The shore of the mainland opposite Kosii is skirted with rocks and islets.

Tides.—The tides, both flood and ebb, set across the bay, but their rate does not exceed 1 to $1\frac{1}{2}$ knots. It is high water, full and change, at about 9^h, and springs rise 8 or 9 feet.

Directions.—From Nokono a course may be shaped to pass on either side of Yuri, the South side being preferable, from which a course S.W. by W. $\frac{3}{4}$ W. will lead up to pass about one mile South of Ko Minasi sima, after which alter to W. by S. $\frac{1}{4}$ S. to pass about $1\frac{1}{2}$ mile southward of Ya sima. When Ya sima bears North haul up W. by N. $\frac{1}{2}$ N. This course leads about $1\frac{3}{4}$ mile northward of Hime sima, but according to the tide vessels are either set to the southward towards the Boungo Channel, or to the north-westward towards Iwami sima. Continuing this course from Hime sima will lead through the Suwo nada up to the entrance to Simonoseki Strait.

The **SUWO NADA**, the western division of the Seto Uchi, is the most open but of no great depth, the soundings varying from 15 to 20 fathoms in the centre. It is bounded on the North by the provinces of Suwo and Nagaton in Nipon, and on the South by the province of Buzen in Kiusiu, and on the East by Hime sima, and is about 40 miles in length (East and West). At its western extreme is the strait of Simonoseki, the western approach to the inland sea.

Directions.—Vessels bound from the Boungo Channel or from the eastward for Simonoseki Strait, may steer to pass Moto yama at the distance of 3 or 4 miles. Thence a course should be shaped, N.W. $\frac{3}{4}$ W. for I saki, which is high and bold, as well as steep-to, and may be rounded at the distance of 2 or 3 cables. At night keep I saki *white* light in Sight N.W. $\frac{1}{2}$ N.

I SAKI and **LIGHT.**—Isaki is the eastern promontory of the North point Kiusiu, and South point of East entrance of the strait of Simonoseki; it may be passed at 2 cables.

On its N.E. extreme, elevated 122 ft., and visible 17 miles off, is exhibited a *fixed light*, showing *red* to the northward and eastward between W. by N. and S.E. $\frac{3}{4}$ E., and *bright* to the southward of the latter direction as far as S. $\frac{1}{2}$ W. The junction of the red and white lights bearing N.W. $\frac{3}{4}$ W. clears the shoals off Moto yama. The tower is of granite 31 ft. high.

SIMONOSEKI STRAIT, surveyed during the years 1872 to 1875 by Captain St. John in H.M.S. *Sylvia*, is 7 miles in length, and has a navigable channel varying from 3 to 7 cables in breadth. Both entrances are encumbered with sandbanks, particularly the western, between which and the off-lying islands extensive reefs project in every direction. The eastern entrance to the strait lies between I saki and Kusi saki, between which it is $2\frac{1}{2}$ miles

wide, but is divided into three channels by two extensive sandbanks named the Middle Ground and Tano Bank.

Kusi Saki, the North point of entrance of the strait, has reefs extending 2 cables off it. There is a large military station here, named Choshin, or or Hagi Chiofu.

Kanziu and *Manziu* are two islands E. by N. of Chofu Point. They are both covered with trees, and should not be passed within 2 cables. *Kanziu* is low and flat, with some large rocks and a rock awash off its South end; but *Manziu* is 190 ft. high.

Middle Ground, midway between Kusi saki and I saki, is a shoal bank of sand extending $1\frac{1}{2}$ mile in an East and West direction, being from one-half to 3 cables in width, and has depths varying from 1 to 3 fathoms on it. The eastern extreme is $1\frac{1}{4}$ mile N.N.E. from I saki Lighthouse.

A *black buoy* surmounted by a cage lies in 3 fathoms at the East extremity of the Middle Ground. From it the middle of *Manzui* bears N. by E.; *Mozi Point*, W. by N. $\frac{3}{4}$ N.; and *Isaki Lighthouse*, S. $\frac{3}{8}$ W. There is a shoal spot, with only 6 ft. water on it, immediately North of the buoy. A *red buoy* with staff and ball is moored in 3 fathoms, $8\frac{1}{2}$ cables West of the black buoy, with Kusi saki bearing N.N.W. $\frac{1}{2}$ W., $4\frac{1}{4}$ cables from the western extreme of the Middle Ground.

This bank divides the strait into two channels, that to the northward (North Channel) carrying the deepest water.

Tano Bank, western extreme, on which is 4 fathoms, lies 4 cables E. $\frac{3}{4}$ N. from *Mozi saki*, from which position it extends in an easterly direction for nearly $1\frac{1}{4}$ mile with depths varying from $2\frac{3}{4}$ to 4 fathoms on it.

This bank divides the portion of the strait lying southward of the Middle Ground into two channels. Neither of them is to be preferred to the North channel (North of the Middle Ground), but of the two the channel North of the Tano Bank (Middle Channel) is the best.

A large clump of firs on *Take saki* (the South point of Simonoseki town), in line with *Mozi saki*, W. by S. $\frac{3}{4}$ S., leads between *Kanabuse* and *Tano Bank*.

Anchorage in 5 fathoms may be found on the outer part of the Tano Bank (which shoals suddenly from 7 to 4 fathoms) well clear of the tide race through the strait.

Kanabuse or **Fisherman Rock** lies 11 cables N.E. by E. $\frac{1}{2}$ E. from *Mozi saki*. It is 120 yards long (N. by W. and S. by E.), has only 4 feet on its southern end, 12 feet on its northern end, and 5 fathoms between at low-water springs; the South end has the appearance of two large square blocks of stone 10 yards apart. There are 6 fathoms close to its South, East, and West sides, and 10 fathoms (sandy bottom) about a boat's length northward of the 12 feet patch. A *buoy*, colored *black* and *white* in horizontal stripes and

carrying a staff and ball, is moored in 9 fathoms, half a cable South of the southern rock, with Mozi saki bearing S.W., and I saki E.S.E.

CHANNELS.—The *North Channel*, northward of the Middle Ground, is, with the exception of the Kanabuse, clear of danger. The *Middle Channel*, South of the Middle Ground, and North of the Tano Bank, carries $4\frac{1}{2}$ fathoms at low water springs. Hino yama kept W. $\frac{1}{2}$ N. until the clump of trees on Take saki comes in line with Mozi saki leads through. The *South Channel*, southward of the Tano Bank, is the narrowest, although the tides here are not so strong as in the North and Middle Channels. It carries a depth of not less than $5\frac{1}{2}$ fathoms at low water.

Mozi Saki.—The strait is narrowed to 3 cables between this point (which is the extreme of a promontory at the North end of Kiusiu), and the eastern end of the town of Simonoseki. *Hino yama*, a peak with three summits, the highest of which is 933 ft. above the sea, is conspicuous on the mainland of Nipon, opposite Mosi saki. Between Mosi Saki and the opposite shore the tide runs with great velocity, but with some interval of slack water between the change of stream.

Whitshed Bay, on the South side of Mozi saki, affords good anchorage in from 5 to 7 fathoms, with Mozi saki and Observation Point in line, or a little open, bearing North; and Mozi village bearing East. Here the heavy ships of the allied fleet anchored after the reduction of the batteries in September, 1864. An extensive shoal bank, with from 3 to 4 fathoms water on it, fills up the whole of the southern part of Whitshed Bay.

SIMONOSEKI is an important town from its position at the entrance of the Inland Sea. It is formed of a single principal street running for nearly 2 miles, at the base of some low steep hills, along the shore of Nipon. Its most conspicuous building is the custom-house, recognised by its tall white gables. A small *light* is exhibited on the shore at the end of a stone balustrade at the eastern quarter of the town.

Supplies of provisions and coal were obtained by the squadron with difficulty, as it was not a treaty port. The *coal*, which is much used here in the forging of nails, was of the worst possible description, and gave 75 per cent. of ash and earthy matter. *Water* of excellent quality was brought off in buckets in large boats.

If intending to anchor off the town of Simonoseki, take a position well below the custom-house in from 6 to 10 fathoms, out of the tides, which are very rapid.

Tides.—It is high water, full and change, at Simonoseki, at 8^h 30^m; springs rise 8 ft., neaps 3 ft. The western stream makes at $2\frac{1}{2}$ hours before high water, and the eastern stream $2\frac{1}{2}$ hours after high water, so that the western stream continues 5 hours and the eastern 7 hours. Off Mozi saki the velocity at springs is from 7 to 8 knots, at neaps 3 to 4 knots; the current is at its

full strength for 3 hours of each tide. There are heavy overfalls in the eastern part of the strait at springs.

HIKU SIMA, lying at the western entrance of Simonoseki Strait, is 3 miles in extent North and South. Its S.W. point, *Entrance Head*, is a wooded bluff, 380 ft. high, to the North of which is a small harbour called *Fuku ura*, where junks anchor in from 9 to 10 ft. at low water. A *fixed bright light* is shown about two-thirds up the hill, on the North point of entrance to *Fuku ura*.

Yodsibi Rock lies E.N.E. $5\frac{1}{2}$ cables from Kibune Point, the S.E. extreme of Hiku sima, and is best avoided by hugging the Hiku sima shore. It uncovers 4 ft. at low water springs, and is marked by a *red conical stone beacon*, 20 ft. in height and 8 ft. in diameter at the base, with a plain rounded top. The rock may be passed on either side, but the western channel is preferable, being twice the width of the other.

Narusi Rock is a quarter of a mile off Kibune Point, and $1\frac{1}{2}$ cable off shore. It uncovers before half ebb, and is very dangerous. A *white conical beacon*, 8 ft. in diameter at the base, 20 ft. in height, and surmounted by a pear-shaped top, has been erected on this rock. To pass outside it, keep Hino yama, the wooded bluff hill over Simonoseki, open of Kibune Point.

Manaita Rocks, lying nearly 2 cables South of Entrance Head, uncover towards low water. A conical *beacon*, coloured *black* and *white* in rings, 8 ft. in diameter at the base, and 20 ft. in height, surmounted by a ball 3 ft. in diameter, has been erected on the largest of these rocks.

KOKURA town and fortress stands on the shore of Kiusiu, South of Hiku sima, at the mouth of a small stream named the Ogawa.

Kokura Ledge is a flat of sand and rock, with shoal patches on it, fronting the low shore of Kiusiu South of Hiku sima. The flat extends from 1 to 2 miles off shore, gradually deepening to 3 fathoms at its outer edge, which is steep-to.

Hiku Flat, lying W.N.W. 1 mile off Entrance Head, is a bank of sandstone rock, 8 cables long and 3 broad, with 13 ft. water on it.

The West extreme of Hiku sima (Cape Sizikuts), in line with the East extreme of Kanasaki sima, N.N.W. $\frac{1}{4}$ W. westerly, leads between Hiku Flat and a small 3-fathom bank, 4 cables N.E. of it (Hamo Bank).

DIRECTIONS.—Approaching the strait with I saki light N.W. $\frac{3}{4}$ W., or at night keeping the *white* light in sight, as before mentioned, pass I saki at half a mile, and when the lighthouse bears S.S.W. $\frac{1}{2}$ W., haul to the northward to clear the eastern end of the Middle Ground, taking care not to bring I saki lighthouse southward of that bearing until Hino yama bears W. $\frac{1}{2}$ S., southerly, when steer for it until I saki lighthouse bears S.E. by E. $\frac{1}{4}$ E., when a small islet will be seen just open North of Kusi saki, bearing N. by E. $\frac{1}{2}$ E. Alter course to S. by W. $\frac{1}{2}$ W. with the above mark on

which will lead between the western extreme of the Middle Ground and Kanabuse Buoy) until the clump of firs on the point South of Take saki is in line with Mozi saki W. by S. $\frac{3}{4}$ S.; keeping this mark on steer for them, rounding Mozi saki at $1\frac{1}{2}$ cable (mid-channel), on passing which haul to the southward, keeping the northern shore on board until Hino yama bears N.N.E. $\frac{1}{2}$ E., when alter course to S.S.W. $\frac{1}{2}$ W., and pass to the westward of the red beacon on the Yodsibi Rocks. Pass Kibune Point at $1\frac{1}{2}$ cable, and take care not to shut Hino yama in with the above point until the Narusi Rock is passed (at about $1\frac{1}{2}$ cable), when alter course to S.W. by S., keeping the hill over Mozi saki open of Kibune Point until Clump Hill (1,778 ft. high) on the southern shore bears S.E. by E. $\frac{3}{4}$ E., then alter course to N.W. by W. $\frac{3}{4}$ W., until the East extreme of Kanasaki sima is in line with Cape Sizikuts (the N.W. point of Hiku sima) bearing N.N.W. $\frac{1}{4}$ W.; haul to the northward with this mark on, which leads to the westward of the Manaita Rock, and in from 6 to 10 fathoms between the Hiku Flat and Hamo Bank, borrowing to the westward as the Hiku Flat is passed, and round Cape Sizikuts at about 3 cables; after which, haul up for the lighthouse on the N.E. point of Rockuren Island, and pass it at from 3 to 4 cables; or at night keep the light in sight, taking care not to bring it to bear eastward of N. by E. $\frac{1}{2}$ E., to clear the shoal extending to the S.E. from Wakura sima and Kanasaki sima.

Caution.—The mariner is reminded that the tidal streams set through this strait with great velocity, and that great caution is necessary for the safe navigation of the ship, to avoid the many dangerous rocks and banks with which it is encumbered. It is therefore recommended that vessels should anchor, if the tide be not favourable on arrival at either entrance, and that the strait should be taken at as nearly at the time of slack water as is possible.

Anchorage may be had at the western entrance to the strait, to the eastward of the Hamo Bank in from 8 to 10 fathoms, with Wakura sima in line with Cape Sizikuts.

The Western Entrance to the Seto Uchi is at its outer part 35 miles across, being formed by the West Coast of Nipon running South for 25 miles from Kado sima, and the North Coast of Kiusiu taking an easterly direction for the same distance, from Kosime no Osima. At the angle where these coasts meet, within 3 miles, is the large island of Hiku sima, above described, South of which is the fairway and entrance to the Strait of Simonoseki.

IWAYA POINT, low and rocky, with projecting ledges, is at the termination of a sandy bay 5 miles wide. A wooded hill, 1,100 ft. high, conspicuous from the offing, with a round gap in its summit, rises 5 miles S.W. by W. $\frac{1}{2}$ W. of Iwaya Point.

The Kiusiu shore eastward from Iwaya Point is generally low, and skirted with sandstone ledges, but the back ranges are from 2,000 to 4,000 feet in height. The shore of Nipon is higher, but its hill ranges lower, or from 1,000 to 2,000 ft.

Siro Islands, two in number and 1 mile apart, lie W. by N. $\frac{1}{2}$ N. 16 miles from the outer point of Kosime no Osima (Wilson Island) and nearly 5 miles N.N.E. from Iwaya Point. The north-eastern one, 400 ft. high, with a wooded summit of rounded outline, has a round rock off its rugged North point and a shoal spit extending 4 cables off its South point. The South island is indented, its eastern sharp peak being 290 ft. high; there is shoal water off its South point; but its North point is steep-to.

To the S.S.E. for a distance of $1\frac{1}{2}$ mile from the eastern end of South Siro Sima are a series of rocky patches and shoals, on the outermost of which is a depth of $2\frac{1}{2}$ fathoms. At $1\frac{1}{2}$ mile southward of this outer patch is a patch of 2 fathoms, and midway between is a rocky patch of $4\frac{1}{4}$ fathoms.

Masui Sima lies N.E. by N. 6 miles of North Siro sima, and 3 miles from the shore of Nipon, off Cape Morotzu, the hills over which are 1,000 ft. high. The channel between is free from known danger.

The northern part of this island is a triple-topped bluff, 900 ft. high; on the West coast (about the middle) there is a very sharp peak; the southern part of the island is lower, and terminates in a bluff. The island is bold-to on all sides, except at its South point, off which reefs extend 1 cable. One mile E.S.E. of the South bluff is a small black rock, 6 ft. high, which should not be approached too closely.

Ai Sima, bearing S. by E., 6 miles from Masui sima, is a low flat island covered with trees, and 1 mile in length. Reefs, dry or sunken, extend 1 mile off its North point, and a spit extends S.E. by S. $1\frac{1}{4}$ mile from the South point; there are also others extending 8 cables East of its South point, and which are marked by a small square rock.

Low Reef or Shirasu and Lighthouse.—To the S.W. of Ai sima is a large detached reef, with a sand patch on it; and in the channel, a mile wide between it and Ai sima, the depths are from 3 to 5 fathoms. The lighthouse, square, and painted in black and white horizontal stripes, 49 ft. high, is situated on the South part of the reef. From it is shown a *fixed red light* at an elevation of 42 ft., visible 8 miles off.

Rokuren Island and Light lie 3 miles S.E. by E. of Ai sima. This island has on its table land a large and conspicuous clump of trees, 390 ft. above the sea, which is visible after rounding Kosime no Osima (Wilson Island), when it will bear about E. $\frac{1}{2}$ N. A spit extends 2 cables from the North point of the island, but the East side is bold. A *fixed bright light* is shown on the eastern extreme of Rokuren, elevated 89 ft. above the sea, and visible 12 miles off. To the westward the light is *obscured* by the high land of Rokuren, between N.W. $\frac{3}{4}$ N. and S. by W. $\frac{1}{2}$ W. The tower is of granite,

25 ft. high. The light when first seen, bearing S.E. $\frac{3}{4}$ S., leads half a mile from the shoal ground North of Ai sima.

U-Ma Sima Group, consisting of Ma sima, Kanasaki sima, Wakura sima, and several smaller islets and rocks, lies to the S.W. of Rokuren.

Anchorage.—There is small anchorage on the S.E. side of Masui sima, with the shore bluff bearing S.W. There is anchorage also along the Nipon shore, East of Ai sima and Rokuren, in 7 and 9 fathoms, but the coast should not be approached within half a mile, as it is fringed with reefs; northward of this the reefs extend a mile off shore. If, however, there be sufficient daylight to get round Rokuren, it is recommended to do so instead of anchoring outside for the night, and bring-to on the bank half a mile South of the U-Ma sima Group, in 6 or 7 fathoms.

