

SAILING DIRECTIONS
FOR
MAURITIUS
AND THE ISLANDS
INCLUDED IN ITS GOVERNMENT

1884.

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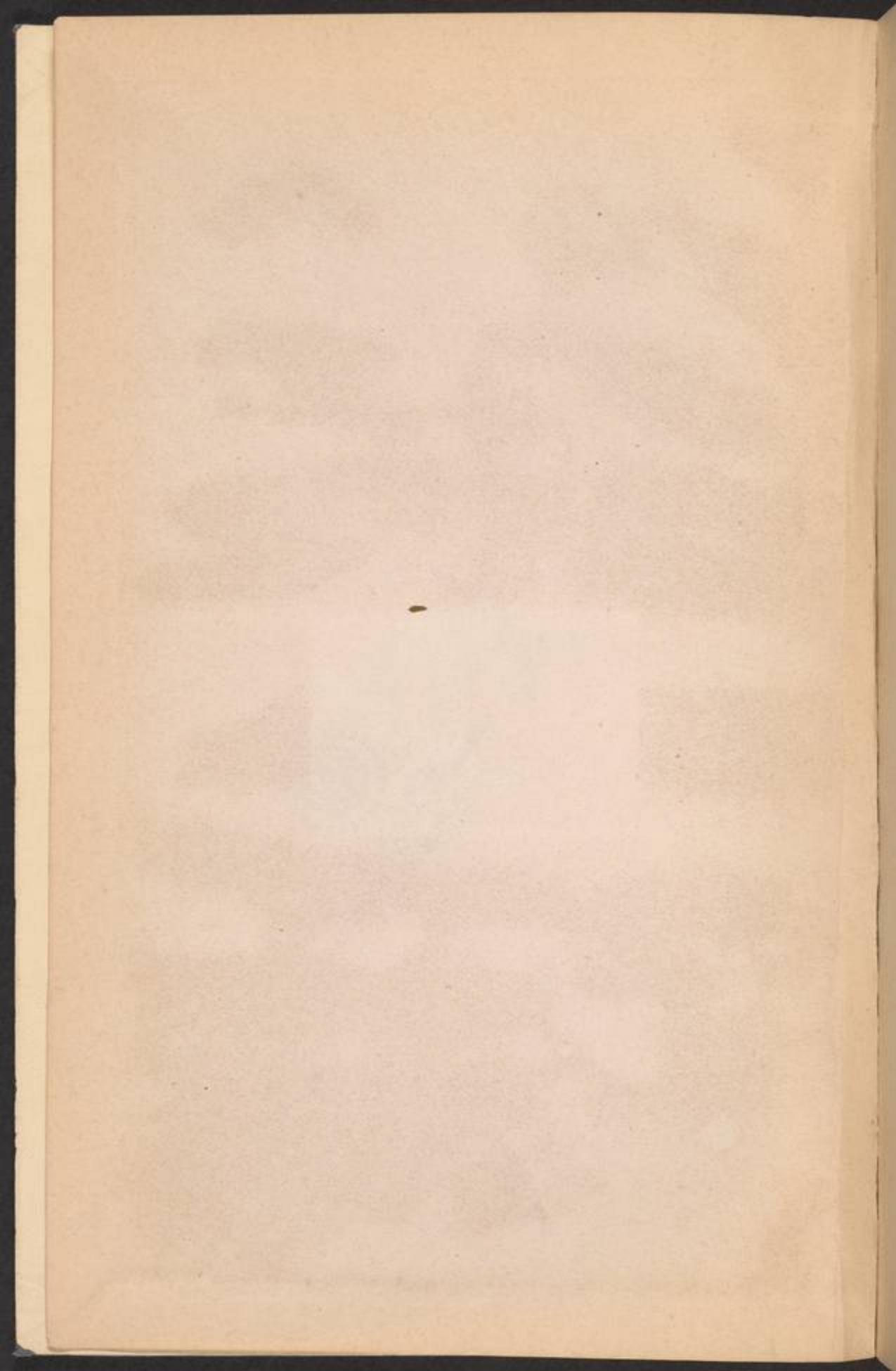
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SAILING DIRECTIONS

FOR

MAURITIUS

AND THE ISLANDS INCLUDED IN ITS
GOVERNMENT.

COMPILED CHIEFLY FROM ADMIRALTY SURVEYS.

By W. R. Martin & W. H. Potter.

With an Appendix.

RÉUNION ISLAND.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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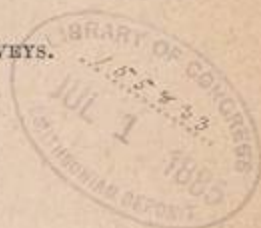
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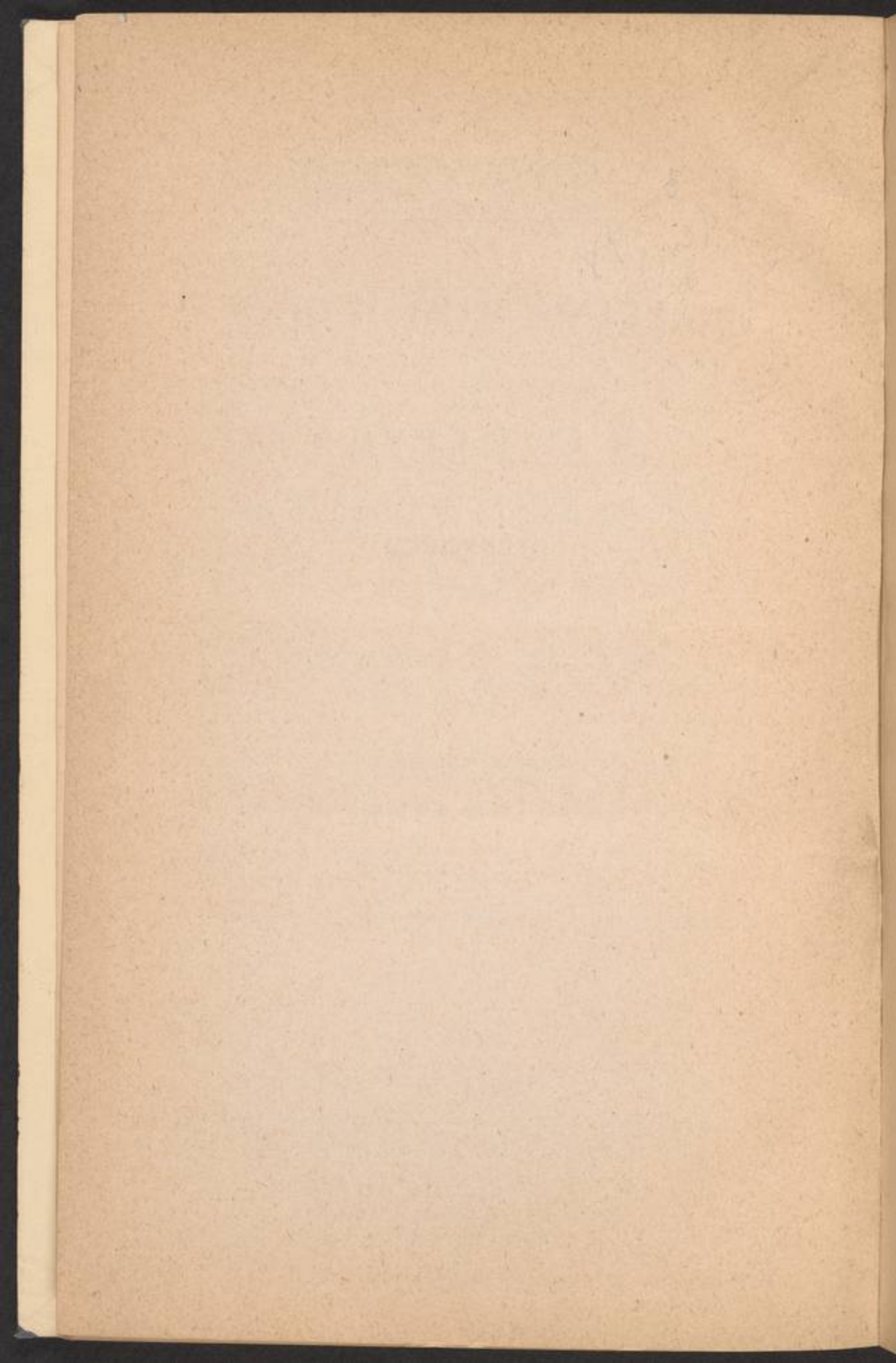
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ADVERTISEMENT.

THIS work contains sailing directions for the island of Mauritius, and the several groups of islands included in its government. These comprise—Rodriguez : Cargados Carajos : Tromelin : Agalega : Chagos with Diego Garcia : Seychelle : Amirante : Providence : St. Pierre : Farquhar : Cosmoledo : Astove : Assumption : Aldabra : and Glorioso. The extensive Saya de Malha and Seychelle banks are also included.