Tides.—It is high water, full and change, at the western entrance to Simonoseki Strait, at 10 p.m., and the rise and fall is scarcely 4 ft. At Kokura, on the South side of entrance, it is high water about 9^h 20^m.

If bound to Simonoseki from the westward, pass about 1 mile North of Kosime no Osima (Wilson Island), and steer E. by N. $\frac{1}{2}$ N. for the North point of North Siro sima, which pass at half a mile; then steer East, taking care not to bring the North point of North Siro sima to the northward of West, till the lighthouse on the eastern extremity of Rokuren Island opens out S.E. $\frac{3}{4}$ S., or at night until the light is sighted, so as to clear the reefs marked by the red buoy off the North point of Ai sima. A S.E. course will then lead up to Rokuren, which can be rounded at 3 cables, when steer S. by W. to pass Cape Sisikuts, the West point of Hiku sima, at a distance of nearly half a mile; or at night keep the light in sight, taking care not to bring it to bear eastward of N. by E. $\frac{1}{2}$ E.

The *Southern Channel* only shortens the distance 4 miles, and requires the new survey as a guide. To the S.E. of Shirasu there is but a depth of 2 to 2 $\frac{1}{2}$ fathoms in it.

THE GOTO ISLANDS AND THE WEST COASTS OF KIUSIU AND NIPON.

The **GOTO ISLANDS**, a mountainous chain of many islands, lying between the parallels of 32° 37' and 33° 20' N., is 50 miles in extent in a N.E. and S.W. direction, and from 5 to 20 miles in breadth. The group cannot be said to have been thoroughly examined, but the information relating to it is much more reliable since H.M.S. *Sylvia*, Lieut. Pearce, R.N., made an examination of the more important portions in 1877. Our knowledge previous to this was from visits of H.M.S. *Saracen*, in 1855, and of Commanders Brooker and C. J. Bullock, in 1866-9.

Tides.—It is high water, full and change, in the East Bay (Ojika) at 8^h 40^m; springs rise 10½ ft., neaps 2 to 4 ft. The duration of the tidal streams in the North part of Goto Islands is nearly equal; the main direction of the flood is to the northward, and ebb to the southward. In the vicinity of Hira sima the streams run through the channels at the rate of 3 to 5 knots during springs, causing heavy overfalls.

Ojika Seto or Kosaka Channel is the strait lying southward of Uku sima and Tera sima, the latter 120 ft. high, off the S.W. side of Uku sima. To the eastward of its entrance are the *Kuromo-ze*, a cluster of rocks, 50 ft. high, at 2¾ miles S.E. of Uku sima. There is *anchorage* in a bay on the N.E. side of Tera sima, between that island and Uku sima. There is a bank in the centre of this harbour of 4¼ to 5 fathoms water; the best anchorage is northward of this bank. Some supplies may be obtained from the villages. The harbour should be approached with Tera sima seen just open to the westward of Uku sima, bearing N.W. ¼ W.

The western entrance of the Ojika seto is only 9 cables wide between Tera sima and No sima. Neither the South side of Tera sima nor the North side of No sima should be approached. *Ai-no-se*, 16 ft. above high water, is in the centre of the strait, 2 miles N.E. of No sima; and *Mu sima*, 254 feet high, with dangers extending a quarter of a mile South from its eastern point, lies on the South side of the eastern entrance to the strait, at 3½ miles eastward of No sima.

Nosaki Sima, 1,142 ft. high, is 3½ miles long North and South. Between it and Mu sima to the northward is a strait a mile wide, in which are several dangers. Between the South end of Nosaki sima and the North end of Nakadori is a narrow strait clear of danger; but the islets *Tanji* and *Skinomu*, lying between 1 and 2 miles S.S.E. of it, should be avoided, as many dangers exist near them.

Ojika Island, 3½ miles long East and West, lies South of No sima, a navigable channel separating them. *East Bay*, on the eastern shore of Ojika, is three-quarters of a mile deep, and nearly 7 cables wide at its entrance. The shore of this bay is fronted with shelving rocks that cover at high water. From Tonzaki, the South entrance point, rocks extend 2 cables in a northerly direction, and shallow water half a mile in a south-easterly direction. Kuszukuri, the North entrance point, is marked by a rock above water at the extremity of the shelving rocks. The depths in East Bay are from 4 to 14 fathoms, the best anchorage being in about 8 fathoms, with the North point of Nosaki sima in line with the rock off Kuszukuri Point, bearing E. by N. ½ N.; and the South end of Nosaki sima in line with Tan-ji Islet, S.S.E. ¾ E.

Ko-guro Sima, 57 ft. high, situated 6¼ cables westward of the S.E. point of Ojika, and 2 cables from the shore, is 400 yards long East and West, and

300 yards broad. This island is steep-to, except off the N.E. point. *Anchorage* can be obtained nearly midway between Ko-guro sima and the S.E. point of Ojika, in $7\frac{3}{4}$ fathoms, sand, with the South extremes of Ko-guro sima and Kuro sima in line, bearing W. by S. $\frac{1}{2}$ S., and the hill over the S.E. point of Ojika N.N.E. $\frac{1}{4}$ E. This anchorage is sheltered from northerly winds,, and the depths are even.

For 11 miles to the westward of Ojika there are many islets. The northern of these, named *Hoage* or *Arch Rock*, lies 5 miles West from the West end of Ojika, and consists of two pinnacles, 167 and 120 ft. high. A *dangerous rock*, dry 5 ft. at low water springs, with 5 to 11 fathoms round it, and on which the sea generally breaks, lies to the northward of Hoage, with the summit of Biriyo sima in line with the West extreme of Hoage, bearing S.W. $\frac{3}{4}$ S., distant from the latter $6\frac{1}{2}$ cables, and Aka sima West point S.E. by E. easterly. There is a depth of from 20 to 34 fathoms between this rock and Hoage.

Shiro-se, 105 ft. high, $13\frac{1}{2}$ miles W. by S. from Ojika seto, is the westernmost islet in the northern portion of the Goto Islands. It is divided into two pinnacles, nearly the same height, lying in a N.E. and S.W. direction. Off the islet are several rocks.

Hodge Rock or *Shaku shi*, a rock awash at low water, with deep water around it, lies N. $\frac{1}{4}$ W., distant $4\frac{1}{2}$ cables from *Shiro-se*. The North peak of *Nosaki sima* in line with Hoage, bearing East, will lead 2 cables to the northward of Hodge Rock.

Korai-no-ze Rock, with 18 ft. water, lies near the S.E. edge of a rocky bank; this bank extending N.W. by N., three-quarters of a mile, with a breadth of 4 cables, has from 5 to 10 fathoms. At 3 cables southward of the rock the depth is 20 fathoms; and at half a mile from the depth of $5\frac{1}{2}$ fathoms on the northern edge of the bank there is 38 fathoms. The North point of *Biriyo-sima*, in line with the North peak of *Nosaki-sima* bearing E. $\frac{2}{3}$ N., leads northward of *Korai-no-ze*. South point of *Hira-sima* in line with the North peak of *Nosaki-sima*, bearing E. by N. $\frac{1}{4}$ N., leads southward of *Korai-no-ze*.

Nakadori sima is $21\frac{3}{4}$ miles long between *Sawo saki*, the South extreme, and *Tsua saki*, the North extreme. The coast line of *Nakadori sima*, the greater part of which has not yet been surveyed, is deeply indented with bays. *O-mitzu yama*, a flat peak, 1,446 ft. high, 6 miles from its North end, is the summit of *Nakadori sima*.

Nama ura Bay, situated on the western side of *Nakadori sima*, immediately to the southward of *O-mitzu yama*, may be recognized by *Cone Rock*, 313 ft. high, which forms the South entrance point of the bay. *Nama ura* is 2 miles deep and half a mile wide, with an even depth of about 16 fathoms; from the N.E. side of entrance shelving rocks extend $3\frac{1}{2}$ cables in a S.W. direction.

The best anchorage for large vessels is near the head of Nama ura, in 10 fathoms water, $2\frac{3}{4}$ cables from the shore, with the peak of O sima just open eastward of the Cone Rock, bearing N. by W. $\frac{1}{4}$ W., a patch of red cliff on the West shore of the bay, just North of Nama village, W. by S. $\frac{1}{4}$ S., and Joss Point N.E.

Hira sima, nearly 2 miles from the East extreme of Nakadori sima, and 4 miles westward of Yenoï sima, is 663 ft. high. Its western side is steep-to, and its eastern irregular, with a few off-lying dangers and islets. *Haidomari Bay*, on the N.E. side of Hira sima, is 6 cables deep. It is, however, only suitable for junks. *Komoda Bay*, situated on the S.W. side of the island, affords protection to small vessels from North and easterly winds; near the centre of this bay lies a small wooded islet, named *Kojima*; vessels should anchor to the south-eastward of this islet. *Nanori* is a remarkable rock, 92 ft. high, 6 cables to the south-westward of Komo-no-saki, having rocky ledges surrounding it.

The channels on either side of Hira sima are navigable; the channel between Hira sima and Nakadori sima is clear of danger, but in the channel between Hira sima and Yenoï sima are the *Saracen Reefs*, situated to the southward of Yenoï sima, and S.E. 3 miles from the North end of Hira sima, and the foul ground to the south-westward of Kuro sima (a small islet 120 feet high). The eastern shore of Hira sima is the clearer side of this channel.

Oldham Rock, covered at high water springs, lies nearly $1\frac{1}{2}$ mile E. by N. from *Sawo saki*, the South extreme of Nakadori. An islet, 78 ft. high, half a mile to the westward of Sawo saki in line with it, bearing West, leads to the southward.

The channel between the South end of Nakadori and Kaba sima to the southward is 3 miles wide, and, with the exception of some dangers close to its northern shore, seems deep and clear of danger. On the S.W. side of Nakadori sima is *Wakamatsu sima*, the narrow *Nakadori Channel* lying between. The strait between Wakamatsu sima and Naru sima, a mile wide, has not been examined. It is named *Takigawara seto*.

The **Kuga Channel**, or **Naru Seto**, between Naru sima on the North and Hisakajima on its South side, was examined by H.M.S. *Saracen*, and found to carry deep water, 26 to 32 fathoms, through it. This channel may be approached either around the North or South sides of Kabasima. If using the channel to the North of Kabasima, there is a *sunken rock* to be avoided. It lies West 3 miles from the North end of Kabasima, and about half a mile eastward of the South end of the island ($1\frac{1}{2}$ mile long N.N.E. and S.S.W.), which lies close to the westward of the long promontory forming the South end of Naru sima.

Hardy Harbour, a small inlet, 6 cables in length North and South, and 3 to 4 cables broad, is a snug anchorage, on the S.W. side of Naru sima. It

is entered from the Kuga Channel. On the South side of its entrance is *Observatory Islet*, at 1 cable South of which a shoal, steep-to, with 9 ft. water, extends $1\frac{1}{2}$ cable from the shore. From the N.W. side of the entrance a shoal extends southward halfway across the entrance. The best anchorage is in 6 or 7 fathoms W.N.W. of Observatory Islet, and rather nearer to the opposite shore.

Fukuye or Fukai, the chief town of the Goto Islands, is situated on the shore of an open roadstead on the north-eastern side of Fukuye sima, the southern and largest island of the chain, and southward of the Fukuye Channel, which separates it from Kuga sima. On either side this channel (which is a mile in breadth, with every probability of carrying deep water throughout) there is an anchorage, also several others surrounding the indented coast of Fukuye sima, but neither channel nor anchorages have yet been explored, with the exception of Tama no ura, on the S.W.

Cape Goto, or *Ose Saki*, the S.W. point of Fukuye sima, about 500 ft. high, is exceedingly bold. Behind, or north-eastward of the cape, rise three fine mountains, about N.N.W. of each other, of which the northern and highest is 1,387 feet above the sea. At the extremity of the coast, which extends E.S.E. 3 miles from the cape, is *Otakara Point*. A quarter of a mile S.E. is the islet *Biro Sima*, 150 ft. in height, with a rock $1\frac{1}{2}$ cable off it to the southward. E. by S. 3 miles from Otakara is *Tsutara Sima*, 320 ft. high. Reefs stretch off its East and West points. To the North of this island is a large bay, at the western part of which anchorage may be obtained. Situated centrally in the large bay, at 7 cables N.N.W. of Tsutara, are two islets.

The coast East of Tsutara has not been explored. Kasayama saki, the southern cape of Fukuye, is low and wooded, and separated by a valley from the mountains.

Tama no Ura, the name of a large inlet or arm of the sea, on the western side of Fukuye sima, only partially explored, is finely situated as a port of refuge, and but for its great depth of water would be a magnificent harbour. Its only entrance is $4\frac{1}{2}$ miles N.N.E. of Ose saki, and $2\frac{1}{2}$ miles S.E. of the island *Saga sima*, which is $1\frac{3}{4}$ mile in length, and shows two distinct hills on its North and South parts, which are separated by a valley through the island. In the bay on the East side of Saga there is good anchorage in 7 to 8 fathoms, quite sheltered from all westerly winds.

The entrance to Tama no ura is a mile wide, and must not be mistaken for the blind opening 2 cables wide, only 2 miles North of Ose saki.

The best anchorage for large ships will be found at the S.E. part of the harbour, in 16 fathoms, mid-channel, with the peak of Boshi yama, which is seen ahead when standing up the harbour, bearing from S.W. by W. to W.S.W. There are many parts of the harbour where ships can make fast to the shore in perfectly tranquil water.

From Tama no ura the coast runs North about 5 miles from Algerine

Bluff, falling to a low point, the north-western promontory of Fukuye, which is fronted by shelving rocks. *Hime sima*, 350 ft. high, is separated from this point by a channel a mile wide, in which was seen a rock awash.

Several *sunken rocks* lie off the N.W. side of Fukuye sima, at distances of from 3 to 6 miles. *Nichisone Rock*, a 9-foot patch, lies West $6\frac{1}{2}$ miles from Hime sima, and N. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from the North end of Saga sima. *Corasone Rock*, of 6 ft., lies N.W. 3 miles from Hime sima. *Decrez Rock*, of 21 ft., N. by W. $\frac{1}{2}$ W., 3 miles from Hime sima. Between the two latter is another sunken rock.

Camono sima is a group of islets, lying 2 miles westward of the western entrance to Tanna ura seto (the channel dividing Fukuye from Hisakajima), N.W. a little more than a mile from the North extreme of these islets is a sunken rock.

PALLAS ROCKS, three in number, lie close together, S.W. 30 miles from Cape Goto. The largest rock, in lat. $32^{\circ} 14' 17''$ N., long. $128^{\circ} 12' 30''$ E., is about 60 ft. high, and very steep-to.

Pallas Rocks are steep-to; fishing vessels, by hooking on to the lee side of the rocks, ride out moderate breezes. During four passages these rocks were passed by the Peninsular and Oriental Company's steam-ship *Orissa*, and the set of the current in this locality was found to be with the wind.

MEAC SIMA GROUP consist of two islands, sometimes called the *Asses' Ears*, with intermediate smaller islands and rocks. *Taka sima*, the N.E. island, is nearly $1\frac{1}{2}$ mile long, and 618 ft. above the sea, and is somewhat level at the top.

Caution.—Reefs a few feet above water were observed by the Peninsular and Oriental Company's steam-ship *Orissa*, in 1875, to extend 2 or 3 miles to the N.E. of Taka sima, and foul ground may possibly extend farther out than was seen. The islet lying N.N.W. a mile distant from Taka sima is about 70 ft. high.

Kusa-kaki, the S.W. island, is less than half the size of the N.E. island, but 100 ft. higher and very craggy. Its remarkable peak probably suggested the name of the group to its first discoverers. *Me sima* and *Wo sima*, the intermediate small islands and rocks, are high and cliffy, the latter partaking generally of the sugar-loaf form. Rocks extend South about a third of a mile from the S.W. island, and a detached rock, 15 ft. high, lies S.W. $1\frac{1}{4}$ mile from the S.W. end of the group.

KOSIKI ISLANDS, consisting of two large and several small islands, extend in a N.E. and S.W. direction from lat. $31^{\circ} 37'$ to $31^{\circ} 53'$ N., and from long. $129^{\circ} 41'$ to $130^{\circ} 0'$ E. They are not high, but their appearance is bold in passing. The *Nadieda Rocks*, off their West side, are considered to be about 4 miles from the shore, and 7 miles North of Haya saki, their westernmost point.

At the South end of Simono ko siki, the southern island is a small bay, in

which is anchorage. A *sunken rock* lies East $1\frac{1}{4}$ mile from the eastern entrance point of this bay and S.E. extreme of the island.

A *reef* is reported (1877) by Capt. Kiljour of the steam-vessel *Kiushu-Mar* as lying in lat. $31^{\circ} 20' N.$, long. $130^{\circ} 10' E.$, about $1\frac{1}{4}$ mile S.S.W. $\frac{1}{2}$ W. from Okino-Akima, and 1 mile from the nearest part of the mainland. The rock has been seen to break in N.W. winds. The reef is said by Captain Davidson, of the *Kiujun Maru*, to lie farther West.

Between *Kamino*, or the northern Kosiki, and the shore, 17 miles distant, are several dangers and rocks. A *conical rock* lies a mile eastward of the N.E. extreme of the island; S. $\frac{1}{2}$ E. $1\frac{1}{2}$ mile from this is *Tsika*, a small rock above water, with a number of dangers just eastward of it. Midway between the conical rock and Tsika is a sunken rock at the West end of a series of rocks above and below water, which thence extends 2 miles to the eastward. *Pinnacle rocks*, a small cluster, lie a mile N.E. of their eastern end. *Pioneer Rocks*, above water, but dangerous from their smallness, are reported as lying S.E. by E. 3 miles from Pinnacle Rocks, and 10 miles W. $\frac{1}{2}$ N. from Kami Saki. A *doubtful sunken rock* is marked 3 miles eastward of the Pioneer Rocks.

Taka Sima, or *Simplegades*, lie S. by E. about $11\frac{1}{2}$ miles from Na Saki, the South point of the Kosiki group. They are described as three rocky islets, forming a triangle, the sides of which are each not more than a cable in extent; to the southward are two small rocks about 7 ft. in height, and a rock awash was observed by H.M.S. *Highflyer*, in 1859, lying a quarter of a mile southward of the group.

The *Tsukarase*, or *Retribution Rocks*, two in number, apparently steep-to, were discovered by H.M.S. *Retribution*, 6th August, 1858. They lie in line North and South, about 2 cables apart, in lat. $31^{\circ} 23\frac{1}{2}' N.$, long. $129^{\circ} 44' E.$ The two southernmost rocks lie in a needle form about 60 ft. above the sea; the northern rock is flat, and only 10 ft. high.

Udsi Sima, or *Roche Poncié Group*,* consist of one island, with some rocks and islets surrounding it. The island is 2 miles in circumference, the western part somewhat flat, but the eastern rising in a precipitous peak to the height of 1,060 ft. above the sea. It is in lat. $31^{\circ} 12' N.$, long. $129^{\circ} 29' E.$ Two and a half and one mile respectively to the S.W. of the island are two small islets; and to the eastward of its peak about a mile is another islet.

"The Udsi Sima are high, and of considerable extent. The easternmost island appeared larger, and its position to be farther North than marked in the chart; no foul ground was near them."—(Stephen Court, Master of H.M.S. *Furious*, 1858.)

The WEST COAST of KIUSIU.—From Satano Misaki, the South point of

* Thus named (and deservedly so, if an European name is admissible), after the Ingénieur-hydrographe of the French Expedition under Admiral Cecille in 1846.

Kiusiu, the coast trends to the northward, forming a large gulf (Kagosima), the coasts of which have only been partially examined.

Anchorage.—H.M.S. *Furious*, in 1858, experienced a strong breeze from the N.E., and being accompanied with a falling barometer, an anchorage was sought for under and to the westward of Cape Chichakoff. The vessel eventually came-to in 13 fathoms, abreast a small village near the centre of the first bay northward of the cape, with the extreme of the cape bearing S.S.W., Horner Peak N.W. $\frac{1}{2}$ N., and Oto Saki N.N.W.; here she was well sheltered. A small but well sheltered inlet in the N.E. corner of the gulf in which the *Furious* anchored (Yama Gawa) has since been examined, and is of great service to small vessels meeting with adverse winds, when bound eastward through Van Dieman Strait.

KAGOSIMA GULF is an arm of the sea 35 miles in length, and from 5 to 10 in breadth, which runs in a North direction into the southern part of Kiusiu. At 25 miles within its entrance the large island of *Sakura* nearly fills the head of the gulf, with channels on both sides leading into an inner gulf or spacious harbour, 6 miles by 9, and quite landlocked.

There is no good anchorage on the eastern side, except on the small bank North of Havock Islands in the North part of the gulf, where there is an anchorage in 7 to 9 fathoms. In *Sata Iras Bay*, about 2 miles northward of Oto Saki, there is shelter from South and S.E. winds for one vessel in $5\frac{1}{2}$ fathoms.

Kami Rock lies in the mid-entrance of Kagosima Gulf, 3 miles off the northern shore. The bearings from it are,—Horner Point, N.W. by W. $\frac{3}{4}$ W.; Horner Peak, N.W. $\frac{3}{4}$ W.; Satano Misaki, S. $\frac{7}{8}$ E.; Oto Saki, S.S.E. $\frac{1}{2}$ E.; and the East head of Tsiring Sima just opening the North and low wooded point of Yama Gawa, N.N.E. $\frac{1}{8}$ E.

Yama Gawa, a small harbour, formed on the West side of entrance of Kagosima Gulf, is the crater of an extinct volcano. Its North part opens East to the sea by a funnel-shaped passage, a quarter of a mile in length, but only 1 cable wide at its inner part, formed by an extensive shoal bank, which extends 1 mile from the shore, South of the entrance. There are $3\frac{3}{4}$ to $4\frac{1}{2}$ fathoms over the lip of the crater or bar, with one patch of 2 fathoms in the centre. No vessel should attempt to enter in bad weather, although a small vessel may lie there at anchor or moored to the shore. Inside the harbour the water is deep.

Two *dangerous sunken rocks*, on the outer of which, named *Waters Rock*, is $2\frac{1}{2}$ feet water, and on the inner 9 feet, lie close together, E. $\frac{1}{2}$ N., 1 mile from the northern point of the entrance to Yama Gawa Harbour. Between the rocks and the shore is a depth of 6 fathoms.

At 4 miles northward of Yama Gawa entrance lies Tsiring sima, on the western shore of the gulf, about 1 mile from the shore, to which it is connected by a reef on which the sea sometimes breaks. It is from 150 to 200 ft. high. On the eastern shore, opposite, a shoal bank called the *Racehorse Shoal*,

extends about $2\frac{1}{4}$ miles from the shore. Between this shoal and Tsiring sima the gulf is narrowed to about 3 miles. Thence the Kagosima Gulf extends for about 17 miles to the northward, with a uniform breadth of about 10 miles to the Island of Sakura.

Seven Rocks is the name of a cluster of small rocks, which lies on the western shore of the gulf at 15 miles N.W. by N. from Tsiring sima. A shoal patch lies just outside them.

The channel at the S.E. end of Sakura is very narrow, and has not been examined. On the western side of the island are several villages, and in the channel dividing Sakura from the shore to the westward is *Parker Shoal*, on which a fort is built. On the S.W. side of this shoal temporary anchorage may be found.

Kagosima.—Facing the Island of Sakura on the West, the Kiusiu shore projects, narrowing the western channel into the inner gulf to 7 cables at its northern part, its length being 4 miles. On this projecting shore stands the city of Kagosima, the fortress of the Daimio, Prince of Satsuma. Battery Point, to the South of the city, is low, and has a spit extending from and around it to 2 cables, and very steep at its edge; a shoal also fills the bay North of this point. Off the centre of Kagosima in front of the Daimio's Castle, is an inner harbour or large camber, gained by entrances between five forts of masonry, which have deep water close up to them. This castle cannot be seen from the gulf. There is a cannon-shot foundry here, worked by Japanese. Two small rivers disembogue, one on the North side of the city with long spits off its points of entrance, on one of which H.M.S. *Racehorse* grounded; the other, South of the city, falls into the shallow bay just North of Battery Point. North of the city the hills reach the sea.

The western shore of Sakura Island is very bold, but anchorage in from 15 to 25 fathoms may be found in Euryalus Bay E. $\frac{1}{2}$ N. of the castle of Kago Sima, very close in. In an easterly gale there is danger of driving off the bank into very deep water and having to slip the cables.

The Coast from Sendai Saki northward to Amakusa, together with the Otentosama Sea, is as yet comparatively unknown. In the middle of the entrance to the Otentosama Sea is Naga Sima, the channel westward of which is foul 10 miles within. The *Kuro-ne-seto*, S.E. of Naga Sima is a safe and clear strait. There is one rock only on the western shore, it is close in, and shows at low water. The tides run with very great velocity through the strait, which should only be used as slack water. The northern part of Otentosama Sea is shoal.

A reef was reported in 1877 as lying $1\frac{1}{4}$ mile S.S.W. $\frac{1}{2}$ W. from Okino-Akima, in lat. $31^{\circ} 20' N.$, long. $130^{\circ} 10' E.$

AMAKUSA, a large island 23 miles in length, lies S.S.W. of the Simabara peninsula; between them is the western entrance to the gulf, only $2\frac{1}{2}$ miles in width. Two harbours, Tomioka and Sagitsu no ura on the western coast of the island, have been examined.

Kotamo Bay, on the South end of Amakusa, is well protected by Kasu sima. A reef lies in the centre of the bay above water, with a passage carrying from 13 to 16 fathoms on each side of it, and three other detached reefs, which always show above water, lie on the eastern shore closer in. The depth in the bay is from 13 to 16 fathoms, shoaling to 8 or 9 fathoms at 1 cable from the shore. In rounding Kasu sima do not approach too near the S.E. rock, as reefs have been observed on which the sea broke heavily outside this rock.

Koto no ura.—This bay has a series of detached reefs in its centre, and there appears to be no anchorage for anything but native craft.

Sagitsu no ura has been recently surveyed, and the channel leading to the narrow passage found rocky and uneven. There are three rocks north-westward of the entrance, the two eastern of which are pinnacles; the western is low. Only 4 fathoms can be carried at low water along the northern shore. *Cormorant Inlet* also is almost closed by the bank of shingle which extends across, and in the channel only 1 fathom at low water can be obtained. *Kami ura* is an inlet on the South shore.

Timioka, about 14 miles from *Sagitsu no ura*, is a lagoon-like harbour, on the eastern side of a small peninsula, which forms the N.W. point of Amakusa. The harbour is formed by a low tongue of land, curving round to the westward and enclosing it, giving complete shelter. The entrance is from the S.E. by a channel carrying 5 fathoms water close along the South side of the low tree-covered tongue which forms the eastern side of the harbour. The deep part of this channel is only 150 yards broad; a vessel should therefore be steered in at that distance from the shore on a W.N.W. course, with the village of *Tomioka* ahead, carrying in $4\frac{1}{2}$ to 5 fathoms, and may anchor in the centre of the harbour in 6 fathoms. It is very shallow off the South shore at entrance, but a flat of 3 fathoms borders the channel, making it for that depth a quarter of a mile in breadth.

SIMABARA GULF.—Of this large gulf, which extends 70 miles into the heart of Kiusiu, little is known. Simabara is a large and broad peninsula, so situated as to make this gulf an inland sea. On the eastern shore of the peninsula there stands a city of the same name. In the centre of the peninsula is an active volcano. The head of the Simabara Gulf is shallow and full of dangers, and vessels navigating it should avoid the very turbulent chow-chow (or disturbed water.)

A rock lies at the entrance of the gulf, and uncovers 5 ft. at low water. It bears N. 20° W. from the East extreme of *Tsuji sima*, and N. 64° W. from East extreme of *Oösima*.

The western passage into the gulf, North of the "5-ft. rock," seems preferable, as it is less exposed in its eastern part to the force of the tide, which here runs with great velocity and produces whirlpools. Great care

is therefore requisite in the steering of the vessel. This rock always shows, except at high-water springs. Southward of the "5-ft. rock," between it and Tsigi-sima, several rocks have been reported showing at low water; the Japanese do not use this channel.

Abreast the town of Simabara a bank, having $3\frac{1}{2}$ fathoms, extends at least half a mile from the shore. There is probably no safe anchorage close to Simabara. To the southward of Do-saki, Ohoye, and Fusinotsu there is probably safe anchorage; and at Fusinotsu is a junk harbour, in which was seen a Japanese barque of 300 tons.

The eastern side of Simabara Gulf seems shoal throughout; but the lead may be considered a safe guide in approaching the bank.

Tsikugo-gawa, situated at the head of Simabara Gulf, is reported to have a depth of 12 ft. on the bar. The foreshore is very low, but the land at the back is high.

Tides.—Springs rise 14 ft. at the town of Simabara; in the southern part of the gulf the range is greater.

About 22 miles of the eastern side of the Nagasaki peninsula has been surveyed. It has generally a bold steep coast, but there are several places on it where a vessel blown to leeward of Nomo saki by West winds will find anchorage and good shelter from them.

Aba Bay is rectangular in shape, $1\frac{1}{4}$ mile deep, and 1 mile in breadth. There is anchorage in the centre of the bay in 7 fathoms, open only between South and S.E. The eastern side of the bay is formed by Maki sima, which has some islets on the reefs on its South side, one of which extends 4 cables. There is a boat camber at the village on the western side of the bay.

On the N.E. side of Maki sima is a small harbour, connected with Aba Bay by a narrow channel. It has from 10 to 12 feet water, but only 9 feet between the reefs at its eastern entrance, which is scarcely a cable wide. There is a road or bridle path to Nagasaki through the valley, only 3 miles distant from the head of Aba Bay.

Mogi Bay is 3 miles S.W. from Aba Bay. Small craft can anchor in from 3 to 6 fathoms, sheltered except from South to East; and larger vessels in from 9 to 11 fathoms off the entrance.

Tameitsi Bay is $5\frac{1}{2}$ miles S.W. from Mogi. Steer for the village at its head, and when Kaba sima shuts in behind the southern point of the bay anchor in 10 fathoms or less, about 2 cables off shore. *Sitsiwura*, a small bay 2 miles farther N.E., has anchorage in from 9 to 10 fathoms, at 2 cables off shore. There is an islet or rock on the reef which extends 2 cables off the South point of the bay; it lies directly under and S.E. of the highest peak of Kawara yama.

Between Sitsiwura and Mogi Bays there is an islet and several large reefs, which extend 2 or 3 cables from the shore.

Misaki Bay, North of Kaba sima and East of the low jutting point and sandy beach where stands the large village of Misaki, affords anchorage in from 7 to 11 fathoms.

Kabasima Bay, between Nomo saki and Kaba sima, affords anchorage at its north-western part open only between S.E. and S.W. Here reefs which dry project $1\frac{1}{2}$ cable from the shore; at 2 cables from the shore there are 8 fathoms, and at 4 cables distance 11 fathoms about E.N.E. of the Nomo Rock. The eastern part of the bay, where a long sandy beach is seen, should be avoided, there being a sunken rock, *Bay Rock*, on which are 6 ft water with 4 and 6 fathoms about it. Its position is E. $\frac{1}{4}$ N. $1\frac{1}{2}$ mile from the Nomo Rock, and N. $\frac{3}{4}$ W. of the West point of Kaba sima, at half a mile from the shores of island and main. Off the South side of Kaba sima are some rocks.

The West Coast of Nagasaki Peninsula.—From 10 miles outside the islands fronting the West coast of Nagasaki the soundings decrease gradually over a bottom chiefly sand, until 30 fathoms is obtained, which will be at a general distance of a mile from all the outer islands; the only exception is an 18 fathoms spit which extends one mile N.W. of the Sotonohirase Rock, and the extremity of which is $1\frac{1}{2}$ mile W.S.W. of the N.W. point of Iwo sima. Within this island, the bottom in the fairway is of mud, gravel, or rock.

IWO SIMA and LIGHTHOUSE.—Iwo Sima lies in a N.W. and S.E. direction, and is of undulating outline, the eastern summit being 400 feet in height. *Signal Head* forms its N.W. point, and on this is established a signal station (for telegraphing the arrival of vessels), and the lighthouse, an iron tower painted white, 38 feet high, from which is shown a *fixed bright light*, elevated 205 feet above the sea. The light is obscured to the South and eastward between S.W. by S. and E. $\frac{3}{4}$ S. *Signal Head* is a good guide for entering the harbour of Nagasaki. It is bold and may be rounded at 3 cables distance in 25 fathoms.

Oki Sima, of much the same height as Iwo, is more wooded, especially its southern summit. There is access to the harbour by the channel East of Oki, between it and Koyaki. Iwo and Oki appear as one long island, although separated by a narrow boat passage.

Hirase Rock, which covers at high water only, is marked by a beacon, painted *red* and 10 ft. high. It lies 4 cables from the eastern shore of Iwo sima, and E. by S. $\frac{1}{4}$ S. 11 cables from *Signal Head*, and although not directly in the fairway, is in the route of vessels beating in and out. There do not appear to be any other dangers near it. If covered, the bluff of Papenburg Island, bearing E. $\frac{1}{2}$ S., leads 3 cables North of it.

Sotonohirase Rock, also covering at high water, is 9 cables off the S.W. shore of Iwo sima, and S. by W. $\frac{1}{4}$ W. $1\frac{1}{4}$ miles from *Signal Head*. *The Kutsnose*, 10 ft. high, lies inshore of the Sotonohirase, at $1\frac{1}{2}$ cable from Iwo

simo. *The Kurose* is a large straggling reef off the South end of Oki, from which it is distant 4 cables.

Taka Sima, at 3 miles S. by W. of Signal Head, has a precipitous ridge about 900 ft. high on its eastern side, and a smaller ridge over the cliffs on its western or sea-face. Reefs extend $1\frac{1}{2}$ cable of its North and West points. Three small islands, about 120 ft. high, Tobi sima to the North, and Futako sima (two islands) on the South, lie in line, North and South of its East face. The latter two are connected and fringed by reefs.

There are *coal mines*, the first in Japan worked on European principles, on the East side of Taka sima, from which coal of a very fair quality is mined. The only anchorage is on the West side of the island in from 2 to 7 fathoms on a bank of coal and sand, which at 3 cables from the shore deepens suddenly to 15 and 20 fathoms. Small vessels might anchor there in fine weather and smooth water, but the anchorage is neither of sufficient extent or protection to be in any way recommended to H.M.'s ships requiring coal.

Hi sima and *Nagano sima*, $1\frac{1}{2}$ and 2 miles S. by W. and S.S.W. respectively from the summit of Taka sima, are smooth-topped islands about 120 feet in height, with rocky shores and with reefs extending more than a cable off their southern points. Nagama sima is 4 cables S.W. of Hi sama, there being deep water, about 14 or 16 fathoms, in the passage between them.

Mituse Rocks, the outermost dangers in the approach to Nagasaki from the South, lie $3\frac{1}{4}$ miles S.W. of Taka sima, and N.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from the summit of Nomo saki. They spread irregularly over an extent of half a mile, the interior rocks of the group covering with the tide. On the northernmost rocks are two pointed islets, 60 ft. in height, with outlying patches on the East and West; the south-eastern of the group is a bare rock about 6 feet above high water. At one cable westward or outside the rocks there are 23 fathoms and no outlying dangers are known, but it would not be prudent to pass between the rocks although the water appeared deep.

NOMO SAKI is the south-western extremity of the peninsula of Nagasaki, and at a distance has the appearance of an island. At 6 cables North of the cape is *Nomo yama Point*, which rises steeply to a wooded summit, beneath which stands a look-out house; the hill slopes towards the cape in two gently descending ridges of small hills: the coast between is broken and rocky, and skirted with dangerous reefs which dry out in patches to a quarter of a mile, but it may be passed at the distance of 4 cables in from 12 to 17 fathoms, gravel and rock. At 2 cables off the cape is an inaccessible islet called *Nomo Rock*, which is surrounded by small low detached rocks, most of which cover.