The directions are derived from Surveys conducted by Captain F. Moresby, R.N., 1821-2; Captain W. F. W. Owen, R.N., 1825; Captain R. Moresby, I.N., 1836-8; Captain Sir E. Belcher, R.N., 1846; Commander W. J. L. Wharton, R.N., 1874-8; Navigating Lieut. J. E. Coghlan, R.N., 1876-7; Commander P. Aldrich, R.N., 1881; and Captain J. P. Maclear, R.N., 1882. Also from the Remark Books of Her Majesty's ships, and other documents in the Hydrographic Department.

Réunion island, given in an appendix, is chiefly derived from "Renseignements Nautiques sur quelques îles éparses l'Océan Indien Sud," published by the French Government.

The work has been compiled by Staff Commanders W. R. Martin and W. H. Petley, of the Hydrographic Department.

F. J. E.

Hydrographic Office, Admiralty, London,
April 1884.

IN THIS WORK THE BEARINGS ARE ALL MAGNETIC
EXCEPT WHERE MARKED AS TRUE.

THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO
100 FATHOMS.

THE SOUNDINGS ARE REDUCED TO LOW WATER OF
ORDINARY SPRING TIDES.

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MAURITIUS

AND THE ISLANDS INCLUDED IN ITS GOVERNMENT.

CHAPTER I.

INTRODUCTORY, WINDS, CURRENTS, PASSAGES, &c.

THE islands in the Indian ocean included in the government of Mauritius are mostly situated within the tropic, between the meridians 40° E. and 73° E.*

Mauritius is the seat of government, with representatives residing at Mahé in the Seychelle group, and at Rodriguez.

Mauritius, Rodriguez and Seychelles are of volcanic formation and of considerable elevation; the others are low coral islands, mostly inhabited, cultivated with cocoa-nuts and are sometimes called the Oil islands.

The geographical position of Mauritius, renders it most valuable in affording repairs and supplies to vessels engaged in the India and China trade; also, with the Eastern Archipelego and Australia.

The north-eastern of these possessions (Chagos islands) has become of importance, a coaling station having been established at Diego Garcia in connection with the rapidly increasing steam communication between Europe and Australasia by way of the Suez Canal.

WINDS.—The South-east trade wind which in the Indian ocean extends from the west coast of Australia to within a few degrees of Madagascar, will be found between the parallels of 4° and 25° South, from April to September, and between 10° and 30° South from November to March. To the Southward of this trade, as far as 60° or 70° S., the

* The islands St. Paul and Amsterdam are dependencies of Mauritius, but are not included in this work. For a description of, and Sailing directions for those islands—
See Australia Directory, Vol. I.

prevailing winds are westerly, which will be found with more or less force and irregularity at all seasons.

The monsoons southward of the equator in the Indian ocean blow from S.E. from the middle of April to the middle of September, and from N.W. varying to W.S.W. from October to March. These monsoons extend from near the African coast, far into the Pacific ocean, and from the equator to the parallel of 8° or 9° S., and near Australia, to 12° or 14° S.

The South-east monsoon, which is the period of fine season, may be considered an extension of the South-east trade, blowing within three or four degrees of the equator when the sun is near the northern tropic, and receding to 10° or 11° S. when the sun is near the southern tropic.

The North-west or westerly monsoon is subject to many irregularities, with occasional heavy gales, thunder, lightning, and rain; it sometimes does not set in before November or December, rarely blowing with regularity and strength except in December and January, when it occupies a space comprised between 10° or 12° S., and 2° or 3° North.

The winds at Réunion (see page 76) will apply to its neighbour Mauritius. At the island of Rodriguez the winds are tolerably constant between East and S.E., occasionally blowing from the northward of East; calms are rare in the vicinity of this island.

From December to April, hurricanes or cyclones take place at or near the above-mentioned islands, they seldom occur in November and May, and are unknown during the other months of the year. For a fuller description of these terrible scourges, which cause almost incalculable damage and loss both on shore and at sea, as well as the rules to be observed to avoid their centre or most dangerous part, the seaman is referred to the works of Mr. C. M. Meldrum, M.A.,* and Dr. Thom,† and to Remarks on Revolving Storms, 1883, published by the Hydrographic department of the Admiralty.

With the usual threatening appearance of the weather, and the rapidly falling barometer preceding a hurricane, most seamen are familiar. It has been observed, however, at Mauritius and Réunion, that the day previous to a hurricane has been very fine, and occasionally no other indication of the approaching tempest appears except a tumultuous heaving of the sea, and the thundering of heavy rollers upon the coast. At Réunion, it is stated that this appearance of the sea is frequently a precursor of a hurricane by some days, and upon the closer approach of the storm, a heavy black coloured bank of cumulus cloud extends from N.N.E. to S.E.,

* Notes of the form of Cyclones in the Southern Indian Ocean, and on some of the Rules for avoiding their centres, by C. M. Meldrum, M.A.; reprinted by Meteorological Office, London, 1873.

† Inquiry into the Nature and Course of Storms in the Indian Ocean south of the equator, by Dr. Thom, London, 1845.

the upper parts of which are a reddish copper colour, throwing a metallic reflection over the sea and surrounding objects.

Equatorial current.—The equatorial current is not found in the Indian ocean, except to the south of the equator. Its northern limit follows nearly the equatorial limits of the trade wind, and the southern limit reaches often to 25° S. Near the meridian of Rodriguez island it divides into two branches, the South-west branch running past the South part of Madagascar and joins the Agulhas current about the parallel of Port Natal. The northern branch runs to the north-westward, passes North of Madagascar, and impinging upon the African coast just South of cape Delgado, it again divides, one branch running southward along the shore of Mozambique, and the other to the northward along the coast.

The velocity of the equatorial current is variable; from 20 to 25 miles per day may be reckoned upon in the body of the current, but much greater rates have been experienced, according to the force of the winds.

It runs past the south part of Madagascar at the rate of 50 miles a day at times, and the northern branch runs past the northern part of that island with a velocity of 30 to 60 miles a day.

CAPE of GOOD HOPE to MAURITIUS.—Leaving the cape of Good Hope for Mauritius, the course should be shaped to the southward to obtain the advantage of the prevailing westerly winds, the parallel of 40° S. being preserved as far as the meridian of 45° E., when a course to the north-eastward may be made to meet the meridian of 61° E. in lat. 32° S., after which Northing should be made, until falling in with the S.E. trade wind, when a course should be shaped for Mauritius.

MAURITIUS to the CAPE of GOOD HOPE.—When proceeding from Mauritius to the cape of Good Hope, advantage is gained by keeping within the limits of the trade wind as long as possible; the course should be shaped to pass about 100 miles south of the island of Madagascar, and to make the coast of Africa about Algoa bay, if not previously sighted farther to the northward. Ships proceeding to the westward between May and September should be well found, and able to encounter a succession of gales. The best plan is to endeavour to keep in the strength of the Agulhas current, carrying low sail; but from September to May it is better to keep more inshore, where there is less likelihood of encountering a westerly gale. The sea is always smoother when well in on the bank.*

From ADEN to MAURITIUS in the South-west Monsoon.—Leaving Aden during the period of the south-west monsoon,

* For a description of the winds, currents, &c. in the vicinity of the cape of Good Hope, see *Africa Pilot*, Part III., 1878.

westerly winds prevails in the gulf of Aden. From Socotra, steam vessels steer to south-eastward and cross the equator in the meridian of 65° E., thence steering south to fall in with the south-east trade wind, which at this season should be met with in from 2° to 4° South. Sailing vessels leaving Socotra should stand on the starboard tack as far as 72° E., passing eastward of the Chagos islands, when the south-east trade wind should be met with and the vessel put on the port tack for Mauritius.

ZANZIBAR to SEYCHELLES.—During the early part of August when the S.E. trade blows strongest and reaches even the African coast, and the current is running strong to the northward, this passage is one of considerable difficulty, and even for steam vessels tedious. With steam power, however, the quickest way is to steam a direct course, taking advantage of any slight veering of the wind to assist with fore and aft sails.

A sailing vessel should leave the African coast in the evening so as to have the advantage of the wind veering from the land, and push across the northerly current on the starboard tack. Should the vessel reach as far north as the equator, she will, when eastward of Seychelles, have but little difficulty in fetching the islands owing to the favourable current, which may be relied on, as far south as the parallel of 4° and which reaches at times to the parallel of 6° S.

MOZAMBIQUE CHANNEL to MAURITIUS.—This passage is at all times difficult to make with dispatch. There are two routes:—*Firstly*, northward of Madagascar. Proceed sufficiently to the northward to avoid the current which sets westward round cape Amber; then work to the eastward, taking advantage of any slant of wind until able to fetch Mauritius on the port tack. This passage may be adopted between October and May, but it is uncertain, and the lee currents cause much anxiety when in the vicinity of the islands and reefs. H.M.S. *Orestes* made the passage in November–December in 22 days; she went as far north as 6° S., passing to the westward of Aldabra and to the south-west of Alphonse; the wind was light and steady at E.S.E. until in lat. 16° S., long. $53\frac{1}{2}^{\circ}$ E., when it drew to E.N.E. The vessel had a westerly current of about one knot an hour all the passage. The prize ship *Manuela* (a very fast sailer) took 30 days to make the passage this way in August–September.