Nomo ura, the entrance of which is one mile N.E. of Nomo yana Point, is small and perfectly sheltered, 6 cables in length and from 1 to 2 in breadth, with 9 to 10 feet at high water in the deepest part of its narrow entrance. Take care to keep rather along the southern shore in entering.

The coast of the peninsula northward from Nomo yama Point is bold with a few outlying rocks, and should not be approached within half a mile, the ground off it being uneven and rocky.

Suzume, 6 miles north-eastward of No saki, is a bare rock, about 50 feet high, and the north-western of a group of islets. *No sima*, the southern, and all the other islets, are wooded and low, and surrounded by large reefs. There is a 5 fathoms channel between No sima and the coast, but the islet must be closed in passing, as a large reef projects from the shore. *Suzume* may be rounded at 3 cables on its West side in 15 fathoms, rock or gravel, but at that distance N.N.E. there are only 5 fathoms.

Koyaki is the largest island off Nagasaki, and is situated directly S.W. of the entrance, which may be gained by the channels both East and West of it. This island is not high, but very hilly, its two chief elevations being 362 and 403 ft. Numerous reefs and islets border its broken outline. Of these *Joka sima* and *Hodagase*, an islet and a rock, lie about W.S.W. at 5 and 8 cables respectively off Mumenoki, the South point of Koyaki, with from 15 to 18 fathoms inside them. *Hodagase* may be passed at 4 cables on its West side in 26 fathoms. The large bay on the northern side of Koyaki has from 17 to 20 fathoms water, and, besides being too deep for convenient anchorage, is open to the N.W. swell. On the eastern side of Koyaki, there is a mass of reefs in the South Channel.

Kageno.—This island appears part of Koyaki, as it is only separated from its North point by a narrow boat passage. The *Naginato* or *Hungry Rock*, which covers at high water, lies a cable East of its N.E. point, off which is a small islet.

Kamino sima, at 6 cables North of Kageno, is the largest island on the northern side of the fairway to Nagasaki. Its North hill is elevated 330 ft., and on its central hill, which is lower, is a *Signal Staff*. On the East side there is a small boat camber; on the S.W. the small flat island of *Siro sima*, on which there is a battery, is connected with a work on Kamino sima by a causeway of masonry. There are other batteries on Kamino sima, all of which command the passage.

North-westward of *Siro sima* are the two small islands *Aino sima* and *Mats sima*. *Aino sima*, at $1\frac{1}{2}$ cables distance, is a flat table island on a reef, with a conspicuous rock (the observing place of Belcher, in 1843, from which several meridian distances were measured to Lu-chu, Quelpart, &c.) close off its South point; *Mats sima*, at 5 cables, is a small hill 90 ft. high. There is deep water in the passage between *Siro sima* and *Aino sima*.

Barracouta Rock.—Off *Kabuto saki*, the S.E. point of Kamino sima, on which there is a battery, are some small islets. One cable from these, S.W. of the Tree Rock, and W. by N. of the South bluff of Papenburg, is the Barracouta, a sunken rock, which is the only hidden danger in the entrance,

and may be cleared to the southward by keeping the summit of the coast range (800 ft.) over Megami Point open of Papenburg, bearing East.

Papenburg, or *Takaboko*, 2 cables S.E. of Kamino sima, is the small precipitous island covered with dark foliage, which so well marks the entrance to the harbour. It may be passed at half a cable in 18 fathoms. To the N.E. of it, and distant one-third of a mile, is a small flat-wooded island, *Nezumi sima*, lying off the small bay of Kibatsu, East of the large village of Kosedo.

Swinger Rock, with 4 ft. water over it, lies nearly midway between Takaboko (Papenberg Island) and Ogami Point. From it, Signal Head, the N.W. point of Iwo-sima, is in line with Kabuto-saki fort. Centre of Nizumi-sima bears N.N.W. $\frac{1}{2}$ W. ; centre of Takaboko (Papenberg Island), W. by S. $\frac{1}{2}$ S. ; Kosaki Temple, Ogami Point, E. by N. $\frac{1}{3}$ N.

This rock may be dangerous for steamships leaving the harbour when passing another vessel in its vicinity, or for sailing vessels working in, care must be taken therefore to keep Signal Head well open of Kabuto-saki fort when near the locality.

The **HARBOUR of NAGASAKI**, an arm or inlet running in a north-easterly direction, is large and commodious, thoroughly sheltered from all winds, and available for ships of all classes. From its entrance, which is a quarter of a mile wide between Ogame Point on the West and Megami Point on the East, it runs N.E. to the city a distance of 2 miles. The depths decrease gradually from 16 fathoms at entrance to 3 fathoms off the city. A *sunken rock* lies about 70 yards South of the East extreme of Ogame Point. A temple stands on the South extreme of the point.

Megami Point is at the foot of a steep ridge, on which are three batteries, one above the other. Within Megami Point $1\frac{1}{2}$ cables (a small islet lying between them) is another point, on the extreme of which, in a battery, is a remarkable large tree. *The Hishiwo Bank*, which fronts the shore from De sima to the foreign settlement, is a good and convenient place for grounding.

The harbour has three approaches. The principal one or fairway is directly from the N.W., the entrance of which, 4 miles outside the harbour, is between Fukuda saki and Iwo sima light. Vessels entering Nagasaki Harbour should invariably use this channel. The second approach is by the Oki Channel, between Oki sima and Koyaki, but it is only 3 cables in breadth. Neither this channel nor its approaches have been yet thoroughly examined. *The Kurose*, a rocky islet with reefs projecting from it lies in the fairway to the entrance to this channel from the southward. The third approach is by the South channel, between Koyaki and the main, and can only be used by steam-vessels. The whole of this channel is so encumbered with rocky patches that instructions for its navigation would not be suffi-

cient; a local pilot would be necessary, and it should never be taken without one.

NAGASAKI, a treaty port, at present second only in importance to Yokohama, and the only place of trade open to foreigners between 1623 and 1857, covers a broad valley on the eastern side of the harbour, surrounded by lofty hills. Its population in 1858 amounted to nearly 70,000. In December, 1876, there were 134 British residents, 14 German, 31 Americans, 14 Danish, and 450 Chinese. Altogether, including a few of other nationalities, numbering about 700 foreign residents. The exports consist of tea, silk, coal, vegetable wax, gall nuts, copper, gold; also various articles for the Chinese market.

De sima, the historic site of the Dutch factory, projects into the harbour on the S.W. side of the city, with which it is only connected by a stone bridge. At the broad steps at its West end is the best place for landing at the city. The Foreign Settlement is on the flat South of *De sima*, having a water frontage of 730 yards; it also stretches up the valley on the Owara Creek on the South. The British Consulate is upon the bluff South of this creek, where there is a good landing place. The American, French, and Portuguese consulates are on the hills at the back of the settlement.

Provisions are plentiful, cheap, and easily obtained, as also is wood and water; the latter is brought off in boats to the shipping. There is a Japanese government steam factory at Akunora, on the West side of the harbour, and also a patent slip. The *dry dock*, which was reported as completed in 1877, is 460 ft. in length, 89 ft. in breadth, and 28 ft. deep.

Coal is worked at several mines in the neighbourhood of Nagasaki, and, although reported as of inferior quality, is used by vessels of the French, United States, Russian and German navies, also by some of the fast tea ships trading to London. The chief mine is at *Taka sima*, before described; there is also a mine on *Hi sima*, which lies 3 miles S.W. from *Taka sima*. At *Muke*, also, in the N.E. corner of Simabara Gulf, coal is worked.

The best *anchorage* for men of war is just above the British consulate bluff, large ships anchoring in from 6 to 7 fathoms, rather over towards Minage Point, at this the broadest part of the deep water of the harbour. Merchant vessels usually anchor off the foreign settlement in from 4 to 6 fathoms, or even above *De sima* in 3 fathoms. In the hot weather of July and August great relief may be experienced from the closeness of the atmosphere, and it will be beneficial to the health of the crews to spring the ship's broadside to the sea breeze, which, in fine weather, is almost constant from the S.W., and generally very fresh.

Pilots, either Japanese or European, can always be had at a charge of 30 dollars, obtained by requisition through the consul. It is said that they are well acquainted with their business, and that it is their custom to take entire

charge of the navigation of the ship; but great caution should be used in this respect, as some of them have only knowledge of particular localities.

Tides.—It is high water, full and change, at Nagasaki, at 7^h 15^m. Springs rise 9 ft., and neaps about 7½ ft., but they are variable. The current in the harbour is always sluggish. A strong southerly wind is said to raise the level at high water at springs from 10 to 12 ft., or 2 ft. above the ordinary level.

Directions.—When making Nagasaki from S.W. or West, steer to round Signal Head, the North end of Iwo sima, at a quarter of a mile, taking care not to bring the light to bear northward of N.E. by N. (on which bearing it is obscured) on approaching it. By keeping the light in sight, or during the day, keeping the North point of Iwo sima bearing eastward of N.E. by N., will clear the shoal water off the dangerous Sotonohirase Rock. After rounding the head, steer E. ½ S. for the Papenburg Bluff, passing it as closely as convenient, but taking care to avoid the Barracouta Rock; then E.N.E. for the entrance. At night do not bring the light to bear northward of W. ¾ N.

Passing in mid-channel between Ogame and Megami Points, a N.E. course direct for the Dutch flag on De sima will then lead up in the best water, and when the factory of Akunora, on the West shore, opens of Minage Point, N. by W., a large vessel should haul up N.N.E., and anchor in 6 fathoms between it and the British consulate or foreign settlement.

Should a vessel, from calms or adverse winds, be unable to enter, every endeavour should be made to get inside Papenburg, if it be the intention to anchor, for outside this island the water is inconveniently deep, and it would be preferable to stand off and on till daylight, taking care not to decrease the soundings below 30 fathoms.

Anchorage can, however, be found in 20 to 26 fathoms over a bottom of thick green oaze with fine sand, good holding ground, or possibly rock or sand and shells if near the Hirase Rock. There is also anchorage East of Papenburg and Kageno, in from 13 to 17 fathoms, or in 11 fathoms on a bank S.W. of Megami Point; the bottom here is mud, and the shelter good except from West. Towards the eastern shore the ground is irregular, and probably rocky.

Miye no Ura, with good anchorage at its head, is about 5 miles N. by E. from Iwo sima light. It runs N.E. and S.W., is 2 miles deep, and the navigator should be cautious, as it is much encumbered with dangers.

The Coast from *Miye no ura* takes a N.N.W. direction to the East Rock (*Kashe*), with bold points and sandy beaches, and moderately elevated coast range of hills, nearly all the points having off-lying rocks; an isolated rock, with deep water around, lies off the centre of a bay, 6 cables from the shore, and N.W. ½ N. 1½ mile from the outer low flat rock, off the northern point of *Miye no ura*. Vessels creeping up in shore must be careful of this rock;

and nearly 2 miles S.E. $\frac{1}{2}$ E. from Kashe (East Rock) are some rocks and islets, 3 cables off the shore.

Mats' sima, a large and well-cultivated island, with coal mines, is 2 miles long and $1\frac{1}{4}$ mile broad. The whole of the channel between Mats' sima and the main is much encumbered with reefs and obstacles.

DIRECTIONS from NAGASAKI to SIMONOSEKI.—The *coast route* is taken by vessels who know the land, and in thick weather prefer to sight it, and feel their way along from point to point; they steer for the square rock Kashe (East Rock), and pass between it and the arch rock Tengu, or rather Hako sima, which is to the eastward of the arch rock, making for the South coast of Mats' sima, the western coast of the last island being safe at 2 cables distance off shore, taking care of the rock above water off its N.W. shore.

The western cape of Mikoto sima can be approached to 3 cables, and from here, in clear weather, a course may be shaped to the westward of Kata sima, up to Taka sima, passing eastward of Kuro sima, and thence along but outside of the islands which lie off the coast of Kiusiu, and forms the East side of the Hirado Straits.

A more direct course from Nagasaki Harbour is to steer straight for Ko tate (Bonnet Rock), but allowance must be made for the current which in the vicinity of Oö tate, and to the southward sets N.W. and S.E., so that a vessel in thick weather finds herself either to the westward and northward of her reckoning, or to the eastward, and towards the main; but, having sighted the cone-shaped, easily-distinguished Ko tate (Bonnet Rock), she can steer for the bold bluff of Kuro sima, bearing in mind that great danger the *Fukushe*, which lies North $4\frac{1}{2}$ miles from Ko tate. This rock was marked by a beacon, 38 ft. high, in 1876, but it had been partially destroyed in 1877.

The southern coast of Kuro sima is steep close-to, and the perpendicular cliffs at its western end loom up in thick weather. The mariner, however, must remember that off its western end, and separated by a passage of $2\frac{1}{2}$ cables, is a low flat rock, above water, with deep water close to it. After sighting the bluffs, vessels should steer for the South coast of Hirado, which can be boldly approached to 1 or 2 cables, and by keeping it in sight at 2 cables distance, the *Costa Rica* and *Robinett Rocks* will be avoided. Vessels can run along the East coast of Hirado to the North as far as Kawatchi Bay, when it is necessary to steer for the opposite shore, to avoid the *Asama*, before entering the narrow part of Hirado Straits, at the red cliff point, from which the vessel must be guided by the sailing directions (pp. 1242-3).

From Hirado or Spex Strait to the North there are no difficulties in clear weather. A straight course for Mats' sima, passing eastward of Madara sima, and giving the rocks off Hato saki a good berth. The conspicuous

cone islet of Yebosi, or its *fixed bright light* (elevated 182 ft.) at night, is a good mark, which can be steered for, and a course shaped to go outside of Wilson Island, taking care to look out for the Kuri no kami (Swain Reef).

It was formerly recommended to vessels to pass eastward of Oogawa sima (the eastern of three islands lying North of Hato saki), between that island and Hirase Rocks, but a dangerous sunken rock having been discovered in that passage in 1876, the best track from Hirado Strait, steering from it on a N.E. $\frac{1}{4}$ E. course, is to pass between Madara and Kagara, and rounding the N.W. point of the latter at a mile; from this a N.E. by E. $\frac{1}{2}$ E. course will lead up close to the West point of Wilson Island, passing half a mile to the westward of Yebosi, between it and the rock off the Idzumi Islets.

Should the passage have been made by the Korea Strait, after rounding the North point of Iki, an E. $\frac{3}{4}$ N. course may be steered for the Siro simas, at the entrance of the Inland Sea, passing well northward of Oro no sima with a clear run of 55 miles. The tidal streams here are not very well known.

Another route from Nagasaki is to steer for Oö tate, and take the clear channel between it and Yenoï sima, passing up the West coasts of Hirado and Ikutski, and enter the Genkai nada by the channel South of Iki sima. In this route the rock South of the Idzumi Islets must be remembered.

If proceeding outside Hirado, after leaving Nagasaki steer N.W., unless wishing to pass outside Hiki sima. A run of 16 miles will place a ship abreast that island, and a further run of 13 miles on the same course will lead up mid-channel between Oö tate and Yenoï sima, from which position a N.N.W. course for 11 miles will reach the islets off the S.W. point of Hirado. Pass a mile outside these islets, and also of the Aska sima, 3 miles North of them, unless intending to take the Obree Channel, in which case the ship may pass between Ko Azika sima and Kasira, and steer N.E. by N. directly for it.

Coasting Hirado and Ikutski on a N.N.E. course, a run of $13\frac{1}{2}$ miles from Oö Azika sima will place a vessel off the North point of Ikutski; then steer N.E. by E. for 7 miles until past *Use*, the small rocky patch off the north-western face of Atsusi no Osima, which, if not seen, may be cleared by keeping the summit of Madara in line with the summit of Mats' sima E. $\frac{1}{2}$ N. Giving Use a berth of $1\frac{1}{2}$ mile, a course E. by N. $\frac{3}{4}$ N. leads up in mid-channel between the rock lying to the southward of Kami Idzumi and Yebosi, and when the latter island bears S.E., alter course N.E. by E. $\frac{1}{4}$ E. to clear Kuri no kami, and pass northward of Wilson Island, being careful lest the eastern tidal stream into the Strait of Simonoseki, which sets rather strongly through the channels East of Wilson Island, should saddle the vessel on to that reef.

Entering Hirado Channel or Spez Strait from the North, vessels of light draught use either passage, but the western, from being full of rocks and

uneven bottom, with the Vineta Rock to the S.W. 1 cable, and further, subject to much "Chow-chow" water and tidal whirls, is not recommended; the eastern passage, although much narrower, is by far the safest.

The North end of Kuro-ko sima kept midway between the rock and the wooded head of Ushi-ga no kubi (a point a little more than 2 cables South of Hirose) leads clear through the passage, passing the rock at little more than half a cable; three-quarters of a cable outside the wooded point.

Vessels of heavy draught when passing through this passage at the springs, when the strength of the tide is great, must remember the shoal patch of 15 feet, which extends $1\frac{1}{2}$ cable to the north-eastward of Ushi-ga no ubi Point. From the wooded point the Kiusiu shore should be kept at a cable's distance while rounding to Red Cliff Point.

Due North, nearly 2 cables from Red Cliff Point is the Oötaske Rock, 5 ft. above water, and E. by N. $\frac{2}{3}$ N. from the latter, three-quarters of a cable, is a sunken rock, having 15 ft. at low water springs; the precipitous fall from the end of a flat-topped ridge on the Kiusiu shore kept open of the Red Cliff Point will clear the sunken rock.

The Kiusiu shore must be kept on board until abreast Aosa saki, which is $1\frac{1}{4}$ mile S.S.W. from Red Cliff Point, where a course for the extreme South end of Hirado (S.W. by S.) can be shaped, which clears the Asama Bank.

The East coast of Hirado can be kept at from 2 to 3 cables distance.

It has hitherto been the practice to pass down the western shore of Kiusiu to the eastward of Kuro sima, &c., but from the numerous islands, rocks, and outlying dangers off that shore, and from the absence of prominent marks for avoiding the James Rock, the above route is recommended; there being no danger along the Hirado East shore.

As soon as the Costa Rica Rock has been passed (which may be known when the Kuro sima bluff bears S.S.E., with the North Kareki open of the South Kareki), a course can be shaped to pass between Mikoto and Ko tate (Bonnet); this course passes 2 miles to the eastward of the Fukushe, taking care to keep the peak of Sisiki on with or open to the eastward of Ho-age (Sail Rock) until Kata bears East.

Vessels taking the outer passage from Simonoseki, and passing between the Goto Islands and Hirado, can round the cone-shaped islet of Take sima off the South end of Hirado, quite close, and to avoid the Fukushe, must either take the direct route between the islands of Otate and Yenoi, or steer for the Ho-age (Sail Rock), in order to run with it and Sisiki Peak in line till Kata bears East.

Anchorage.—Vessels passing through this strait will often find it convenient to anchor. The places recommended are Kawatchi, on the East side of Hirado, and Taske on the North side, or at Kamada on the Kiusiu shore, immediately North of the entrance to the strait from the northward.

Vessels from the westward, bound for the Inland Sea, and finding bad weather

coming on from the North or West, will find Go no ura convenient and safe. From the westward, steer for the South point of Hira sima (the outer or southern island, which has a smooth top, with black cliffy and rocky shores), giving it a berth of from 2 to 3 cables, then steering E. by N. for the next low rocky islet, giving it a berth of half a mile; haul up N. by E. $\frac{1}{2}$ E., anchoring near the head of the bay in 12 fathoms, remembering the low rock on the port hand, just above water, when passing up the bay. From the eastward vessels must remember, before making the South coast of Iki sima, the 8-foot rock which lies to the southward of the Idzumi Islets, when they can steer for Ka saki (the southern cape), from which the coast should not be approached nearer than half a mile, to avoid the rock above water, and the ledges farther to the northward.

The WEST COAST of NIPON is but little known, and should therefore be navigated with necessary prudence and caution. The only parts at present surveyed are the islands Sado, Awa sima, and Tabu sima, and the strait between Sado and Niägata, by H.M. ships *Actæon* and *Dove* in 1859. The coast from Tsugar Strait to Cape Noto has been partially explored by the *Bittern* and other of H.M. ships, the Russian gun vessel *Djigit*, and H.M. surveying vessel *Saracen*. The latter vessel has also explored the coast between Simonoseki, the western entrance of the Inland Sea, and Taka yama (Cape Louisa), lat. $34^{\circ} 40' N$.

Tsuno or Kado Sima and Lighthouse.—Tsuno sima is of peculiar formation, appearing from the northward as two very flat quoins. The lighthouse a granite tower 100 ft. high, is placed on the N.W. point of the island. From it is shown a *flashing bright light*, showing a flash every 10 seconds, elevated 142 ft., and visible 18 miles off seaward, between S. $\frac{1}{2}$ E. and N.E. by E., in which latter direction the light is intercepted by Square Rock Point, which is 8 miles distant from the lighthouse.

Igama Bay has its entrance E.N.E. from the lighthouse. It has not been explored, but the best anchorage seems to be in its N.W. corner, just within the North entrance point.

Bank.—About $4\frac{3}{4}$ miles in a N.N.W. $\frac{1}{4}$ W. direction from the Tsuro sima lighthouse is situated the tail of a bank, composed of broken shells, sand, and stone, and having at this part a depth of 16 fathoms. In the winter, during N.W. gales, a heavy sea runs on the bank, and many junks have foundered there.

Mino Sima is in lat. $34^{\circ} 47' N$., long $131^{\circ} 7' E$., W. by N. $\frac{2}{3}$ N. distant 20 miles from the northern coast of the province of Nagato. Approached from the northward, at 9 miles distance, it appears much extended, with an undulating outline, its highest part, elevated 492 ft., being in the centre of its West side. A large square rock lies half a cable off its eastern point, and there is an islet on its N.W. side.

Miku ura, in lat. $35^{\circ} 32' N.$, long. $133^{\circ} 24' E.$, affords an excellent anchorage in 9 fathoms, mud; shelter (except with winds from the East, which are of little consequence) can be obtained. Rocks are said to lie off the lagoon opening on the South side.

The **Oki Group**, consisting of one large and a group of three smaller islands, and a number of islets and rocks, lie N.E. and S.W. of each other, and occupy an extent of 23 miles in that direction. There is an open and apparently safe channel between the large islands and the group of smaller ones. *Oki sima*, the N.E. or largest island, about 10 miles in diameter, was estimated at 3,000 ft. elevation, but no indication of a port, nor even the prospect of a tolerable anchorage was observed along its western shore.

Miyadsu, an excellent harbour, completely landlocked, with good holding ground, situated in about lat. $35^{\circ} 32' N.$, long. $135^{\circ} 15' E.$, is easy of ingress and egress, and free from dangers. The town contains about 12,000 inhabitants. Silk is manufactured in the neighbourhood, and this is a great mart for dried fish. In entering with the southernmost of the Okino Islands, bearing N.E. $\frac{3}{4}$ E., steer S.W. $\frac{3}{4}$ W. between Whale Point and Kata sima; then steer S.W. $\frac{3}{4}$ S. until at the mouth of the harbour, when steer direct for the battery, keeping in mid-channel up to the anchorage. The soundings from the mouth of the harbour will gradually decrease from 11 to 7 and 6 fathoms to abreast of the town, with bottom of sticky mud.

Tsuruga Bay, in about lat. $35^{\circ} 40' N.$, long. $136^{\circ} 1' 20'' E.$, is very easy of ingress and egress, and, so far as is known, free from rocks, excepting those supposed to exist well in on the western shore. The town of Tsuruga, at the head of the bay, contains about 15,000 inhabitants, and exports dried fish and rice. Approaching Tsuruga Bay from the northward, steer so as to be distant 6 miles from the North end of Tamagawa when it is brought in line with Ibo Point; then steer S.E. $\frac{1}{2}$ S. until the triangular white cliff seen to the left of the town is opened, when bring it to bear S. $\frac{1}{2}$ E., and then steer for it until the first prominent point on the left of the bay going in is brought to bear E. by N. $\frac{3}{4}$ N.; then steer S. $\frac{1}{2}$ W. to the anchorage.

Mikuni Bay.—The approach to Mikuni Roads, in about lat. $36^{\circ} 13' N.$, long. $136^{\circ} 8\frac{1}{2}' E.$, is bold to within half a mile from the shore, when the soundings vary from 9 to 6 fathoms. The town of Mikuni is said to contain 10,000 inhabitants, and is situated on the right bank of a river. The anchorage in the outer roads is exposed from S.W. round West to North, but completely sheltered from all other winds. On Cape Sakiura, just northward of Mikuni, a light is sometimes shown.

CAPE ROIVEN or NOTO, in lat. $37^{\circ} 28' N.$, long. $137^{\circ} 22' E.$, is elevated about 700 or 800 ft., the land rising 1,200 to 2,000 ft. to the westward of it. At 12 miles W. by S. from the cape is a remarkable white cliff, that shows well to the westward. A reef, which dries, extends eastward 2 miles from

the cape, with much uneven ground in the vicinity, and it is reported that a 5-fathom patch lies at a distance of 3 miles.

A sunken ledge of rocks, with only 3 ft. water, is said to exist between the Astrolabe Rocks and Waisima, $2\frac{1}{2}$ miles from the latter place.

Aroostook Reef lies nearly N.N.W. $\frac{3}{4}$ W., 10 miles from Cape Roiven. From the reef the northern Astrolabe Rock bears W. $\frac{3}{4}$ S., and Isonosu Hill S.W. $\frac{1}{2}$ W.

Yutsi Sima, in lat. $37^{\circ} 50\frac{1}{2}'$ N., long. $136^{\circ} 55'$ E., is 40 ft. high, about two-thirds of a mile in diameter, level, and cultivated; there are a few stunted trees on it, and a small village on its southern side.

Nana Sima (Astrolabe Rock), in lat. $37^{\circ} 35'$ N., long. $136^{\circ} 54'$ E., is 200 feet high, about a quarter or a third of a mile in diameter, and is the largest and highest of a group of five rocks, which extend nearly $1\frac{1}{2}$ mile in a N.E. and S.W. direction, and vary from 200 to 70 ft. in height.

Nanao Harbour, in lat. $37^{\circ} 2'$ N., long. $136^{\circ} 58'$ E., has two entrances, caused by Noto-jima, an island about 3 miles long. The city of Nanao is situated in the extreme western angle of the bay. There are some iron-works here.*

Toyama Bay.—Cape Roiven is the western point of entrance to this extensive bay, which is broadly open to the North and N.E. The shores of this bay appear populous, and at *Fushiki*, in the centre of the head of the bay, a *fixed bright* light is shown. Good anchorage will be found with this light bearing S.S.W. $\frac{3}{4}$ W., distant three-quarters of a mile.

At 15 miles S.W. $\frac{1}{2}$ W. from Niëgata the low shore terminates at *Kadota yama head*, $4\frac{1}{2}$ miles North of a spur of the fine peaks of *Yafiko yama*, which has the appearance of a blunt cone sloping on the West. A mile to the South the peak of *Kauriko yama* rises to a higher elevation.

PORT NIEGATA.—The city of Niëgata stands on the left bank of, for Japan, a rather large river, with 4 fathoms water within the entrance; but a bar off the entrance seals it to vessels of greater draught than 7 or 8 feet ($7\frac{1}{2}$ feet in 1877). In fresh breezes from seaward the sea breaks across the entrance, and at that time not even a boat could cross the bar without risk. The roadstead off the river's mouth is quite exposed, and the holding ground bad.

Niëgata, one of the ports open by treaty to foreign trade, is the most opulent city on the West coast of Nipon. It is said to be more than four times as large as Hakodate, and the population exceeds that comparison. A small battery near the entrance to the river appeared to be unarmed.

The port of Niëgata still (1877) remains unvisited by foreign ships. There is no good harbour, which is much to be regretted, as it is the outlet of one

* The places on the coast between Nanao and Niëgata are described by J. Troup, Esq., in the Journal of the Royal Geographical Society, vol. xlii., 1872.

of the most fertile districts of the country. Imports are mostly brought overland from Yokohama. There is a temporary light-tower (1877) at the mouth of the river.

Anchorage.—Although Niëgata is opened to European trade, no vessel except a powerful steamer could, during the autumn or winter months, remain at anchor off that port, as before mentioned. Under these circumstances, the most prudent course to adopt would be to anchor under shelter of Sado Island, and have the cargo transported from Niëgata in junks or light-draught steamers.

Soundings reach to a considerable distance off the mainland in the vicinity of Niëgata; vessels, therefore, running between Sado and Nipon at night, or in a fog, should keep the lead quickly hove. Should soundings be obtained and decrease gradually, the mainland is being approached. A run of very deep water will be found on the Sado side of the channel.

The town of *Aosima yama* stands near the embouchure of a river, which also has a clear channel carrying only 7 ft. It is said to be 6 miles N.E. of Niëgata, but is but half that distance according to the Japanese manuscript.

Tides.—For the distance of 4 miles a strong indraught, on the flood tide, is experienced off the entrance of Niëgata, greatly to the inconvenience of sailing vessels seeking an offing. The ebb would, of course, assist them off the land.

Sado Island, lying 25 miles westward of the important trading port of Niëgata, is $33\frac{1}{2}$ miles long, N.N.E. and S.S.W., nearly 17 at its widest part, and is composed of two parallel mountain ranges lying N.W. and S.E. of each other, the neck of land joining them being a plain, on the N.E. and S.W. sides of which are formed two extensive open bays.

The bend in the coast-line on the N.E. side of the island forms an extensive bay called *Minato-mats*, which affords anchorage in from 12 to 16 fathoms, sheltered from E. by S. (round South and West) to North. A conspicuous rock, 60 ft. high, called *Siza*, marks Okawa Point, the South extreme of this bay, in which no known dangers exist. At the head of the bay is the town of *Ibesso* or *Yebisu*.

Another eligible anchorage will be found off Oda village, a quarter of a mile S.S.W. of Matsu saki, a low projecting tongue of shingle, bearing S.S.W. $\frac{1}{2}$ W., distant $10\frac{1}{2}$ miles from Okawa Point. The *Actæon* rode out a heavy gale of wind here in 13 fathoms water.

The South part of the East coast possesses several coves and inlets in which small craft will find excellent shelter, but there is no harbour of importance on it.

Nearly every little valley has its stream of excellent water flowing down to the beach, and when the sea is smooth easily obtainable. Coal is not known.

Awa Sima, the N.E. extreme of which is in lat. $38^{\circ} 29' 36''$ N., long. $139^{\circ} 16' 7''$ E., is a narrow strip of land running N.N.E. and S.S.W., and reaching at its southern extreme an elevation of 680 ft.

The S.E. side of the island is fringed with a narrow bank of soundings, but is clear of rocks. Rocks are found off the West side of the island to the distance of a quarter of a mile, and off the N.W. side to the distance of a mile.

The hand-lead will afford but little warning to vessels approaching the N.W. side of this island.

Tabu Sima (Observatory Rock, off the East extreme of which is in lat. $39^{\circ} 11' 53''$ N., long. $139^{\circ} 34' 17''$ E.), is in shape somewhat of a horse-shoe, with a club at its N.E. end. It is on top nearly a flat, varying from 120 to 150 ft. in height. Its greatest length is $1\frac{1}{2}$ miles N.E. and S.W. Except on the S.E. side, the island is surrounded by detached rocks; they all show, and are in no instance more than three-quarters of a mile off shore.

Bittern Rocks.—This group of three small rocks, two above water and one awash, was discovered by H.M.S. *Bittern*, 8th July, 1855. The southwestern or largest rock, in lat. $40^{\circ} 31'$ N., long. $139^{\circ} 31'$ E., and lying W. by S. about 15 or 17 miles from Cape Yokoiso, is about 18 ft. high, and in size and appearance resembles the hull of a vessel of about 200 tons.

TSUGAR STRAIT, separating Nipon from Yezo Island, is about 40 miles in length in an E.N.E. and W.S.W. direction, and $9\frac{1}{2}$ miles wide at its narrowest part.

Winds.—Strong N.W. winds prevail in this strait during the winter months, accompanied by snow and rain, and the weather is very boisterous. In April the wind hauls to the westward, with heavy squalls from the S.W. In May the wind is from the southward, variable between S.W. and S.E., or more easterly or westerly, and fine weather commences, lasting until the middle of September when it becomes unsettled and summer commences to break up with frequent gales; winter fairly setting in in October.

Dense *fogs* prevailed in May and June; after that period they are comparatively rare.

Current.—Through the middle of Tsugar Strait the current sets constantly to the north-eastward, but its breadth varies considerably according to the state of the wind and weather. The shores of the strait are subject to tidal influence, the flood making to the eastward and the ebb to the westward; the velocity of the whole stream on the flood tide being thus considerably augmented; whilst on the ebb it is diminished.

Awomori Bay, a vast interior basin at the North end of Nipon, opens on the South side of Tsugar Strait. The entrance is 5 miles wide, and with high land on both sides. Off the salient part of the West point, some half-tide rocks lie one cable from the shore.

The town of *Awomori*, in the S. W. part of the bay, stretches along the beach for nearly a mile. It appears to have from 15,000 to 20,000 inhabitants. A great quantity of rice is exported to *Yezo*. This anchorage is open to the North; the soundings decrease gradually, and 9 fathoms will be found at 2 cables from the shore, with good holding ground. A considerable river flows into the sea East of the town, but its entrance is blocked by a bar, the outer edge of which projects $1\frac{3}{4}$ cables.

A *fixed red light* is shown at *Awomori* from a pole placed 100 ft. from high water mark in the front of the town.

Toriwi Saki, the most northern point of *Nipon*, lies 26 miles W. by N. $\frac{1}{2}$ N. from *Siriya Saki*, which with its lighthouse is described on page 1199. *Toriwi saki* is a low tapering point, off which, at the distance of a cable, is *Low Islet* or *Omasaki sima*, 40 ft. high. The ground all around this cape and islet is very foul, except to the N.E., where a vessel may anchor to wait tide in 13 fathoms, with the centre of the islet bearing S.W. by S. distant about a mile. This is a useful anchorage for vessels approaching *Hakodate* from the eastward, particularly during the light south-westerly winds common to the strait during the summer months. There is a tide race, near the full and change of the moon, 3 miles North of *Low Islet*, and heavy overfalls with a N.E. swell. On such occasions care must be taken to avoid this locality. There is no clear channel for large ships between the race and the islet.

Singapore Rock, with 6 ft. on it at low water springs, lies N. by E. $\frac{2}{3}$ E., $2\frac{1}{2}$ miles from the centre of *Low Island*, and is at the extremity of a sunken ledge, with from 6 to 17 fathoms on it, connecting this rock with *Low Island*, excepting in which directions the soundings round it vary from 13 to 21 fathoms. This rock is surrounded to a considerable distance by the most conspicuous of the overfalls existing in the vicinity, all of which should be carefully avoided.

NORTH SHORE.—*Cape Sirakami* (*Nadiejda*), the North point of western entrance to *Tsugar Strait*, is a high bluff similar to *Cape Siwokubi*, but not so safe of approach. The coast, for more than a mile on each side of the cape, is bordered with numerous rocks, generally above water, some of which extend nearly 2 cables from the shore. As it is not known whether the dangers extend under water beyond this distance, it will be prudent to give the cape a good berth in passing.

Cape Tsiuka, at $12\frac{1}{4}$ miles N.E. by E. from *Cape Sirakami*, is a high cliffy point, which may be further known by three rocks extending a quarter of a mile from a point one mile north-eastward of it; the outer rock of the three is of a conical form, and 70 ft. high.

Vessels can anchor in the bight of the bay, between *Capes Tsiuka* and *Sirakami*; but as a southerly wind on the western tide sends in a cross

swell, it would not be prudent to anchor far in. The best position is in from 15 to 20 fathoms, with the southern white cliff bearing West about one mile.