Secondly, southward of Madagascar, which is the route usually taken, and should be adopted at all events between May and October. Work down the Mozambique channel,* and get into the latitude of westerly winds, and then make easting in latitude 25° to 30° S., or farther to the

* See Africa Pilot, Part III., 1878, pages 165–8.

southward according to the time of the year. Off the south part of Madagascar E.N.E. winds, called "Fort Dauphin winds," will generally be met with, and sometimes, particularly about December or January, a westerly wind will blow for several days together between Madagascar and Mauritius, but this is not frequent.

MAURITIUS to INDIA.—During the period of the south-west monsoon in the northern portion of the Indian ocean, the route known as the Boscawen passage should be taken; passing westward of Cargados Carajos and Saya de Malha bank; and eastward of Tromelin or Sandy island, of Agalega, and of Seychelle islands, crossing the equator in 62° E. Thence steering to the westward of the Lakadivh islands, if bound to Bombay, or through Eight-degrees, or Nine-degrees, channel when bound to Cochin or Colombo.

Ships bound to Bombay that cannot cross the equator on the above route before the beginning of October, should, if the wind permits, pass through the Nine-degrees channel, and steer northward of east, until soundings be obtained on the Malabar coast, at a depth of 40 or 50 fathoms water, mud bottom, and then haul to the northward and work up near the shore with the aid of the land and sea winds; the former commence about the beginning of October below Calicut, but do not extend far off shore until November. This route, however, will be found preferable to working up westward of Lakadivh islands and shoals, where the winds are, at that same period, generally light and variable from northward.

When the N.E. monsoon has decidedly set in, proceed upon the Boscawen route as far as 4° or 3° south, steer eastward upon the parallel, to 82° or 84° E. if bound for the Malabar coast, but as far east as 95° E. if bound for the northern part of the bay of Bengal. Upon the parallel above mentioned north-westerly winds with much rain will be experienced, and a strong set running to the eastward.

INDIA to MAURITIUS.—During the south-west monsoon, vessels leaving the Malabar coast should take their departure from the south part of Ceylon about Dondra head, and endeavour to cross the equator in long. 84° E. From thence a south course should be made to fall in with the S.E. trade wind, in about 4° south. Vessels from the northern ports in the bay of Bengal cross the equator in about 93° E. and thence making as much southing as possible into the region of the trade wind.

When the North-east monsoon is blowing in the China sea, vessels from the straits of Sunda will have to make their way through a belt of variables and calms to 10° or 14° S. before falling in with the south-east trade wind, and it must be borne in mind that in the region of the latter, during the

months December to April, hurricanes or cyclones may be encountered.* From the strait of Malacca to Seychelles in the north-east monsoon, it is advisable to make westing northward of the equator, passing through the Eight-degree channel and crossing the equator in 54° E. ; by this route the region of hurricanes is avoided and advantage is gained by the strong westerly current. H.M.S. *Alert* (a dull sailer) made this passage in February-March 1882, in 22 days, and was set by the current an average of 35 miles per day upon the route. Particular attention must be paid to obtaining the ship's position frequently when approaching the northern edge of the Seychelle bank, for the current will be often found to be running to the eastward within 150 miles northward of Bird island. In the passage above alluded to, the *Alert* experienced a gradual but complete change of the direction of the current in a period of 20 hours (from W.S.W. round by south and east to E.N.E.) within 140 miles of the bank. The velocity of this current was $2\frac{1}{2}$ miles per hour.

* See Remarks on Revolving Storms, 1883. Published by the Hydrographic Department of the Admiralty.

CHAPTER II.

MAURITIUS ISLAND.

Variation in 1884 - - - - 10° 30' Westerly.

The island of Mauritius (or isle of France), situated in the Indian ocean at 450 miles eastward of the coast of Madagascar, is 33 miles long in a N.N.E. and S.S.W. direction and 25 miles broad; the western and central parts of the island are mountainous, attaining an elevation of 2,711 feet in the Piton Rivière Noire, the highest summit, and in clear weather is visible from a distance of fifty miles, though as the summits are frequently enveloped in clouds the land is not generally seen from so far. Pieter Both, a remarkable mountain 2,776 feet high, having a huge knob on the summit, is situate $3\frac{1}{2}$ miles S.E. from Port Louis.*

The formation of Mauritius is volcanic and it is surrounded by numerous coral reefs; there are many small streams, generally flowing through deep ravines, but none of these are navigable beyond a short distance from the sea.

The island was discovered by the Portuguese in 1505 and was occupied by the Dutch in 1598 who named it Mauritius in honour of Prince Maurice; abandoned by them in 1710 it was taken possession of by the French. Since 1810 it has remained a British possession.

Mauritius is divided into nine districts, Port Louis, Pamplémousses, Rivière du Rempart, Flacq, Grand port, Savane, Moka, Plaines Wilhems and Black river; the chief productions are sugar and rum.

Mauritius rises somewhat steeply from the sea, a depth of 100 fathoms being found in most parts at distances of from one mile to $1\frac{1}{2}$ miles from the shore, except off the northern side, where a small group of islands and numerous shoals are situated on a bank extending 14 miles in a north-easterly direction.

Statistics.—In 1881 the total population of Mauritius numbered 360,850, and in 1880 the imports were valued at 2,169,672*l.* and the exports at 3,634,788*l.*

* See Admiralty charts:—Indian ocean general, No. 2,483; Indian ocean, southern part, No. 748*a*; and Mauritius or isle of France, No. 711.

Mail communication.—The mail packets of the Messageries Maritimes call at Port Louis every 28 days, when on the voyage from Marseilles to Australia and New Caledonia. Mails are also conveyed, via the Cape of Good Hope, by the Castle mail packet company's steamships every 28 days.

Harbours.—The only harbours of importance in Mauritius are those of Port Louis on the north-west side and Grand port on the south-east side; of these Port Louis, where the capital is situated, is the most frequented.

ISLANDS NORTHWARD OF MAURITIUS.—A small group of islands with several banks and reefs having deep water between them lies northward of Mauritius.

Serpent island.—This small clifly island is the north-eastern of the group; it is 530 feet high and is foul on both the north-west and south-east sides.

Round Island, 1,055 feet high is the highest of the group, it lies $1\frac{1}{2}$ miles south-westward of Serpent island and is almost inaccessible except at two places on the western side where landing may sometimes be effected. This island has the shape of a haycock and can be seen from a distance of 30 miles, often in cloudy weather or when the horizon is hazy, it is made out before the main island.

Nab reef is a dangerous breaking reef about half a mile in extent, east and west. Its centre lies W. $\frac{1}{4}$ S. distant $1\frac{1}{2}$ miles from the summit of Serpent island; and N. $\frac{3}{4}$ W. about $1\frac{1}{4}$ miles from the north extreme of Round island.

In the channel between Serpent and Round islands, there are depths of 17 to 26 fathoms, rocky bottom.

The Blinder, is a sunken reef which breaks occasionally, lying S.W. by W. about 2 miles from Serpent island; N.W. by W. $\frac{1}{2}$ W. 4 cables from the north-west extreme of Round island; and S. by W. $\frac{1}{4}$ W. about one mile from Nab reef.

Caution.—As both eastern and western streams set with great strength over the Blinder and Nab reefs, and through the channel which separates Serpent island from Round island, vessels should not attempt that channel, as they would probably get becalmed under the high land of Round island, and drift on to Nab reef.

Should a vessel, however, be compelled to pass between Serpent and Round islands, she should be kept mid-channel, and when between the islands, steer W. $\frac{1}{4}$ S. towards Pigeon-house rock, and pass half a mile northward of it.

La Caille bank, is of small dimensions, with 7 fathoms water on it, lying E. by S. $\frac{3}{4}$ S. distant $7\frac{1}{2}$ miles from Flat island lighthouse; S.S.W. distant $2\frac{3}{4}$ miles from the south extreme of Round island; and 3 miles within the 100-fathom edge of soundings.

Abbé bank, lies S.W. $\frac{1}{2}$ W. distant $1\frac{1}{4}$ miles from La Caille bank, and is about three-quarters of a mile in extent; this bank is a narrow circular coral ridge, with 7 to 10 fathoms on it, and 13 to 18 in the centre:—from which Serpent island is just shut in with the eastern part of Round island, the summit of Round island bearing N.N.E. $\frac{1}{2}$ E., distant $4\frac{3}{4}$ miles; Flat island lighthouse N.W. by W. $\frac{1}{4}$ W., distant $6\frac{3}{4}$ miles; and Gunner's Quoin W. $\frac{1}{4}$ N. distant $8\frac{1}{2}$ miles.

Between La Caille and Abbé banks (on both of which the sea breaks in bad weather and occasionally during fine weather) there are depths of 11 and 19 fathoms, coral bottom.

Clearing marks.—Serpent island, its breadth open east of Round island bearing N. by E. $\frac{1}{2}$ E., will lead to the eastward of La Caille and Abbé banks in 30 fathoms; Flat island lighthouse bearing W. by N. or Gunner's Quoin W. $\frac{3}{4}$ S., will lead to the northward in from 20 to 30 fathoms; and Flat island lighthouse N.W. $\frac{3}{4}$ W. or Gunner's Quoin W. $\frac{3}{4}$ N., will lead to the southward of the banks in from 22 to 23 fathoms.

Flat island.—This island the north-western of the group, lies $6\frac{1}{2}$ miles westward of Round island; the surface is generally flat, but the south-west extreme rises to a hill 310 feet high on which a lighthouse is built.

Pigeon-house rock, 172 feet high, lies off the north extreme, having a narrow boat passage between.

Gabriel island, 70 feet high, lies 3 cables south-eastward of Flat island and is joined to it by reefs; a small islet 6 feet high lies close southward of Gabriel island.

LIGHT.—From the lighthouse on Flat island is exhibited at an elevation of 364 feet, a white light which revolves *every minute*; it should be visible in clear weather from a distance of 25 miles.

Note.—Flat island light is obscured by Round island when bearing between West and W. $\frac{1}{2}$ S.

Quarantine establishment.—On the south-west extreme of Flat island is situated the cholera quarantine establishment for Mauritius; it is in telegraphic communication with port Louis.

Sandringham reef, (on which the vessel of that name was wrecked,) lies S.E. distant $1\frac{3}{4}$ miles from Flat island lighthouse, and 4 cables from the south extreme of the islet off Gabriel island. There is a depth

of 17 fathoms at one cable south of the reef. As the tide sets with great strength over Sandringham reef, it should be given a wide berth.

Clearing marks.—By day, vessels coming from the eastward should not approach Flat and Gabriel islands nearer than to have Canonnier point lighthouse in line with the south-east extreme of Gunner's Quoin, bearing S.W. by W. $\frac{1}{2}$ W., until Pigeon-house rock is in line with the semaphore on the eastern side of Flat island, N. $\frac{3}{4}$ W.; when Flat island lighthouse may be approached under easy sail.

By night, do not shoal to less than 23 fathoms when approaching Sandringham reef from the eastward, until Flat island light bears N.W. by N.

Rip bank on which the sea breaks without warning, is of coral formation, about 2 cables in extent north-east and south-west, with 7 to 9 fathoms water, and lies S.E. three quarters of a mile from Sandringham reef; from the south-east extremity of Rip bank, Flat island lighthouse bears N.W. $\frac{1}{2}$ W., distant $2\frac{1}{4}$ miles.

At a distance of 4 cables south-east of this bank there is a depth of 23 fathoms, coarse sand mixed with coral.

Clearing marks.—The north-east extremes of Flat and Gabriel islands in line bearing N.W. by N., leads to the north-eastward of Rip bank; Pigeon-house rock in line with the semaphore (east side of Flat island) N. $\frac{3}{4}$ W. leads to the westward; and Gunner's Quoin W. by S. $\frac{1}{4}$ S. leads to the southward.

Anchorage will be found near the south end of Flat island in 9 fathoms, sand and coral, with Flat island lighthouse bearing N.W. by N. distant about one mile; and the summit of Serpent island in line with the small islet off Gabriel island E. by N. $\frac{3}{4}$ N.

As the sea rises quickly with southerly winds, and the holding ground is not good, vessels should, on the indication of bad weather proceed to sea.

The pilot station that formerly existed on Flat island has been abolished; but if necessary a pilot will be sent from port Louis to vessels at anchor off Flat island.

Gunner's Quoin island.—This small triangular shaped island lies N.N.E. $\frac{1}{4}$ E. distant 2 miles from cape Malheureux; the hill from which the island takes its name is 518 feet high and situated over the west extreme of the island.

Foul ground extends from the north and south extremes and also fringes the eastern side of this island.

The Blacksmiths, are a cluster of rocks awash at low water the outer of which lies N.E. by E. $\frac{1}{4}$ E. distant 3 cables from the north-

eastern extremity of Gunner's Quoin. There is a depth of 17 fathoms, rocky bottom, 2 cables north of the rocks.

Caution.—Vessels should give Gunner's Quoin a berth of one mile when passing to the northward of it, as the flood or eastern stream sets over the Blacksmiths.

The Carpenters, consists of three rocks awash, on which the sea breaks heavily. The outer rock lies S.S.E. distant 2 cables from the southern extremity of Gunner's Quoin. At 2 cables south of these rocks, there is a depth of 17 fathoms, rocky bottom.

Caution.—The eastern or flood stream sets with great strength over the Carpenters, causing dangerous races which extend 3 miles seaward of the point; vessels passing through Quoin channel (between Gunner's Quoin and cape Malheureux) should give the southern extremity of Gunner's Quoin a berth of one mile.

Malheureux rock, is a small coral knoll with 29 feet on it, lying N.E. by E. $\frac{1}{2}$ E. about $3\frac{1}{2}$ miles from Canonier point lighthouse, and N.N.W. about one mile from cape Malheureux.

Round island shut in with the southern extremity of Gunner's Quoin, the latter bearing E. by N. $\frac{3}{4}$ N., will lead north-west of this rock.

Anchorage.—Vessels can anchor southward of Gunner's Quoin island, and the fleet of transports employed in the capture of Mauritius lay at this anchorage.

Tides.—The tides among the islands north of Mauritius run during springs, from 4 to 5 knots an hour, causing races dangerous for small vessels to pass through. At neaps the strength of tide seldom exceeds 2 knots.

The night tides are stronger than those of the day time, and the strongest tides occur two days after full and change of the moon.

The eastern or flood stream begins to make 5 hours before the moon's meridian passage, and runs for 6 hours, the western or ebb stream then makes, and runs for 6 hours, there being no slack water. During the eastern or flood stream a strong set will be felt towards Canonier point and the reefs off it; and sweeping through Quoin channel and round the north end of Mauritius with great strength. During and after westerly winds this set is greatly accelerated. On the bank of soundings, among the islands, the flood stream takes an easterly direction, but with strong southerly winds it is deflected to the north-east.

The tides separate at low water off point Piment, north of Turtle bay, the line of separation working towards Rocky point, which it reaches by the time of high water.

While the eastern stream is setting round the north part of the island, a weaker stream will be setting to the southward along the west coast.

The ebb stream sets generally about W.N.W., but is very little felt on the western side of the island between Canonnier and Caves points.

The tide inshore turns 2 hours before the stream in the offing; and during the last half of the flood, near Gunner's Quoin, sets to the eastward at the rate of 4 knots, and on the Mauritius shore skirting the 10-fathom edge of the bank, sets to the westward at the rate of 3 knots an hour.

It is high water, full and change, at the northern part of Mauritius island, at 0h. 30m.; springs rise 3 feet.

DIRECTIONS.—By day, vessels coming from the eastward should pass the southern extremity of Round island at a distance of $1\frac{1}{2}$ miles, and not bring Flat island lighthouse to bear northward of W. by N. until the summit of Serpent island is in line with the west extreme of Round island, bearing N.E. $\frac{1}{4}$ E., when a W. $\frac{3}{4}$ S. course should be made to pass between Gunner's Quoin and Flat island.

At a distance of 10 miles E. by S., from Flat island light, soundings will be obtained in 29 fathoms, coarse brown sand mixed with broken shells and coral, and at 6 miles from the light on the same bearing, 29 to 30 fathoms, black and white speckled sand.

With Flat island lighthouse bearing N.N.W. $\frac{1}{4}$ W. distant 10 miles, there is a depth of 29 fathoms, fine white sand, about 2 miles from the reef projecting from Amber island, and just within the 100-fathom edge of the bank, varying as the light is neared, from 27 to 25 fathoms, and the nature of the bottom changing from fine white sand to coarse brown sand, mixed with shells and coral.

At a distance of 3 miles from the light, on a N.N.W. $\frac{1}{4}$ W. bearing, soundings will be obtained in 23 fathoms, when a W. $\frac{3}{4}$ N. course should be steered. Proceeding on that course the depth of water will decrease to 20 and 18 fathoms, coarse brown sand and shells, on the tail of the bank which extends south from Flat island. The water will again deepen to 22 and 23 fathoms, coarse brown sand, when Flat island bears N.N.E.

After rounding Gunner's Quoin at the distance of a mile, steer to bring the summit of Serpent island in line with the western extremity of Gunner's Quoin, bearing N.E. by E. $\frac{3}{4}$ E.; that mark on astern will lead northward of the reefs off Canonnier point.

Vessels arriving off Round island, when the eastern stream is running, should pass to the northward of Serpent island and Pigeon-house rock.

From a position one mile north of Serpent island, a W. $\frac{3}{4}$ S. course (allowing for tide) will take a vessel abreast Pigeon-house rock, which should be rounded at a distance of one mile, and when the south extreme

of Round island comes in line with Pigeon-house rock, a S.W. $\frac{1}{2}$ W. course will lead about 2 miles to the westward of Canonnier point.

Having passed Canonnier point, when the north point of Mauritius (cape Malheureux) is in line with the pitch of Canonnier point, bearing E. $\frac{3}{4}$ N., and Butte aux Papayers, (a hill near the north end of the island on which there is a semaphore and two flagstaffs,) is in line with a conspicuous chimney near the beach (Triolet), bearing S.E. by E. $\frac{1}{4}$ E., steer S. by W. $\frac{1}{2}$ W. for the light-vessel at the entrance to Port Louis.

At night, having opened the light on Canonnier point on a S.W. $\frac{3}{4}$ W. bearing, bring Flat island light to bear N.E. by E., and steer S.W. by W. until Canonnier point light bears E. by N. $\frac{1}{2}$ N., thence steer S. by W. $\frac{1}{2}$ W. for Port Louis harbour light. Care should be taken, when nearing Canonnier point, especially if the eastern stream be running, not to bring Flat island light north of N.E. by E.