HAKODADI HARBOUR, or more properly Hakodate, on the North side of Tsugar Strait, is situated at the foot of the northern slope of a high peninsula which is connected with the mainland of Yezo by a low sandy isthmus. It is an excellent roadstead 4 miles wide and 5 miles deep, and for accessibility and safety is one of the finest in the world. Its entrance is between Hakodadi Head and Mussell Point, which bear East and West of each other, distant $4\frac{2}{3}$ miles. The harbour is in the south-eastern arm of the bay, and is completely sheltered, with regular soundings and excellent holding ground, the best anchorage being over a depth of 5 fathoms, black mud, in a line with the avenue leading to the governor's house. The town of Hakodate stands on the N.E. slope of the promontory, facing the harbour, and in 1854 contained about 6,000 inhabitants. Hakodate exports herring oil; bear, river and sea otter, and deer skins, antlers, and edible seaweed in large quantities; and large junks of from 200 to 300 tons visit the harbour engaged in this trade. There is telegraphic communication between Hakodate and the other Japanese ports.

A *lightvessel* painted red, with two masts carrying a ball at the foremost head and exhibiting a *fixed bright light*, elevated 36 feet above the sea, is moored in $7\frac{1}{2}$ fathoms (at low water spring tides) off the most northern point of the spit, which runs out from Point Anama, the N.W. point of the town, with the mouth of Kamida Creek bearing E. by S. $\frac{1}{2}$ S., and White Bluff S. by W.

Vessels of large draught entering the harbour should pass North of the lightvessel, as there is a bank of stones directly South of her.

At $2\frac{1}{2}$ cables South from the vessel is a *triangular floating beacon* moored in $5\frac{1}{2}$ fathoms. The passage between the lightvessel and the beacon may be taken by vessels drawing less than 18 ft. water.

South of the beacon the bottom is composed of large stones, and is very irregular. The banks on the East side of this bay must be avoided, that extend half a mile from the shore. A vessel can moor at half a mile from the shore in $5\frac{1}{2}$ fathoms mud, good holding ground. In less than that the bottom is gravel, and anchors hold badly.

Water can be obtained, likewise *coal* and wood for steaming purposes. There is a brass and iron foundry on a limited scale. Vessels, even when seriously damaged, can undergo repairs in the harbour.

Pilots.—Vessels entering the bay are boarded by pilots, who charge five Mexican dollars, without any distinction as to the size of the ship. There are no special harbour regulations.

Tides.—It is high water, full and change, in this harbour, at 5^h., and the extreme rise and fall of tide is 3 feet.

Directions.—Entering Hakodate Harbour, after rounding Hakodate Head, and giving it a berth of a mile to avoid the calms under the high land, steer for the sharp peak of Komaga-daki, bearing about North, until the eastern peak of the Saddle Mountain, bearing about N.E. by N., opens to the westward of the round knob on the side of the mountain, then haul up to the northward and eastward, keeping them well open until the centre of the sand hills on the isthmus bears S.E. by E. $\frac{3}{4}$ E. (these may be recognised by dark knolls upon them). This will clear the spit which runs in a N.N.W. direction two-thirds of a mile from Anama saki, the north-western point of the town. Round the lightvessel, passing northward of her, and anchor as convenient in from 6 to 8 fathoms, taking care to keep the lightvessel bearing westward of N.W. to avoid the shoal bank off the town. Should the lightvessel be removed, then bring the sand hills a point on the port bow, and stand in until the above point of the town bears S.W. $\frac{1}{2}$ W., when the vessel will be in the best berth, in $5\frac{1}{2}$ or 6 fathoms water. The upper part of the harbour is generally crowded with small vessels.

At night bring the light to bear N.E. $\frac{3}{4}$ N., and steer for it on that bearing, taking care not to bring it to bear North of that bearing. Round it as before directed, and anchor as convenient. Should the light be removed steer a northerly course on entering Hakadodi Bay to a depth of 7 fathoms, and keeping in that depth on an easterly and south-easterly course the spit will be safely rounded.

Should the wind fall before reaching the harbour, there is good anchorage in the bay, in from 25 to 10 fathoms water.

Cape Siwokubi bears E. by S. 12 miles from Hakodadi Head, and N. by E. $\frac{3}{4}$ E. $9\frac{1}{2}$ miles from Low Islet on the Nipon shore; this is the narrowest part the Strait of Tsugar. This cape is steep-to, and the N.E. current frequently runs with greater strength close to the rocks than out in the stream. The summit of the bluff immediately above the cape is 1,022 ft. high.

Cape Yesan, the North point of eastern entrance to Tsugar Strait, is the East extreme of a bold promontory, with several remarkable dome-shaped mountains in the rear. The cape itself is a steep cliff about 600 feet high; the *volcano* immediately above it is 1,935 ft. high, and frequently capped with a light cloud of steam, and a jet of steam is constantly seen issuing from a hollow on the West side of the hill, but it is not otherwise active.

At $2\frac{1}{2}$ miles E. $\frac{2}{3}$ S. from Cape Siwokubi is *Conical Islet*, 200 ft. high, lying close to the coast.

DIRECTIONS.—Sailing vessels approaching Tsugar Strait from the westward during foggy weather should guard against being carried by the current to the northward past the entrance. Should the weather be clear when nearing Cape Yokoiso, it may be as well to sight it; but if doubtful, shape a course (allowing for the probable current) direct for Oho saki. Should a fog come on suddenly when nearing this cape, recollect that the coast is clear and

sandy, and the soundings are regular to the southward, but rocky with irregular soundings to the northward of it. The cape is steep-to, and standing out prominently from the coast line, forms a good landmark.

No particular directions are required in passing through the strait from the westward, the only dangers being those off Toriwi saki above described, and the Rattler Rock off Siriya saki, and the north-easterly current will always be found strongest in the middle of the stream. After passing Tatusipi saki, if the weather is thick, and the vessel bound to Hakodate, endeavour to make Cape Tsiuka, and proceed from thence to Mussell Point; or giving Cape Tsiuka a berth, feel the way by the lead into the bay, between it and Cape Saraki, and anchor till the weather clears.

Approaching the strait from the eastward, steer for Siriya saki, and endeavour to make it on a N.W. bearing. Pass the cape at not less than 2 miles distance, then haul in to avoid the current and to anchor should it fall calm. In this case, by keeping this shore close aboard, the vessel may probably be drifted up to Low Islet, off Toriwi saki, by the western stream, when the N.E. current is running like a mill stream in mid-channel.

At the anchorage off Low Islet the vessel must wait a favourable opportunity for crossing the strait. During the summer months the winds are generally light from the S.W. for a considerable period; the wind, however, generally freshens a little when the western stream makes, and this is the right time to weigh. Pass about half a mile from Low Islet, between it and the Singapore Rock, and in crossing the current take care not to be set to leeward of Hakodate. If proceeding straight to Hakodate from the eastward, the better course is to cross the strait, and passing about 5 miles off Siriya saki make for Cape Yesan, so as to take advantage of the cold westerly set along the South shore of Yezo.

Proceeding from Hakodate to the westward against S.W. winds, keep well inside Cape Tsiuka, and if unable to round it, anchor with the stream or kedge about 2 miles to the N.E., weighing again when the next western tide makes. Should the wind be very light, a vessel may not clear the strait in one tide; in this case it will be better to wait a tide to the eastward of Cape Sirakami, and take the whole of the following tide to clear the strait, than run any risk of being swept into the strait again by the current. Vessels passing through the strait, particularly to the westward, should have a good kedge and 150 fathoms of hawser ready for immediate use, and must keep the land close on board.

Tides.—The tide in the stream runs about 12 hours each way near the full and change of the moon, and there are two regular tides by the shore in 24 hours. At full and change the flood or eastern stream makes at Tatusipi saki at 6^h 30^m a.m., at 7^h 0^m at Cape Tsiuka, and at 7^h 30^m at Toriwi saki. The western stream begins about 12 hours later. The turn of the stream takes place 1½ hours later every day. With heavy S.W. gales the

north-easterly current swells and fills the strait, attaining a velocity of from 5 to 6 knots an hour, and entirely overcomes the ebb tide.

YEZO ISLAND.—The coast line of Yezo is about 1,000 miles in extent, and its eastern shore appears low from seaward, resembling table-land; its appearance is, however, most deceptive, as the country is a repetition of abrupt hills of a uniform height, interspersed with deep valleys, rivers, swamps, and large lagoons.

The western coast is bold, and ranges of lofty mountains, many of the summits of which are extinct volcanoes, rise in every direction. The highest of these, *Shubets*, a cone-shaped mountain 30 miles inland, is an active volcano, and from its size and grandeur may well be considered by the Japanese as the *Fusi yama* of Yezo.

The island is almost entirely covered with wood, the ground being in many places strewn with the trunks of trees in all stages of decay, and covered with moss, lichen, and rank vegetation; and the coarse bamboo grass is found in some places growing to a height of 15 ft.

There are numerous rivers and streams, the largest of which, the *Iskarri*, is on the West coast, and three or four large lakes are said to exist in the interior. *Coal* is found in several places, but is principally procured from the village of Kamami, near Iwani, on the West coast. Sulphur abounds, and sulphur springs are numerous.

Yezo is a conquest and colony of Japan, and small settlements of emigrants from the South, and of natives are found scattered along the shores. The Ainos or aborigines of Yezo are a race of stunted growth, and are grossly ignorant, wretchedly poor, and filthy both in person and habits; unlike the Japanese, they allow their hair and beards to grow to a great length. They appear to be of a different race to the Japanese.

Little or no agriculture is carried on, both Japanese and Ainos principally subsisting on the produce of the ocean. Salmon and herring fishing on a large scale is their principal occupation, and large quantities of seaweed are collected, dried in the sun, and sent South, finding its way into all parts of Japan and China.

“Want of harbours, or even anchorages, is the great drawback to Yezo. The extent of coast line is about 1000 miles, and along the whole of that distance there are only Hakodadi and Endermo on the S.W., and Akishi on the S.E., that can be called harbours. Hamanaka is an anchorage, Nemoro is but an anchorage, and from Nemoro to Otarunai, a distance of 420 miles, there is nothing in the shape of a harbour. A vessel may anchor at one or two places, provided the wind is off shore; under such circumstances little could be done in the way of exportation should the island become of any importance.

Otarunai is at all times safe, and might be made an excellent harbour.

There is no place between Otarunai and Hakodadi which can be used as an anchorage, except Sutsini and Rogers Island, and there only under favourable circumstances. Considering Otarunai as a harbour, there are then four along the 1000 miles of coast line, namely, Hakodadi, Endermo (in Volcano Bay), Akishi, and Otarunai; and three anchorages possessing good shelter—these are Hamanaka, Nemoro, and Sutsini.

None of the places I visited in the East had ever seen European vessels even pass the coast, except some years ago, when a vessel went once or twice to Nisibets, and a steamer passed into the Straits of Yezo, and proceeded to Nemoro; the *Sylvia* is the first man-of-war, and almost the first ship, that has been round Yezo."—(Journal of the Royal Geographical Society, vol. xlii., 1872, Notes on the East, N.E., West Coasts of Yezo.—Commander H. C. St. John, R.N.

In the same volume will be found a long and interesting description of a journey made nearly around the coast of the island by Captain T. Blakiston, F.R.G.S.

With this we shall close the description of Japan. A description of the coasts to the northward will be found in the North Pacific Directory.

A P P E N D I X.

NAMES, MONEY, WEIGHTS, MEASURES.

Geographic Terms.

THERE is not a more vexed question than the proper mode of representing the sounds of an Oriental language by our European alphabet. Though every language has much in common, there are still those great and important differences in the value of different letters or syllables, that each language, or even dialect, would require a separate alphabetic system, and a great variety of independent letters, or combinations of letters, to represent the specific peculiarities of each. If it be difficult, or impossible, to represent the various local pronunciations of our own tongue, the different way in which many words composed of the same letters would be uttered by a native of Devonshire, Northumberland, or Lanarkshire, how difficult or impossible it will be to carry such a system into a tongue of a totally different construction.

But there would be a limit to some of this confusion, if it were agreed as to what should be a common value for the European alphabet. Formerly every one represented the names of places, difficult to describe the sound of, in that mode which seemed best to him, without heeding what value those of any other nation would give to his orthography. The confusion thus arising is nowhere more evident than in the countries described in this work, where no written language similar to our own exists.

As has been before remarked, certain values should be given to every letter, and this system is now generally adopted by modern writers; and, as far as practicable, has been followed in this work. Briefly, the system is this, that all the consonants are to be pronounced as in English, French, &c., and the vowels as in Italian, *i* as *ee*, and *u* as *oo*, or *ou* in French. In the vocabularies of the names which are given for each principal language hereafter this system is followed.

MALAY, SINGAPORE, ETC.

Malay Vocabulary.

MALAY.	ENGLISH.	MALAY.	ENGLISH.
Amas - - -	Gold.	Gajah, gajah mina -	Elephant, whale.
Anak, anak ayer -	Child, rivulet.	Gosong - - -	Shoal, sand-bank.
Ang-in - - -	Wind.	Gunong - - -	Mountain.
„ durat - - -	Land wind.	„ api - - -	Volcano.
„ laut - - -	Sea breeze.	Jambatan, palamban	Bridge.
Api - - -	Fire.	Jurang, churang -	Creek.
Arang - - -	Charcoal, coal (?).	Kalang-an - - -	Dry dock.
Ayer - - -	Water, river.	Kampong - - -	Enclosure, village.
„ baku - - -	Ice, hail.	Kamudi - - -	Rudder, helm.
„ dang kal - -	Shallow water, ford.	Kapal - - -	Ship.
„ masin - - -	Salt water.	Karang - - -	Coral reef.
„ sung-ei - - -	Rain water.	Karra - - -	Monkey, ape.
„ tawar - - -	Fresh water.	Karsik - - -	Gravel, sand.
Banchah - - -	Marsh, morass.	Kayu, kayu api -	Wood, firewood.
Barat, barat tapat	West.	Kilat - - -	Lightning.
„ daya - - -	South-west.	Korong - - -	Cabin, poop.
„ laut - - -	North-west.	Kota - - -	Fort, castle, tower.
Batang - - -	River.	Kuda - - -	Horse.
Batu - - -	Rock, stone.	Kuku - - -	Fluke of an anchor.
„ barani - - -	Loadstone.	Kuning - - -	Yellow.
„ Bedil - - -	Gun, musket.	Kwala - - -	Mouth of river.
Belantara - - -	Forest, desert.	Labuh-an - - -	Anchorage, harbour.
Bender - - -	Port for trade.	Lama - - -	Former, old, ancient.
Bengkok, Bungkok-	Crooked, humped.	Lamong - - -	Buoy.
Besar - - -	Large, great.	Lang-it - - -	Sky, heavens, roof.
Besi - - -	Iron.	Lang-kong - - -	Arch, crescent.
Beting - - -	Sand-bank.	Lapong - - -	Gap, wide.
Biduk - - -	Boat, Great bear.	Laut, laut besar	Sea, the ocean.
Bintang - - -	Star.	„ salatan - - -	Southern ocean.
„ kutab - - -	Pole-star.	Layen - - -	Sail.
Bras, nasi, imei -	Rice, boiled rice.	Lembah - - -	Valley.
Buah - - -	Fruit.	Lichah, Lumpun	Mud.
Buaya - - -	Alligator, crocodile.	Lima, lima-blas	Five, fifteen.
Bukit - - -	Hill.	Lubok - - -	Bight or recess.
Bulan, bulan baru	Moon, new moon.	Mata - - -	Points of the com- pass.
„ purmana - - -	Full moon.	Merah - - -	Red.
Buluh - - -	Bamboo.	Nang-ka - - -	Jack Fruit.
Burong - - -	Bird.	Negri - - -	City, town, country.
Damie - - -	Peace.	Padang - - -	Plain, open space.
Danau, tasek - -	Lake, small lake.	Padi - - -	Rice in the husk.
Dapur - - -	Cooking place.	Padoman - - -	Mariner's compass.
Datu, datuk - - -	Chief of a tribe.	Pahak, lembah -	Valley.
Da-un, dahan - -	Leaf, bough.	Pakau, pasar - -	Market place, ba- zaar.
Dayong - - -	Oar, paddle, to row.	Palamban - - -	Bridge.
Etam - - -	Black.		
Gading - - -	Ivory.		
Gadong, godong -	House.		

MALAY.	ENGLISH.	MALAY.	ENGLISH.
Panjang - - -	Long, tall.	Salat, sellat - - -	Strait of the sea.
Punchuran, trusan - -	Channel, passage.	Salatan - - -	South.
Pasang - - -	Tide.	„ daya - - -	South-south-west.
„ besar - - -	Spring tide.	Sampan - - -	Canoe, small boat.
„ kadang - - -	High water.	Sapah, sippah - - -	Quid of Betel.
„ kring - - -	Low water.	Sudagan (Ar.) - - -	Merchant trader.
Payang, rawah - - -	Marsh.	Sung-ei - - -	River.
Pendek, korang - - -	Short, wanting.	Tambaga - - -	Copper.
Pikul - - -	Weight of 133 lbs.	Tambang - - -	Mine.
Pinang - - -	Betel nut.	Tanah, benua - - -	Land, country, earth
Pisang - - -	Plantain, banana.	Tanda - - -	Beacon.
Ponchak, kaman- chak - - -	Peak of a hill.	Tanjong, tapat - - -	Cape, point, cliff.
Prigi - - -	Well.	Tasek - - -	Inland sea, lake.
Pulau, Pulo - - -	Island.	Teluk - - -	Bay.
Putih - - -	White.	Timor - - -	East.
Rachun - - -	Poison	„ laut - - -	North-east.
Rakil - - -	Raft.	„ tung-ara - - -	South-east.
Rantau - - -	Plain, flat sea coast.	Ubat bedel - - -	Gunpowder.
Rata - - -	Flat, level, low.	Ujong tanah - - -	Promontory.
Rawang, rawah - - -	Swamp, marsh.	Utara - - -	North.
Rumah chukei - - -	Custom-house.	Utang, rimba - - -	Forest.
Rumpak - - -	Pirate.	„ timor - - -	North-east.
Sakat - - -	Bar, barrier.	„ sa-mata timor - - -	North-north-east.
		„ barat-laut - - -	North-north-west.

Money.