Note.—A sailing vessel becalmed among the islands north of Mauritius should anchor to avoid being drifted by the strong currents.

Canonnier point.—This projecting point lies W. $\frac{3}{4}$ S. from cape Malheureux distant $3\frac{1}{2}$ miles; upon the extremity of this point a light-house has been constructed.*

LIGHT.—From this lighthouse is exhibited a fixed light elevated 38 feet, and visible in clear weather from a distance of 10 miles; this light shows *red* when bearing northward of N.E. $\frac{1}{2}$ E. and is obscured when bearing westward of S.W. $\frac{3}{4}$ W. and northward of N.E. $\frac{3}{4}$ N.; it is not visible from Port Louis light-vessel.

WHALE ROCK, with 4 feet over it at low water, lies N. by W. distant $4\frac{1}{2}$ cables from Canonnier point lighthouse.

A rock with 18 feet water, having 9 fathoms close outside and 50 fathoms $2\frac{1}{2}$ cables beyond, lies 6 cables N. by W. $\frac{1}{4}$ W. from Canonnier point lighthouse, and N.W. by N. $1\frac{1}{2}$ cables from Whale rock.

The summit of Serpent island in line with the western extremity of Gunner's Quoin bearing N.E. by E. $\frac{3}{4}$ E. will lead clear of the rocks off Canonnier point.

By night.—Flat island light bearing N.E. by E. will lead to the northward of these rocks.

Caution.—There is a dangerous indraught towards Canonnier point, vessels under sail coming from the northward should therefore give the point a berth of $1\frac{1}{2}$ miles when rounding it.

* Several manufactories stand near the beach of Canonnier point, the chimneys of which when seen from a distance resemble lighthouses.

Canonnier point lighthouse is situated near the shore and is a low white tower with a red lantern, and keeper's dwelling near it is painted white.

Coast.—Immediately eastward of Canonnier point is situated a shallow inlet, known as Grand bay, but between Canonnier point and Port Louis there are only a few unimportant indentations, two of which are known as Arsenal and Tombeau bays.

PORT LOUIS the capital of the island is situated on the western side at 13 miles from the northern extreme; the entrance to the port is $1\frac{1}{4}$ cables wide between coral reefs, and lies in a N.W. and S.E. direction expanding within to a basin 7 cables long and 5 cables wide with shoal water extending for a considerable distance from the north-east and south-west sides; at the head of this basin is situated the city of Port Louis.*

Port Louis presents a picturesque appearance when seen from the offing as steep hills rise immediately behind it, and in the background are seen the remarkable mountains known as the Pouce or Thumb (so named from the resemblance to a thumb held upright) and Pieter Both mountains, surmounted by a curious knob. These mountains are 2,650 and 2,676 feet high respectively, and form part of a chain lying 2 miles south-eastward of Port Louis, from which spurs extend in a northerly direction.

The citadel situated on a hill 289 feet high rising in the centre of the city is a prominent object as is also Signal mountain, 1,081 feet high and rising over the western side of the port.

LIGHT.—A light-vessel painted white is moored in 15 fathoms off the entrance to Port Louis; from this vessel is exhibited a flashing light, showing a flash every *twenty seconds*; it is elevated 34 feet, and should be visible in clear weather from a distance of 9 miles.

From the light-vessel the eastern shoulder of Corps de Garde mountain (a perpendicular cliff) is in line with the eastern rise of Petit Malabar hill, bearing S. by W. $\frac{1}{2}$ W.; Cassis church (two conspicuous square towers) in line with the western extremity of Barkly island, S. $\frac{1}{2}$ W.; and Citadel flag staff in line with inner end of the boat jetty at Fort George, S.E. $\frac{1}{2}$ S.

Approaching Port Louis from the westward, the light-vessel should not be brought to bear to the northward of E. by N. until within a distance of one mile.

Harbour.—Vessels generally enter the harbour in tow of a steam-tug, but should the wind be fair for entering under sail, there is not room for a large vessel to "round to" inside; if going to the man of war moorings off Cooper island, it is advisable to have hawsers ready to run out astern, as well as ahead. The merchant shipping lie in tiers, moored head in, leaving a channel up the middle just wide enough for the traffic.

The wind is generally off the land, but during the day it occasionally blows in from the sea. At times fresh westerly winds (called Malagash) prevail for several days.

* See Admiralty plan:—Port Louis, No. 713, scale $m = 7.75$ inches.

Buoys.—The north-west extreme of the shoals on the eastern side of the entrance is marked by a bell buoy in 8 fathoms, and the outer edges of the shoals extending from the shores on both sides within the entrance are marked by buoys, black on the eastern side and red on the western side. After a hurricane, it sometimes occurs that the whole of the buoys are washed away. The mark to lead in the centre of the harbour is, Pieter Both mountain in line with the Citadel flagstaff bearing S.E. $\frac{1}{4}$ E.

Pilots.—A pilot boat carrying a distinguishing flag coloured red and white, at the peak, cruises during the day, a mile outside Port Louis light-vessel.

Anchorage.—The usual anchorage off Port Louis is in from 15 to 20 fathoms, coarse sand mixed with broken coral and shells, with the light-vessel bearing from S.E. to S.S.W., distant about half a mile. A vessel will have entered the anchorage ground when Gunner's Quoin is in line with a conspicuous gap in the trees near Rocky point, bearing N.E. $\frac{1}{4}$ N., and may anchor as convenient westward of a line joining the Martello tower, on the south side of Great river bay and the light-vessel.

The quarantine anchorage is to the southward of a line joining Pouce mountain and Fort William (south side of entrance to Port Louis harbour) in 10 fathoms, coarse sand and coral, with the light-vessel bearing N.E. distant half a mile.

A small black buoy is moored in 4 fathoms, S.S.W. $\frac{1}{4}$ W. distant 4 cables from the light-vessel, for the use of the quarantine guard boat.

Moorings for vessels of war are laid down southward of Tonnelier or Cooper island.

Caution.—The outer mooring chain of the light-vessel lies in a N.N.W. direction, 170 fathoms, therefore, vessels should not anchor within that distance, with the light-vessel bearing S.S.E.

Time signal.—A time ball is dropped on Signal mountain (by electricity from the Royal Alfred observatory) at 1h. 0m. p.m. Mauritius mean time corresponding to 21h. 9m. 46.5s. Greenwich mean time.

This signal is made every Monday, Wednesday, and Friday (holidays excepted).

Docks.—At the head of Port Louis (Trou Fanfaron) there are three dry docks, one patent slip and one small ordinary slip; the principal dock is 378 feet long over all, 60 feet wide at the entrance and at high water springs has a depth of 20 feet over the sill.

Tides.—It is high water, full and change, in Port Louis at 0h. 30m., springs rise 3 feet, neaps 2 feet.

Hurricane signals.—The following signals are made to vessels in the harbour and roadstead from the flagstaff of the Port office (at the head

of the harbour) and repeated from fort George on the approach of bad weather :—*

Day signals.

A white flag, with blue horizontal stripes and ball above at the Port office, repeated at fort George, and accompanied by a gun.

Send down top-gallant yards, and prepare for bad weather. The masters of all ships and vessels in this port are required immediately to repair on board their respective vessels; and vessels at the Bell buoy ought to proceed to sea.

A red flag, with a ball above.

Vessels in the port are to strike lower yards and topmasts. Ships at the bell buoy to go to sea.

Note.—The signals are respectively confirmed by a gun from fort George. Vessels are required to answer the above by hoisting their national ensign at the main.

Night signal.

One blue light at the Port office repeated at fort George, and accompanied by a gun.

Vessels at the Bell buoy to proceed to sea forthwith, and vessels in the port to make every preparation for bad weather.

Note.—None but Commercial Code signals are used.

Population.—In 1881 the estimated population of Port Louis was 66,500.

Caution.—Vessels standing towards Port Louis at night, should approach under easy sail, or at a low speed with an anchor ready, and, unless under favourable circumstances, the shore should not be approached nearer than 3 miles.

As no communication is permitted with the shore until the health-officer has visited the ship, nothing can be gained by endeavouring to anchor off Port Louis after sunset, therefore it is advisable to keep under way until daylight, bearing in mind that the wind generally hauls to the southward towards morning.

Coast.—From Port Louis to cape Brabant (the south-west extremity of the island) the coast is generally fringed with coral reefs extending from half a mile to $2\frac{1}{2}$ miles from the shore; there are no indentations of any importance, the principal bays being known as Petite Rivière, Tamarin, and Black River bays.

Cape Brabant rises to an isolated flat-topped hill 1,809 feet above the sea, and which forms an excellent object of recognition for vessels approaching the south coast of Mauritius.

* Harbour-master, Port Louis, 1884.

The south coast from cape Brabant to the entrance of Grand port has also several small and unimportant indentations known as Bay du Cap, Jacotet bay and port Souillac or Savane.

Reefs extend nearly three-quarters of a mile from the south-west extreme of cape Brabant, and both flood and ebb streams in the vicinity run with a velocity of from 3 to 5 knots an hour, the flood setting to E.S.E. and the ebb to W.N.W.