The silver coin in general use in Singapore, Penang, and Malacca are the rupee and dollar. Foreign monies, also, are freely used, especially the Mexican and Spanish dollar. All government accounts are kept in £ s. d. The metallic value of the rupee of course depends on the market price of silver. In 1872 it was 1s. 11½d.; in 1874-5, 1s. 10d.; in 1875-6, 1s. 10¼d.; and in 1876-7, 1s. 9¾d.

12 pies = 1 annam = 1½d.	1 cent = ½d.
16 annas .. 1 rupee 2s. (nom.)	100 cents = 1 dollar .. 4s. 3d.
100 rupees = 46½ dollars.	
100 dollars 214 rupees, 1 anna, 5 pies.	

The same denominations for moneys, weights, and measures prevail, with variations throughout most of the Malay States.

The word *picul* is the Malay word *pikul*, which, like the Chinese word *tan*, means a load or burden carried on the back. *Mace* and *tael* are derived, through the Malayan and Javanese *mas* and *tail*, from the Hindu *Masha* and *tola*. *Cash* is from *caixa*, the Moorish name of the tin coin found by the Portuguese at Malacca in 1511. *Catty* or *kati* is the Malayan pound, and *candareen* or *kondrin* is also Malay. *Pice* is the Javanese word *piehis*.

Weights.

The commercial weights in use between Europeans and natives are the Chinese *picul*, *catty*, and *tael*. A little discrepancy exists in the weight of the *picul* and

catty in some places ; and there is a distinction between the Chinese and Malay picul ; the latter is equal at Penang to $142\frac{2}{3}$ lbs. avoirdupois, and is only used to weigh tin and pepper. This discrepancy arises from the use of the *bahr*, which varies considerably in weight, and is divided into 3 Malay piculs ; the *bahr* is equal at Penang to 421 catties. By the Malay picul, goods are purchased from the native vessels ; but they are re-sold by the Chinese picul. By the *coyan*, of 50 Chinese piculs, grain and salt are sold ; a bag of salt weighs 100 lbs. avoirdupois ; but one of grain or rice weighs 164 lbs. The *coyan* at Penang is a measure ; 45 piculs of rice, or 43 of salt, make a measurement *coyan*.

The Chinese *dotchin* is commonly met with ; but among merchants English weights and scales are generally used ; and, in fact, wherever Europeans have colonized or settled in Malaya, they have fixed the imperfect native measures and weights, as thereby making them the standard, or by supplanting them with their own.

Gold dust is weighed by the *bunkal*, equal to 2 dollars or 832 grains, troy, which is divided into 16 *miams* of 12 *sagas* each ; a catty of gold is $1\frac{2}{5}$ of the common catty. In the towns on the eastern side of the peninsula the *bunkal* and catty are found to be about 10 per cent. less than these. Pulse, dhol, and rice from Bengal are sold by the bag of 2 bazar maunds, or $164\frac{1}{3}$ lbs. Piece goods are sold by the *corge* of 20 pieces, and Java tobacco by the *corge* of 20 baskets.

At Malacca the picul weighs 135 lbs. avoirdupois ; and 3 piculs, or a *bahr*, 428 lbs. avoirdupois.

Measures.

The measure of length frequently used by the Malays and other natives is the *hasta* or cubit, equal to 18 English inches ; but among the Chinese, as well as Europeans, the English yard is always used.

The chief measure of capacity for grain and oil is the *gantang*, divided into 4 *chupals*, each about $2\frac{1}{2}$ lbs. avoirdupois ; the *gantang* is equal to 271.65 cubic inches, or $1\frac{1}{4}$ gallon ; 10 *gantangs* make one *parah*, which is merely a nominal measure ; and 80 *parahs* of rice make 1 picul ; 800 *gantangs* are counted to a *cayan*, about 2 tons 7 cwt.

SIAM.

Siamese Terms.

Used in the Charts and Sailing Directions.

SIAMESE.	ENGLISH.	SIAMESE.	ENGLISH.
Bang - - -	Village.	Fai - - -	Fire, light.
Bon - - -	Upper.		
Buri - - -	City.	Hin - - -	Rock, stone.
		Hatsai - - -	Sandbank.
Dam - - -	Black.		
Deng - - -	Red.	Khao - - -	Mountain, hill.
Din niau - - -	Clay.	Khao or Khaao - - -	White.
Din-so-phong - - -	Chalk,	Khlon - - -	Mud.

SIAMESE.	ENGLISH.	SIAMESE.	ENGLISH.
Klong - - -	Canal or creek.	Pa - - -	Forest.
Koh - - -	Island.	Pak - - -	Mouth.
Kok - - -	Olives.	Pak-nam - - -	Mouth of a river.
		Pom - - -	Fort.
Lem - - -	Point, promontory.		
Lang-tao - - -	Bar (of a river).	Rong-pa-si - - -	Custom-house.
Lat - - -	A cut, short cut.		
Mai - - -	New.	Sai - - -	Sand, gravel.
Mé-nam - - -	River.	Sao-thong - - -	Flag-staff.
Muang - - -	Town.		
Nam - - -	Water, or tide.	Tha-leh - - -	Sea, lake.
Nam-khun - - -	Rising tide.	Thai - - -	Siamese.
Nam-o - - -	„ beginning of.	Thit nua - - -	North.
Nam-tem-khryae - - -	Full tide.	Thit tai - - -	South.
Nam-long - - -	Ebbing tide.	Thit tawan-ok - - -	East.
Nei - - -	In.	Thit tawan-tok - - -	West.
Noi - - -	Little, or less.	Thi-thot-samo - - -	Anchorage.
Nok - - -	Out.		
Nei-qua - - -	Inner.	Wat - - -	Temple.
Noi-qua - - -	Lesser.		
Nok-qua - - -	Outer.	Yot - - -	Peak.
		Yai - - -	Great,
		Yai-qua - - -	Greater.

Money.

200 to 450 Cowries or Bier - - -	=	1 P'hai-nung - - -	=	$\frac{1}{2}$ d.
4 P'hai-nungs - - -	=	1 Fuang - - -	=	$3\frac{3}{4}$ d.
2 Fuangs - - -	=	1 Salung or Miam - - -	=	$7\frac{1}{2}$ d.
4 Salungs or Miam - - -	=	1 Tical or Bat (silver) - - -	=	2s. 6d.
4 Ticals - - -	=	1 Tamlung - - -	=	10s. 0d.
20 Tamlungs - - -	=	1 Catty or Chang - - -	=	£10.
100 Changs or Catties - - -	=	1 Picul - - -	=	£1,000.
3 Dollars (Spanish) - - -	=	5 Ticals.		

Measures of Length.

The *niu* is supposed to be equal in length to 8 grains of husked rice; the *kup* or *keub* to measure from the end of the thumb to the end of the middle finger; and the *sok* from the end of the middle finger to the elbow.

	Inches.	Metres.
1 niu - - -	= $\frac{3}{4}$	= .20637
12 niu - - -	= 1 kup or keub - $9\frac{3}{4}$.24764
2 kup - - -	1 sok - - - $19\frac{1}{2}$.49528
2 sok - - -	1 ken - - - 39	.99056
2 ken - - -	1 wa or vōua - 78	1.98112
	yards.	
20 wa - - -	1 sen - - - $43\frac{1}{2}$	39.62244
	miles.	kilometres.
100 sen - - -	1 rōeneng - 2.462119	3.962244
4 rōeneng - - -	1 yote - 9.848477	15.848976

Capacity.

		Pint.	Litres.
1 tanan	- - =	$1\frac{1}{2}$ gallons.	= 8519
20 tanans	- - = 1 tang	3.75	17.038076
25 tanans	or $1\frac{1}{4}$ tang		
	- - = 1 sat	4.6875	21.297595
80 sats	or } 1 coyan	375	hectolitres. 1.7038076
100 tang	- - }		

Weights.

		Troy Grains.	Grammes.
1 tical	- - =	$233\frac{1}{3}$	= 15.11975
4 ticals	- - = 1 tael	$933\frac{1}{3}$	60.479
		lbs. av.	kilogrammes.
20 taels	- - = 1 catty	$2\frac{2}{3}$	1.20958
50 catties	- - = 1 picul	$133\frac{1}{3}$	60.479

The *Coyan* is a weight which is usually reckoned equal to 20 piculs, but it varies from 18 to 22 piculs. The coyan of paddy (rice in the husk) is reckoned at about $16\frac{2}{3}$ piculs, and is considered equal to $2133\frac{1}{3}$ lbs. av.*

COCHIN CHINA (ANAM.)

Money.

"The every-day money of the country is cash of the Chinese pattern, though bar silver, cast in pieces weighing ten taels each, is also made use of by merchants. Lumps weighing a tael, with Chinese characters on them, as also round silver coins of Chinese origin, are occasionally seen, both finding their way down from Yunnan. Gold is not used as money. The cash are, in one respect, singular, being made of zinc, or what seems like a mixture of lead and sand, and so fragile as to be easily broken between the finger and thumb; 60 cash make one *chek*, 10 *chek* make one *koon*, or 'ligature,' as the French name it; 5 *koons*, on an average, go to the dollar, but the exchange varies daily. On April 14th, 1876, the exchange was 3,300 cash, or 5 *koon* 5 *chek* per dollar; while at Hue, the capital of Annam, the dollar had been commanding 7 *koon* and over. At Hai-phong, foreign silver coins of any denomination are readily taken."—(N. B. Denny, Ph. D.)

Accounts are commonly kept in *quan*, *mas*, and *sapeks*, as follows:—

	1 sapek, or dong, or cash	=	$\frac{1}{2}$ d.
60 sapeks	= 1 mas, or mottien, or heap		$3\frac{1}{2}$ d.
10 mas	1 quan, or string		2s. $9\frac{1}{2}$ d.

* The Merchants' Handbook of Money, Weights, and Measures of all Nations. By W. A. Browne, LL.D. London: Edward Stanford, 6, Charing Cross.

Measures of Length.

			Inches.	Metres.
	1 ly - - -	=	·0192	= ·00048
10 ly - -	= 1 phau - - -		·192	·00487
10 phau - -	1 tac - - -		1·92	·04876
10 tac - -	1 thuoc or cubit -		19·2	·48766
			feet.	
5 thuoc - -	1 ngu - - -		8	2·43835
10 thuoc - -	1 truon - - -		16	4·87670
			yards.	
3 ngu - -	1 sao - - -		8	7·31506
3 truons - -	1 chai vai or that -		16	14·63012
10 saõ - -	1 mao - - -		80	73·15064
10 chai vai - -	1 quo - - -		160	146·30128

The thuoc, which is the chief unit of measures of length, varies considerably in different places; thus there are six different values assigned to it, varying from 15 to 25 $\frac{3}{4}$ English inches, or from ·38098 to ·656209 mètre, but the thuoc, the value of which is given in the Table, is the one in general use. The drapers' thuoc is a little longer, being equal to 25 $\frac{3}{4}$ inches; the tac to 2 $\frac{1}{2}$ inches; the phan to ·256; and the ly to ·0256 inch English.

Distances.

			Yards.	Metres.
	1 li or mile - - -	=	486	= 444·390138
2 li - -	= 1 dam - - -		972	888·780276
			miles.	kilometres.
5 dam - -	1 league - - -		2·761	4·4439

Square Measures.

			Square yards.	Square metres.
9 sqr. ngu - -	= 1 sqr. saõ - - -	=	64	= 53·510208
				Ares.
100 sqr. saõ - -	1 sqr. maõ - - -		6400	53·510208

Weights.

			Troy Grains.	Grammes.
10 ai - -	= 1 tran - - -	=	·000006	= ·0000003
10 tran - -	1 huy - - -		·000060	·0000638
10 huy - -	1 chau - - -		·000601	·0000389
10 chau - -	1 hot - - -		·006015	·0003898
10 hot - -	1 hao - - -		·060156	·0038981
10 hao - -	1 li - - -		·601563	·0389806
10 li - -	1 phan - - -		6·015625	·3898061
10 phan - -	1 dong - - -		60·15625	3·8980605
10 dong - -	1 luong - - -		601·5625	38·9806056
10 luong - -	1 nen - - -		6015·625	389·806056
			lbs. av.	
10 luong - -	1 can - - -		1 $\frac{3}{8}$	623·68969
				kilogrammes.
10 can - -	1 yen - - -		13 $\frac{3}{4}$	6·23689
5 yen - -	1 binah - - -		68 $\frac{3}{4}$	31·18484
10 yen - -	1 ta - - -		137 $\frac{1}{2}$	62·36896
5 ta - -	1 quan - - -		687 $\frac{1}{2}$	311·84484

Measures of Capacity for Grain.

		Imperial Gallons.	Litres.
	1 hao - - -	= $6\frac{2}{3}$	= 28.270586
2 hao - =	1 shita or tao -	$12\frac{1}{3}$	56.541172

“The weights and measures in use for commercial purposes are Chinese, and bear Chinese names, differing from the Canton standard only in being heavier. The *leong*, or ounce, weighs about $1\frac{1}{2}$ ounce English, and the *catty*, 1 lb. 6 ozs. 10 grs. There are several differing standards of length. The ell used for measuring piece goods is $25\frac{1}{2}$ inches. It is in fact necessary in buying articles of any description to agree beforehand as to the length or weight of the denomination used. This especially applies to grain and similar products.”—(N. B. Dennys, Ph. D.)

NETHERLANDS' INDIA.

Money.

The monetary system of Netherlands' India has of late years been assimilated to that of Holland. The silver standard is the Netherlands *guilder*, or *florin*, which is divided into 100 *centen*.

	1 Cent	=	$\frac{1}{4}$ d.
100 Cents =	1 Guilder or Florin	=	1s. 8d.

The gold coinage in Holland was suppressed by law in 1850, and has not since been re-established. It consisted of the 10 *gulden* and 5 *gulden pieces*. These are sometimes met with, but they are not a legal tender; their price rises and falls with the fluctuation of the market. The average price of the 10 *gulden* piece is about 9 *gulden* and 65 cents, and that of the 5 *gulden* piece about 4 *gulden* and 82 cents.

The silver coins are the $2\frac{1}{2}$ *gulden piece* (sometimes called *rix-dollar*), the *florin* or *guilder*, and the $\frac{1}{2}$ *florin*. These are of the fineness of $\frac{904}{1000}$ ths, and the *florin* weighs 866.17 grains troy. There are also in silver of a lower standard the 25, 10, and 5 *cent pieces*. The 5 *cent* piece is often called a *stiver*.

The copper coins are the *cent* and the $\frac{1}{2}$ *cent*, worth respectively $\frac{1}{8}$ d. and $\frac{1}{16}$ d. sterling.

Weights.

The weight for gold and silver is the Dutch mark, troy, divided into 9 reals, each weighing 422 grains, English.

The commercial weights in common use are based on the China weights, thus.—

16 taels =	1 catty	=	$1\frac{1}{4}$ lbs. Dutch troy.
100 catties =	1 picul	=	125 „ = 136 lbs. avoirdupois. or 61 kilogrammes.
3 piculs =	1 small bahar	=	408 „
$4\frac{1}{2}$ piculs =	1 large bahar	=	612 „

In foreign trade, however, the Dutch troy pound of 2 marks is generally used. The proportion of the Dutch and English weights are—

1 Dutch troy pound	=	7576 grains, English.
1 Dutch commercial pound	=	7625 „

The metric weights are as follows—

		Grains Troy.		
	1 korrel	=	1.5432349	= 1 decigramme.
10 korrel	= 1 wigkje	=	15.432349	= 1 gramme.
10 wigkje	= 1 lood	=	154.32349	= 1 decagramme.
			Lbs. av.	
10 looden	= 1 onze	=	.220466	= 1 hectogramme.
10 onzen	= 1 pond	=	2.20466	= 1 kilogramme.

Measures.

The measures for rice and grain are the picul and coyan or koyang, and for smaller quantities the *timbang* and gantang. The coyan weighs at—

Batavia	-	-	-	27 piculs or 3,375 troy Dutch lbs.
Samarang	-	-	-	28 piculs or 3,500 „
Soerabaya	-	-	-	30 piculs or 3,750 „

or about 60 imperial bushels.

The *timbang* contains 5 piculs or 10 sacks; 5 gantangs make 1 *measure*; and 46 measures are equal to a *last*. These measures are principally in use among the natives.

The most general liquid measure in all the Dutch settlements is the *kan*, 33 of which are equal to a little more than 13 English gallons. A leager or legger of arrack is 388 Batavia kans, equal to 133 imperial gallons, or 550 litres.

Of long measure, the *ell* is $27\frac{3}{4}$ English inches, and the foot of 12 *duimen*, or inches, is equivalent to $12\frac{9}{16}$ English inches.

The metric system of measures is as follows—

		Imperial Pints.		
	1 maatje	=	.176077	= 1 decilitre.
10 maatjes	= 1 kop	=	1.760773	= 1 litre.
			Imperial Gallons.	
10 koppen	= 1 schepel	=	2.200967	= 1 decalitre.
			Imperial Bushels.	
10 schepels	= 1 mud or zak	=	2.751208	= 1 hectolitre.
			Imperial Quarters.	
30 mudden	= 1 last	=	10.31703	= 30 hectolitre.

A market schepel contains $2\frac{1}{2}$ schepel, or 25 koppen, and is equal to 5.5024175 imperial gallons, English.

Length.

In 1820, Holland adopted the metric system; and the weights and measures are the same as those of France, but have different names, as will be seen by the following tables:—

		Inches.			
	1 streep	=	0.3937	=	1 millimetre.
10 strepen	= 1 duim	=	.3937079	=	1 centimetre.
10 duimen	= 1 palm	=	3.937079	=	1 decimetre.
10 palmen	= 1 el	=	39.37079	=	1 metre.
		Yards.			
	1 ellen	=	10.936308	=	1 decametre.
100 roeden	= 1 mijle	=	1093.6082 or nearly 5 furlongs	=	1 kilometre.

NORTH-WEST BORNEO.

Memorandum forwarded by H.B.M., Consul-General for Borneo, with regard to Dr. Browne's tabulated series of questions on the Currency, Weights, and Measures of Borneo, &c.

Money.

On the N.W. Coast of Borneo, goods and produce are exchanged for each other, the reckoning being made in so many piculs of brass guns, a picul being worth about 35 dollars.

This is not altogether an imaginary mode of keeping accounts, for the guns are actually cast in quantities at Brunei, and weigh from 2 to 8 guns to the picul. At Brunei fines are levied in piculs of guns. Dollars and cents are also a medium of exchange.

In the South of Borneo, under Dutch rule, the real and guilder are used in reckonings, the real being an imaginary coin worth 2 guilders.

In Lootoo and the territories in Borneo belonging to that country the currency consists of doubloons, dollars, and Pitis, 5,000 of which are equal in value to a dollar. These small zinc coins are made in China and Manilla for the Lootoo market, and are similar to the copper cash used in China, but are much smaller and thinner. In the extreme North of Borneo money is almost unknown, and accounts are kept in pieces of cloth, each piece equal to 1.50 dollar. In the mountains of the same district reckonings are made in bundles of iron for large accounts, each bundle, so far as I could learn, being in weight about 8 lbs. For small accounts they reckon in charges of gunpowder.

The mountaineers (Legai) in the N.E. of Borneo, reckon in cakes of salt for small accounts, and pieces of cloth, each representing 3 dollars, for large accounts.

In the western part of New Guinea accounts are calculated in pieces of black cloth, each valued at 10 guilders.

Weights used at Brunei.

16 taels	=	1 Catty.	
100 catties	=	1 picul	= 133½ lbs.
40 piculs	=	1 koyan.	

Measures of Quantity.

2 pahus or bambus	=	1 chupa.
4 chupahs	=	1 gantang.
10 gantangs	=	1 para.
20 gantangs	=	1 picul.
40 piculs	=	1 koyan.

Measures of Length.

2 jankals	=	1 hasta.
2 hastas	=	1 ella or yard.
2 ellas	=	1 dapa or fathom.

PHILIPPINE ISLANDS.

Money.

The currency of the Philippines is the Spanish dollar divided into rials and cuartos, but for commercial accounts, and to correspond with the American dollar, also divisible into cents. A dollar consists of 8 rials, equal to 160 cuartos, a rial being equal to 20 cuartos.

The coinage consists of the gold pieces of 4 dollars, 2 dollars, and 1 dollar; of the silver pieces of 4 rials (equal to 50 cents), 2 rials (equal to 25 cents), 1 rial (equal to 12½ cents), and a recent emission of 20 and 10 cent pieces; and of the copper pieces of 2 cuartos and 1 cuarto.

The Government accounts are, however, calculated in escudos or florins (2 to the dollar), and in ten-thousandths of an escudo; thus, 1 dollar 6 rials are equal to 1 dollar 75 cents, and to $3\frac{5000}{10000}$ escudos.

Weights.

The weights commonly in use are the picul and its parts. There are also the following Spanish weights:—

8 dram	=	1 ounce.
16 ounces or 2 marks	=	1 pound.
25 pounds	=	1 arroba = 25½ lbs. avoirdupois.
4 arrobas or 100 lbs.	=	1 quintal = 102 „
5½ arrobas or 137½ lbs.	=	1 picul = 148 „

Measures.

The Spanish foot is about $11\frac{1}{8}$ English inches. It is divided into 12 pulgados, each containing 12 lines. The *vara*, or measure for cloth, is three feet, or 4 palmos, or 36 pulgados, equal to $33\frac{1}{2}$ English inches; 100 varas are equal to $92\frac{2}{3}$ English yards. English goods and some other goods are sold by the English yard. The *corge* is 20 pieces. The *caban*, a measure for grain, contains $3\frac{1}{10}$ cubic feet; a *caban* of rice weighs 123 lbs., and of paddy 85 lbs. Sixteen Manila piculs equal 1 ton English weight. One ton weight of hemp measures 2 tons of 40 cubic feet.

CHINA.

Glossary of Chinese Words.

CHINESE.	ENGLISH.	CHINESE.	ENGLISH.
Chah	Barrier.	Miau	Temple.
Chah-hwang-muh	Boom.		
Chau	District, city, islet.	Nan	South, southern.
Chin	Town.	Ni	Mud.
Chuen	Channel.	Nui	Inner.
Chung-yuen.....	Mainland.		
		Pau-tai	Fort.
Fau-fu	Buoy.	Peh, pei	North.
Fau-tau.....	Roadstead.	Peh	White.
Fu	Departmental city.	Po, Hu	Lake.
		Pu	Sea-shop.
Gau,	Harbour.	Pwang-sheh	Rocks.
Hai	Sea.	Sha	Sand, sand-bank.
Hai-kau	Bight, creek.	Shan, san	Hill, Mountain.
Hai-kioh	Cape.	Shan-hu	Coral.
Hai-mun	Estuary.	Shan-ting	Mountain chain.
Hai-yau	Gulf.	Shan-tau	Bluff, cliff.
Heh	Black.	Sha-sien	Shoal.
Hiah-kau	Strait.	Sha-tan	Bar.
Hiang-tsun	Village.	Sheh	Stone.
Hien, Chau	District city.	Sheh-tan	Reef.
Ho.....	River.	Shin	Spirit (celestial)
Ho-tun	Lighthouse.	Shui	Water.
Hu.....	Lake.	Si	West, western.
Hung	Red.	Siau-ho.....	Rivulet.
Hwan	Yellow.	Sima (Japanese) ..	Island.
		Siwo (Japanese) ..	Current.
I.....	Barbarian.	So	Town, village.
Kau	Mouth.	Tah	Pagoda.
Kiang	River.	Tau	Island, head.
Kiau	Bridge.	Tau-tu	Clay.
Kin	Gold.	Ting, Ti-tau	Promontory.
King	Capital city.	To-muh.....	Wooded.
King-chi-chau....	Peninsula.	Tsiau-pi	Cliff.
Koh	Rocky peak, headland	Tshui-sha.....	Gravel.
Kwang-lau	Lighthouse.	Tsui-wei	Rocky, stony.
Kwan	Custom-house.	Tung	East, eastern.
Kuh	Valley.	Tutan	Ferry.
Lau	Tower, old.	Wan	Bay.
Li	Inner.	Wi-moh-ti	Isthmus.
Lin	Forest.	Wei	Outer.
Ling	Chain of hills.	Wei	Military post.
Lung	Tiger.		
		Yang.....	Sheep.
Ma	Horse.	Yen-tun	Beacon, buoy.
Ma-tau	Jetty, port.		

Money.

The only native coin now in use throughout China is the *tsien*, called *cash* by the English, and *sapeque* by the French, who derive it from the Portuguese *sapeca*. It

is circular from $\frac{5}{16}$ to $\frac{9}{16}$ inch in diameter, and has a square hole in the middle for convenience of stringing them. It is cast, not stamped. On one side it bears the name of the province it is cast in, in Mandchu letters, on one side of the hole, with the Chinese word "money" on the other. On the other side is the name of the emperor reigning, on each side of the hole, and above and below it two Chinese characters, signifying "current money." Copper coins of this shape were first cast about B.C. 1120, when Saul was King of Israel, and has ever since been retained as the national currency.

Spanish, Mexican, and South American dollars (though not acknowledged by the government) are employed as a commercial medium throughout the maritime provinces.

The nominal moneys of account are the *liang*, *tsien*, *fan*, and *li*, called by foreigners *tael*, *mace*, *candareen*, and *cash*, the proportion of which, one to the other, is decimal. The candareen is equal, only in accounts, to 10 cash; but, owing to the deterioration of the coin, its actual value in Canton, in 1854, was about the eighteenth part of a candareen, 1900 ordinary cash, or 1800 picked ones, being paid for a tael. Since that time the exchange has risen from various causes, and only 1350 to 1400 can be obtained for a tael. At Amoy, in 1850, a Spanish dollar would purchase 3600 pieces of the poorest kind, but only 1300 selected ones. At Canton, at the same time, the dollar bought 1200 current cash, and at Shanghai 1750. In 1863 a dollar at the same three cities would exchange for 1100, 1050, and 1100 pieces, showing the result of freer intercourse.

The terms tael, mace, candareen, and cash, are merely denominations of weight; the cases in which stamped pieces of silver (other than clean dollars) pass current as coin being few, except in small transactions. It is more convenient, however, to speak of them as nominal moneys.

The circulating medium in transactions with foreigners, at the open ports, is chiefly in whole or broken dollars; the value of the dollar in relation to the tael varies in different transactions. In calculations and accounts between foreigners and merchants, and almost always in bargains between the Chinese themselves—

Taels are converted into dollars at the rate of - - taels 720 per 1000 dollars.
 But payments in *cash* are generally weighed at - - ,, 717 ,,
 Tradesmen paid by compradores receive - - - ,, 715 to 717 ,,

The value of the tael in relation to sterling money was reckoned by the East India Company at 6s. 8d., but its intrinsic value varies according to the price paid for dollars per ounce in London. Hence, to convert taels into sterling money, multiply the price paid for dollars by multiplier 1.208. Thus, if the price of the dollar be 60d. per ounce, the value of the tael will be $60 \div 1.208 = 72\frac{4}{100}$ d., if at 66 it will be $79\frac{7}{100}$ d.

Taels.	Mace.	Candareen.	Cash.	Drs. Avoird.	Grs. Troy.	Grammes.	Tolas.
1	10	100	1000	21.33	579.34	37.796	3.23
—	1	10	100	2.13	57.984	3.779	—
—	—	1	10	0.213	5.798	0.378	—

Commercial Weights.

The unit of the table is the *liang* or tael.

1 kernel of millet	is 1 <i>shu</i> .		
10 shu	= 1 <i>lui</i> .		
11 lui	= 1 <i>chu</i> or pearl.		
24 chu	= 1 <i>liang</i> or tael	=	1 $\frac{1}{3}$ oz. avoird.
16 liang or taels	= 1 <i>kin</i> or catty	=	1 $\frac{1}{3}$ lbs. "
2 kin	= 1 <i>yin</i>	=	2 $\frac{2}{3}$ lbs. "
30 kin	= 1 <i>kium</i>	=	40 lbs. "
100 kium	= 1 <i>tan</i> or picul	=	133 $\frac{1}{3}$ lbs. "
120 kin	= 1 <i>shih</i> or stone	=	160 lbs. "

Chinese weights and grain measures, and the linear long and land measure, all vary in different parts of the country; but, as a general rule, they are largest and longest in the southern provinces.

1 ton	is equal to 16 piculs 80 catties,
1 cwt.	" 84 catties.
1 lb. avoirdupois	$\frac{2}{3}$ of a catty or 12 taels.
4 oz.	is equal to 3 taels.
1 picul	" 1.19047 cwt. or 1 cwt. 21 $\frac{1}{3}$ lbs.
3000 taels	" 302 lbs. troy.

The difference in the values of the weights above a tael as fixed by the natives, and those in common use in China, are as follows—

	British Treaty,	French Treaty,	Common Weights.
Stone - - -	159.99 lbs. avoird.	72.544 kilog.	159.11 lbs. avoird.
Picul - - -	133.33 "	60.453 "	132 6 "
Catty - - -	1.333 "	604.53 grammes.	1.326 "
Tael - - -	1.333 oz. avoird.	37.783 "	1.328 oz. avoird.

Measures.

<i>Length.</i>	1 <i>lih</i> or gran is 1 fun.	
	10 fun - - -	1 tsun or inch.
	10 tsun - - -	1 <i>chih</i> , coid or foot = 14.1 in. Eng.
	10 <i>chih</i> - - -	1 chang or pole = 11. ft. 9 in.
	10 chang - - -	1 yin.
<i>Capacity.</i>	1 grain of millet is 1 suh.	
	6 suh - - -	1 kwei.
	10 kwei - - -	1 tsoh or pugil.
	10 tsoh - - -	1 chau or handful.
	10 chau - - -	1 choh or ladle.
	5 choh - - -	1 yoh or cup.
	2 yoh - - -	1 koh or gill = 0.103 litre.
	2 koh - - -	1 shing or pint = 1.031 "
	10 shing - - -	1 tau or peck = 10.31 "
	16 tau - - -	1 yu.
	5 yu - - -	1 koh = 51.55 "
	2 yu - - -	1 shih = 10.310 "
	16 koh - - -	1 ping.
	1 fu - - -	6 tau 4 shing.

These are taken from the "Chinese Commercial Guide," by S. Wells Williams, an excellent work.

JAPAN.

Glossary of Japanese Words.

JAPANESE.	ENGLISH.	JAPANESE.	ENGLISH.
Chisai	Little, small.	Kaze	Wind.
Ko, as a prefix.....	Little, small.	Ame	Rain.
Oki	Large, great.	Yuki	Snow.
O, as a prefix	Large, great.	Kumo	Clouds.
Daibo	Fort.	Midzu	Water.
Kuchi	Mouth.	Hi	Fire.
Makes guchi in the		Tsuki.....	Moon.
compound, as	Mouth.	O Hi	Sun.
Kawa guchi	The river's mouth.	Ki	Tree.
Kawa	River.	Michi.....	Road.
Makes Gawa in the		Machi	Street.
compound.....	River.	Iye.....	House.
Yama	Mountain.	Hirōi.....	Wide.
Kuni	Country.	Hoso	Narrow.
Nada	A sea.	Nagai, pronounced in	
Umi	The sea.	Yedo.....	Long.
Seto	Strait.	Nangai	Long.
Hana	Point.	Mijikai	Short.
Saki	Cape.	No (possessive pron.)	Of.
Misaki	A prominent cape.	Wa (the definite art.)	The.
Ura	Bay.	Wo (the objective	
Minato	Harbour.	case.)	
Mura	Village.	Ga (the indefinite	
Sima, in the Yedo		art.)	A or any.
dialect pronounced	Island.	Kane, makes in	
Shima, and some-		the compound	
times forms in the		Gane	Metal.
compound Jima, as	Island.	Aki-gane (red metal)	Copper.
Awa Jima.....	Awa island.	Kin	Gold.
Hama	Coast, shore.	Gin	Silver.
Tei-haku	Anchorage.	Tetsu.....	Iron.
Siwo, pronounced in		Tomio	Lighthouse.
Yedo.....	Tide.	Se	A shoal.
Shiwo	Tide.	Fukai	Deep.
O shiwo, or siwo	Spring tide.	Asai	Shallow.
Ko shiwo ,,	Neap tide.	Takai	High, lofty, tall.
Michi shiwo ,,	Flood tide.	Tera	Temple.
Hiki Shiwo ,,	Ebb tide.	Fune.....	Boat.
Iwa	Rock.	Joki sen	Steamer.
Ishi	Stone.	Ho bune	Sailing vessel.
Kita	North.	Kuroi	Black.
Minami.....	South.	Shiroi	White.
Hagashi	East.	Hana iro	Blue.
Nishi.....	West.	Ki iro	Yellow.

JAPANESE.	ENGLISH.	JAPANESE.	ENGLISH.
Hatoba	Wharf, landing-place.	Doro	Mud.
Gake	Cliff.	Hashi	Bridge.
Take	Hill.	Sibansho	Guard house.
Ikiari	Anchor.	Gunkan	Man-of-war.
Uma	Horse.	Hata	Flag.
Imo	Potatoes.	Gats	Month.
Mame	Beans.	Nichi.....	Day
Kochira ni asai ka..	Is it shoal here?	Omo kaji	Starboard.
„ fukai „	Is it deep here?	Tori kaji	Port.
Nin or jin.....	Man.	Ushi	Bull.
Onna.....	Woman.	Niwatori	Fowl.
Kodomo	Child.	Tamago	Egg.
Uchi	In, inside.	Kamo	Duck.
Haru	Spring.	Karo	Magistrate.
Natsu	Summer.	Shikwan	Officer.
Unjoshō	Custom house.	Daimio	Noble.
Aki	Autumn.	Joki sha	Railway.
Fuyu.....	Winter.	Oka	Land.
Hama	Sand.	Midzu umi	Lake.

In the pronunciation of many of the above words i and u are often almost inaudible.

Money.

The coinage now in use in Japan was adopted in the year 1871. The *Yen*, a gold coin weighing 25.72 grains troy, was constituted the fundamental unit of the system. The gold coins are 1, 2, 5, 10 and 20 yen pieces, the latter valued at £4 3s. 4d. The one yen piece is valued at 4s. 2d. English.

Silver and copper coins are as follows. The yen or dollar being the coin used in paying duties and in commercial transactions between Japanese and foreign merchants:—

<i>Silver.</i>		<i>Copper.</i>	
1 yen	= 4s. 2d.	1 sen	= $\frac{1}{2}$ d.
50 sen	„ 2s. 1d.	$\frac{1}{2}$ sen	„ $\frac{1}{4}$ d.
20 sen	„ 10d.	1 rin	„ $\frac{1}{20}$ d.
10 sen	„ 5d.		
5 sen	„ 2 $\frac{1}{2}$ d.		

Weights.

<i>Avoirdupois.</i>		
1 drachm	- - - - =	.4695 Monme.
1 oz.	- - - -	7.5117 „
1 pound	- - - -	120.187 „
1 cwt.	- - - -	13461. „
1 ton	- - - -	269220. „
<i>Troy.</i>		
1 grain	- - - -	.01717 „
1 pennyweight	- - - -	.4121 „
1 oz.	- - - -	8.242 „
1 pound	- - - -	98.1 „

Measures.

1 inch	-	-	-	=	.08378	Shakus.
1 foot	-	-	-	-	1.005362	„
1 yard	-	-	-	-	3.016086	„
1 pole	-	-	-	-	16.588473	„
1 furlong	-	-	-	-	663.539	„
1 mile	-	-	-	-	5308.312	„
1 geographical mile	-	-	-	-	6119.304	„
1 degree	-	-	-	-	367158.	„ or 28.330111 Ri.

The measures of capacity are as follows:—

Japanese.	Chinese.	Cubic measure.	Liquid measure.
10 Sai - - =	1 Shiyaku (Choh) =	1.1075 cubic inches.	
10 Shiyaku -	1 Ngoö (Koh) -	11.075 „ „	or .3195 pints.
10 Ngoö -	1 Shoö (Shing) -	110.75 „ „	or 3.195 „
10 Shoö -	1 To (Tau) -	1107.5 „ „	or 3.9942 gallons.
10 To - -	1 Koku - -	6.409 cubic feet	or 4.9928 bushels.

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