GRAND PORT, situated on the south-east side of Mauritius, has the disadvantage of its entrances being exposed to the full force of the south-east trade wind and the ocean swell. The anchorage is protected by a long narrow reef which uncovers at low water springs, and extends in a general N.E. by N. and S.W. by S. direction for 7 miles, having two principal entrances (North and South entrances) between it and the reefs extending from the main land, also a narrow shallow passage (Danish entrance) at $1\frac{1}{2}$ miles from the northern extremity.*

On the southern part of this off-lying reef are situated six small low islands.

Both North and South entrances have deep water in them.

A range of mountains (Bambou mountains) rises over the western part of Grand Port, from which spurs extend to the coast; the most conspicuous peaks on this range are Grand Port mountain near the southern extremity which attains an elevation of 1,590 feet, and Bambou peak, 2,060 feet high, situated 3 miles north-eastward of Grand Port mountain.

Mahébourg, the principal town in Grand Port, is situated on the southern side of the port, but the anchorage is not much frequented as the prevailing winds render the departure of sailing vessels difficult, and both North and South entrances are narrow and tortuous—of the two South entrance is to be preferred.

South entrance.—The entrance to this channel lies between Isle de la Passe, a small islet covered with buildings on the south extreme of the off-lying reef, and Laverdie spit the eastern extremity of the shoal ground extending from the main island; westward of Isle de la Passe the channel is 4 cables wide, but at the northern part it is narrowed to a quarter of a mile and marked by a conical black buoy on each side.

LIGHT.—From a lighthouse on Fouquets island, half a mile north-eastward of Isle de la Passe, is exhibited a fixed white light, elevated 108 feet and visible in clear weather from a distance of 16 miles. This light is obscured landwards between the bearings of N.E. by E. $\frac{1}{4}$ E. and S. by W. $\frac{3}{4}$ W.

Directions.—There is a pilot establishment at the lighthouse and vessels should not enter without their assistance.

* See Admiralty plan:—Grand Port, No. 1,401, scale $m = 3$ inches.
RA 8758.

In case of necessity a vessel without a pilot should enter during the forenoon when the shoal water may be discerned from aloft.

Grand Port mountain in line with the centre of Isle de la Passe bearing N.W. $\frac{3}{4}$ N. leads eastward of Laverdie spit, after rounding which steer to pass 3 or 4 cables westward of Isle de la Passe and anchor in 8 or 9 fathoms on Annanas bank in the middle of Horse Shoe bight north-westward of Isle de la Passe,

Vessels bound to Grand Port may approach the light when bearing from N. by E. round by north to W. by S.; and when about 2 miles from it should heave to for the pilot, with the vessel's head off shore.

Should it be desired to get shelter, approach the light under easy sail till at about three-quarters of a mile from it, avoiding the shoal patch of 6 fathoms off Laverdie point, the extreme of the coral reef bounding the south side of entrance to Grand Port; then steer so as to round Isle de la Passe at the distance of half a mile, as a spit runs out from its south side for about a cable's length; when haul to the northward and anchor in from 18 to 20 fathoms water. It is not recommended to attempt to enter without a pilot, except in cases of extreme necessity.

A vessel from the southward bound to Port Louis, round the north end of the island of Mauritius, (the usual track,) should after sighting Fouquets island light, steer so as to pass it at a distance of about 4 miles; when at that distance, with the light bearing W. by S., a course N.N.E. $\frac{1}{2}$ E. for 9 miles, if the weather be clear, will bring a vessel in sight of Flat island *revolving* light, bearing about N. by W. $\frac{1}{2}$ W.; the course can then be shaped as required.

A vessel from the northward having Flat island light on a N.N.W. bearing should be careful, after sighting Fouquets island light, not to bring it, when at a distance of less than 8 miles, on a more southerly bearing than S.W. by W. $\frac{1}{2}$ W., or she will be too near the coast reef northward of the Grand Port.

The coast reef bounding Grand Port is bordered by a bank of irregular soundings extending some distance seaward; the lead, if carefully attended to, will prove a tolerable guide in thick weather.

Vessels bound into Grand Port should not approach it at night, but should heave to well southward of the light, as the drift is to the northward, and much time will be lost in working back. Isle de la Passe on the north side of the entrance is easily known by the battery and other buildings on it. At times the rollers render the channel unnavigable, although the depth is from 14 to 22 fathoms; and generally the reefs on either side are visible from aloft. The rise of tide is 3 feet.

Note.—During and after strong south-easterly winds the south entrance is often unnavigable in consequence of rollers, and Laverdie spit breaks heavily at times within the 10 fathoms line.

Danish entrance, situated $5\frac{1}{2}$ miles north-eastward of South pass, has in it only a depth of 2 fathoms and frequently breaks right across; this passage should not on any account be used without a pilot.

North entrance.—The entrance to this channel is half a mile wide between Isle Roche (a small islet with a beacon on it 25 feet high) and the spit extending off the northern part of the off-lying reef. Bambou peak bearing W. $\frac{3}{4}$ S. leads from the offing to this entrance, but vessels drawing 19 feet water should not attempt to proceed through the narrow channels leading to Mahébourg; those of lighter draught should not do so without the assistance of a pilot, as these channels are silting up.

Soundings.—In the vicinity of both North and South entrances to Grand Port the 100-fathoms line lies about $1\frac{1}{2}$ miles from the edges of the reefs.

Tides.—The time of high water in Grand Port is uncertain, being much influenced by the wind; from the same cause the rise of tides varies from 18 inches to 3 feet.

Coast.—Northward of Grand Port the fringe reef assumes the character of a barrier reef extending some distance from the shore and through which there are numerous narrow openings leading to unimportant anchorages for small vessels.

Maipeu Patch.—This patch is the most off-lying on this coast and situated North $1\frac{3}{4}$ miles from Maipou village. At 6 cables outside the coast reef, is a small coral knoll with 7 fathoms water, having 23 fathoms rocky bottom close-to on its north side, and on its south side 15 fathoms close-to.

From the centre of this patch cape Malheureux bears W. $\frac{3}{4}$ N., distant 3 miles; and Flat island lighthouse North distant $5\frac{3}{4}$ miles.

General Directions.—Sailing vessels making Mauritius from the southward, and bound to Port Louis should, in order to avoid the calms under the high land near the south-west part of the island, pass to the eastward and round the north end of the island, proceeding as before directed. At night having sighted Isle Fouquets fixed light (Grand Port) it should not be brought to bear to the eastward of N. by E. nor approached nearer than 4 miles. On this bearing and distance, a vessel will be one mile outside the 100-fathom edge of soundings, and may steer N.E. $\frac{1}{4}$ E., about 10 miles; thence N. by E. $\frac{1}{4}$ E., for 7 miles; Flat island light should be then seen bearing N.N.W. $\frac{1}{4}$ W., and may be steered for on that bearing.

By day, Pigeon-house rock in line with the summit of Gabriel island bearing N. by W. $\frac{1}{2}$ W. will lead clear of the reefs in the vicinity of Amber island. Immediately within the 100-fathom edge of soundings, depths of 46 to 50 fathoms, coarse sand and coral, will be found. By not shoaling less than 50 fathoms, a vessel will be clear of danger.

CHAPTER III.

RODRIGUEZ ISLAND.

Variation in 1884 - - - - 8° Westerly.

GENERAL DESCRIPTION.—Rodriguez island lies about 330 miles to the eastward of Mauritius. It is 10 miles long, in an E.N.E. and W.S.W. direction, and 4 miles broad.

The island is of volcanic formation, composed almost entirely of basalt, with a little upraised coral at each extremity, and hilly throughout with but little flat land. A central ridge, 1,300 feet high at its culminating point (Montagne Limon), divides the island longitudinally from the east extreme for the greater part of its length, and from this ridge, spurs separated by deep ravines extend to the northern and southern shores. The western portion of the island is rather more broken into isolated hills, and is lower.*

Except during the dry season, there is no lack of streams in the valleys, some of them however are charged with mineral, and their waters are not fit to drink.

There is but little cultivation, though the soil is rich. The sides of the hills are more or less bush-covered, and dotted with small trees, the old forests only existing in the deeper gorges.

Rodriguez island contained in 1881 a population numbering 1,478.

There are large herds of cattle on the western part of the island, and goats are numerous, cargoes are occasionally sent to Mauritius; fowls and pigs are plentiful; there are also many partridges and large flocks of wild guinea fowl.

There are several collections of houses in the bays, and in the interior, but one only (Gabrielle) besides port Mathurin, that can be called even a hamlet. There are no roads and the paths are very bad.

Of natural curiosities, there are some perfect basaltic columns, 190 feet high in the Baie aux Huitres Valley; and numerous caverns in the

* Information derived from the visit of H.M.S. *Shearwater*, with the Transit of Venus expedition, 1874. See Admiralty chart:—Rodriguez or Diego Rais island, No. 715.

coralline limestone of the western end; some of the latter are very large, one being nearly half a mile in length.

Fringing reef.—An extensive flat coral reef encircles Rodriguez island, varying much as to its distance from the shore. At the south-eastern point of the island it is only 20 yards from the shore; from the western end it extends $4\frac{1}{2}$ miles in a southerly, $2\frac{1}{4}$ miles in a westerly, and 4 miles in a northerly direction.

The position of the reef is indicated by breakers, even in the calmest weather. The outer edge is tolerably steep-to, except in a few places, but with the swell that generally rolls on to it, the sea often breaks in 10 fathoms, several hundred yards outside the actual shoal water. A vessel in light winds can anchor almost anywhere outside the reef in from 10 to 20 fathoms.

The surface of the reef is even, and at low water springs the major part is dry, most of the rest being covered only by a foot or two of water, leaving a few shallow channels that nothing but canoes can traverse.

There are several narrow openings or passes in the edge of the reef at different points round the island; these passages are used by the fishermen to the deep water fishing grounds, and might be of great value to the crew of a wrecked ship if known. During *ras-de-marées* (rollers) however, they are impassable.

At *Quatre-Vingt Brisans*, the south-west corner of the encircling reef, the edge is altogether broken up into detached patches, and in this part the breakers are heaviest.

Grande passe.—A large pass on the south-eastern side leads into port South-east; the entrance, at a distance of $1\frac{1}{2}$ miles from the shore, is about 200 yards wide, and a few hundred yards outside there is a bar with depths of 4 to 6 fathoms on which the sea breaks during *ras-de-marées*.*

Inside the bar the water is deep, but a rock on the eastern side rather narrows the entrance and throws a roller across occasionally. The pass itself is 130 yards broad, and $1\frac{1}{4}$ miles in length, deep, and clear of rocks throughout; but the great velocity of the tides, the number of turns in the channel, and the ordinary strength of the wind, render it inadvisable for a vessel to attempt unless in an emergency.

No marks can be given for the entrance, but it may be clearly seen from aloft at a distance of one or 2 miles.

South-east port.—The harbour is small but well sheltered, being protected from any swell by the reef, has good holding ground of mud and sand, and would be a useful anchorage were it not for the difficulties

* See plan of port South-east on Admiralty chart, No. 715, scale $m = 1.5$ inches.

attending getting in and out, the latter especially affecting a sailing vessel.

Hermitage islet, small and rocky, stands in the centre of the harbour.

Islets.—Several low coral islands stand on the south side of the reef. To the westward, Crab island, Katherine, Frigate, and the neighbouring islets are high, and basaltic. Cocoa and Sandy islands to the N.W. are mere sand cays with low scrub on them. Booby and Diamond islands, to the westward of Mathurin bay, are basaltic rocks 50 to 60 feet high.

There are several deep bays on the shores of the island, some of them with deep water, but as the reef blocks them up, they are useless for anchorages.

The communication of the island is carried on entirely by canoes, which can pass at all times except at low water springs by a shallow channel that exists nearly all round close to the shore. A ship's boat can only pass through these at high water.

MATHURIN BAY, the sole practicable harbour, lies on the northern side of Rodriguez island, and is an excellent anchorage formed by a semicircular inward curve in the edge of the reef. The holding ground is good, the bottom being sand and mud and very even. To seaward the bay is protected by a coral bank with depths of one to 3 fathoms, named the Middle ground, which stretches across the entrance, leaving channels to the eastward and westward of it, but as the wind during the greater part of the year is from the S.E., the island itself prevents the swell from being felt to any extent. There is room for a large number of vessels to lie at anchor in Mathurin bay.*

Middle ground is a large coral bank with general depths of 5 to 8 fathoms, and a number of small patches of one to 3 fathoms on it. The bank does not generally show, and except during ras-de-marées, the sea never breaks on it.

Passages.—The Eastern passage is narrow and somewhat intricate, leading between coral heads, which cannot always be seen; but a sailing vessel must enter by this passage, as the wind is usually too much from the southward to admit of her fetching in through the Western passage. It is not at all impossible for a ship to work in through the Western passage, but a stranger would run more risk by doing so than by taking the Eastern passage.

To enter by the Eastern passage bring Diamond island in line with a notch in the hills at the western end of Rodriguez island, bearing S.W. by W. $\frac{1}{4}$ W., and run in on that line until Mont Piton comes in line

* See plan of Mathurin bay on Admiralty chart, No 715, scale $m = 3$ miles.

with a whitewashed cliff bearing S. $\frac{3}{4}$ W., when a vessel will be inside the reefs, and may alter course towards the houses of port Mathurin; this course will lead in not less than $4\frac{1}{2}$ fathoms, though very near to some patches of 2 fathoms.*

A buoy marking a 2 fathoms patch lies at the inner end of the Eastern passage, and if used as a guide must be passed close-to, leaving it on the port hand. The course by leading marks leaves this buoy about 120 yards to port, and there will be a 4-fathom head between the ship and the buoy.

Mont Piton shows as a sharp cone, and is quite unmistakable when near Mathurin bay, but when seen from the eastward or westward it loses its conical shape.

The Western passage is recommended for steam vessels, and for sailing vessels going out, being wide and straight; the only danger to a large vessel is a 3-fathoms patch which must be left to the westward.

A steam vessel approaching Mathurin bay from the westward should not shut in point du Sel with point Corne until Mont Piton is in line with the eastern and larger of the two flagstuffs in port Mathurin, bearing S. $\frac{3}{4}$ E.; steer in on that line until Booby island bears W. by S., then alter course to S.E. for the anchorage; not less than 10 fathoms will be found on this track.

Leaving Mathurin bay steer for Booby island until Mont Piton is in line with the flagstaff; steer out on that line until point du Sel opens of point Corne; a vessel will then be clear of the reefs, and can keep away to the westward; but if going to the eastward take care not to bring Booby island to the westward of W. by S. until the Middle ground be passed.

Pilot.—There is a good pilot at port Mathurin, who will come off to a ship on the usual signal for a pilot being made.

Anchorage.—The most convenient anchorage in Mathurin bay is, in 10 fathoms, bottom sand and mud, off a small buoy marking the entrance to the creek, with Mont Piton in line with the cliff of point Venus bearing S. $\frac{1}{4}$ W. and point Manioc (the extreme of land to the west) showing inside Diamond island.

The creek is deep but narrow, running into the coral reef towards the settlement, and makes a good berth for the small schooners that carry on the trade of the island. These place their anchors on the coral at the end of the creek, about a quarter of a mile from the town, mooring head and stern.

* The whitewash is on the most prominent and blackest cliff on the coast. Should it not be well kept, the cliff itself is a good mark, and can easily be recognised when on the bearing indicated. The whitewash is one-third from the east end of the cliff.

Tides.—It is high water, full and change, at port Mathurin, at 0h. 30m.; springs rise $5\frac{1}{2}$ feet, neaps $1\frac{1}{2}$.

There is a tolerably constant current passing the island setting to the westward. The tidal streams are not appreciable, except in the channels or passes.

Rollers.—Occasionally rollers set in (ras-de-marée), which cause a swell in Mathurin bay and heavy breakers on all dangers. These come from all quarters, and generally last only a few hours.

Landing.—Boats land at the upper end of the creek in Mathurin bay at a small pier extending from the village, during high tide, but they cannot get within 400 yards at low tide, and wading must be resorted to. There is a small sluggish fish called the "Laff," which lies in the mud, a wound from the poisonous spine of which is said to be dangerous.*

Port Mathurin, the name given to the settlement of Rodriguez island, is a village consisting of about 50 huts, including two or three general stores. It is situated at the seashore on a flat sand bank formed at the entrance of the valley Soupir and Cascade, and is nearly surrounded by water at high tide. The house of the magistrate and the police station are close to the landing place. The flagstaff used as a leading mark is situated close to the beach, and the Union Jack is hoisted on it when any vessel is in sight.

Point Venus, a clifly headland on the south side of Mathurin bay, nearly half a mile to the eastward of port Mathurin, is in latitude $19^{\circ} 40' 23''$ S., longitude $63^{\circ} 26' 15''$ E. A stone hut used by the party who observed the transit of Venus on December 9th, 1874 marks the point.

Water can be obtained from Cascade river to the eastward of the houses but it is very difficult to procure as the reef only permits boats to get in at high tide, and the casks must be taken some distance inland to get good water.

Soundings.—A bank having soundings from 20 to 40 fathoms, coral and sand bottom, extends from the reef on the north side of the island for $3\frac{1}{2}$ miles; on the east 6 miles; on the south 2 miles; and on the west side 12 miles. The bank is steep to all round, and falls suddenly into 200 fathoms.

Winds.—The S.E. trade wind is more or less continuous at Rodriguez island all the year round. During the months June to October (inclusive) is the most settled weather, the wind blowing from East to S.E. with a force of from 3 to 6, but generally fresh. Hurricanes are considered to

* Captain R. D. King, R.N., H.M.S. *Euryalus*, 1881.

visit Rodriguez island a month earlier, and to occur more frequently than they do at Mauritius, but the latter statement is not well authenticated. From November to May hurricanes may possibly be experienced, and the weather altogether during these months is unsteady; the wind draws round to the northward as far as N.E. by E., and remains there for some days together; calms also occur at this season, but not often; neither are they of long duration. Rains prevail from December to April, but are not continuous.

Rodriguez island is a cool place and remarkably healthy.

CHAPTER IV.

CARGADOS CARAJOS ISLETS AND SHOALS, TROMELIN ISLAND,
SAYA DE MALHA BANK AND AGALEGA ISLAND.

Variation in 1884 - - - - 7° 0' Westerly.

This extensive group of islets and shoals (known also as St. Brandon shoals) is situated 220 miles from Mauritius, the southern island of the group (Coco island) being situated N.E. by N. from Round island distant 205 miles, and N.W. by N. from the north extreme of Rodriguez, distant 275 miles.*

The western side of the group was examined by Sir E. Belcher in 1846 but the eastern side is imperfectly known and should not be approached. Several small islands (known as Coco, Avocarè, Mapare and Establishment islands) are situated on the main reef which is above water and extends in a curve concave to the westward for 25 miles in a general north and south direction.

Besides these islands on the main reef there are several detached islands known as Frigate, Pearl, Siren, North and Albatross islands having numerous shoals and breakers between them.

Albatross island is the northern of the group and is separated from North island and the northern edge of the main reef by a channel 7 miles wide.

Soundings.—A bank of soundings extends from the western and northern sides of the group, a depth of 32 fathoms being found at 16 miles westward of the main reef; between Albatross and North islands depths of 10 to 15 fathoms were found, but the eastern side of the group is said to be steep-to and therefore dangerous to approach.

Anchorage.—Vessels can anchor in the bight north-eastward of Coco island on a sandy bottom, but not in less water than 11 fathoms,

* See Admiralty charts :—Indian Ocean, Northern portion, No. 748*b*; Cargados Carajos shoals, No. 1,881.

anchorage can also be obtained in 11 fathoms south-westward of Establishment island.

There is said to be a good port for small vessels on the north-east side of the main reef but it is difficult of approach for sailing vessels.

Supplies.—Water is difficult to procure and is of bad quality; fish are numerous.

A few fishermen from Mauritius reside on Establishment island during the fishing season.

Tides.—It is high water full and change at 2h. 0m., springs rise 4 feet. In the month of August a strong current was experienced off the southern side of the group, setting to the westward.

Directions.—Cargados Carajos islets should not be approached by night: but during daylight they may be seen from the masthead in clear weather for a distance of 10 miles.

A vessel approaching from the southward and intending to anchor off them should steer direct for the main reef, the south-west extreme of which may be rounded at a distance of a mile.

Vessels approaching from the northward are recommended to make Albatross island.

NAZARETH BANK.—From Cargados Carajos a bank having over it depths of from 14 to 45 fathoms extends 180 miles in a N.E. by N. direction; the eastern and western limits have not been well defined but within the depth of 100 fathoms the bank is supposed to be 50 miles broad.

This bank is frequently crossed by vessels and there are no dangers known to exist upon it.

The least depth known is 14 fathoms, which is found near the north-east extreme and from which Albatross island bears S.W. $\frac{3}{4}$ W. distant 150 miles.

Nazareth bank is separated from Cargados Carajos by deep water, the vicinity of which is indicated by the change of colour; the current between these banks runs strongly to the westward.*

Current.—A strong westerly current of from 25 to 50 miles in 24 hours has been experienced between Nazareth bank and Saya de Malha at all seasons of the year.

Tromelin island.—This island extends one mile in a N.W. and S.E. direction, is about 800 yards wide and about 15 feet high.†

* Captain F. Moresby, H.M.S. *Menai*, 1821, contained in *Nautical Magazine* for 1842, page 743.

† See plan of Tromelin island on Admiralty chart, No. 1,881, scale *m* = one inch.

It is surrounded by a bank of soundings which within a depth of 10 fathoms extends one mile from the north-west extreme and half a mile from the south-east extreme.

Vessels can anchor off the north-west extreme in a depth of 8 fathoms but the holding ground is indifferent.

Landing.—The island is surrounded by a coral ledge extending about 150 yards from the shore, and on which the sea breaks heavily; landing can only be effected on a steep sandy beach close eastward of the north extreme; this should only be attempted near the time of high water.

The northern part of the island is the higher and is covered with low bushes, the southern part is very low.

Tide race.—A heavy race is formed off the north extreme of Tromelin island by the meeting of the ebb stream and the westerly current, this often breaks so heavily as to be dangerous for boats at a quarter of a mile from the shore.

SAYA DE MALHA BANK.—This extensive bank as at present defined lies between the latitudes of $8^{\circ} 16' S.$ and $11^{\circ} 46' S.$, and the longitudes of $59^{\circ} 37' E.$ and $62^{\circ} 16' E.$ It has a length of 234 miles in a N.N.W. and S.S.E. direction, with a breadth varying from 20 miles in the northern portion, to 120 miles in the southern.*

The northern portion to which Commander Aldrich principally directed his attention, is about 75 miles long, north and south, with a width in the centre of 23 miles, tapering both north and south to a point, with apparently a deep-water channel about 20 miles wide to the southward, between it and the main body of the bank.

This northern bank is steep-to, the eastern edge with from 6 to 12 fathoms, rising abruptly from the ocean. From the eastern edge the bank gradually deepens towards the western, to 20 and 30 fathoms, falling suddenly into deep water, bottom was not obtained within two miles of the western edge with 130 and 200 fathoms of line. Six miles eastward of the bank, bottom was not reached with 500 fathoms of line. The apparent north end where the bank is about 2 miles across, with 12 fathoms, lies in lat. $8^{\circ} 18' S.$, long. $60^{\circ} 6' E.$, two miles north-east of which position, bottom was not reached with 150 fathoms of line.

Shoal ground.—The shoalest water found was 5 fathoms, near the eastern edge of the northern portion of the bank, in lat. $9^{\circ} 12' S.$, long. $60^{\circ} 21' E.$, with about 10 fathoms for 16 miles to the south-westward, dropping suddenly into no bottom with 220 fathoms. North-eastward of

* Commander P. Aldrich, H.M. Surveying vessel *Fawn*, 1881. See Admiralty chart:—Saya de Malha bank, No. 496.

the 5 fathoms, for a distance of 6 miles, there is a general depth of 10 fathoms, with no bottom at 500 fathoms 13 miles distant. It is probable that shoaler water may exist on this bank.*

Nature of bottom.—From the soundings obtained, the nature of the bottom appears to be coral to a depth of about 33 fathoms, and in deeper water to be composed of fine sand. H.M.S. *Fawn* anchored in 14 fathoms in lat. $9^{\circ} 53'$ S., long. $60^{\circ} 51'$ E., riding easily with 100 fathoms of cable, though there was occasionally a chopping sea. Also in lat. $8^{\circ} 25'$ S., long. $60^{\circ} 10'$ E., in 11 fathoms. Here the bank is only 5 miles broad, dropping suddenly to the westward from 17 to 125 fathoms.

Fish.—A plentiful supply of large fish were caught whilst at anchor on the bank.

Current.—From observations taken when at anchor, and during surveying operations, the mean direction of the current was found to be a little southward of west, with an average strength of one knot per hour. In the many channels of deeper water between the shoaler parts of the bank, the current is variable, and runs with increased velocity, but over the shallow parts the strength is much diminished.

Tide rips.—North-westward of the bank, in lat. $7^{\circ} 45'$ S., long., $59^{\circ} 40'$ E., heavy tide rips and one overfall were observed, probably caused by the meeting of the current from the opposite sides of the bank; bottom was not obtained with 230, 180, and 214 fathoms of line.

REPORTED BREAKERS.—In the assigned position of "reported breakers" lat. $7^{\circ} 15'$ S., long. $61^{\circ} 26'$ E., a careful look-out was kept for broken water, but none was observed, though there was a lumpy sea on, and bottom was not obtained with 350 fathoms of line.

REPORTED SHOAL.—Search was made for the shoal reported to exist in lat. $12^{\circ} 12'$ S., long. $60^{\circ} 42'$ E. (approx.), but bottom was not obtained with 450 fathoms of line.

Agalega island.—This island, low and covered with trees, is divided into two parts connected by a reef, extends about 11 miles in a N.W. by N. and S.E. by S. direction, and is surrounded by reefs which extend a considerable distance from the north-west and south-east extremes.

The reefs are steep-to and afford no anchorage except possibly off the eastern side of the southern island where there is said to be anchorage for small vessels.

* On the southern portion of the Saya de Malha bank, in about lat. 11° S., there are some coral patches of 4 fathoms or less, on one of which it is said the French schooner *Eliza* was in some danger, and the same depth has also been reported on the northern portion.

Landing can only be effected with difficulty.

H.M.S. *Frolic* in 1857 anchored in 10 fathoms, coral and large rocks, at 2 cables distant from the reef on the eastern side of the island.

At this anchorage the tidal streams attained the velocity of from one to three knots an hour, the first of the ebb setting in with greater velocity.

Supplies.—The island abounds with hares, partridges, guinea fowl, wild pigs, peacocks, and wild fowls, there are also plenty of fish and turtle.

The inhabitants who are chiefly labourers brought from the Malabar coast, are employed in preparing cocoa-nut oil.

Water is procured from wells but is not of good quality.

CHAPTER V.

CHAGOS ARCHIPELAGO.

Variation in 1884 - - - - 1° 30' Westerly.

This extensive archipelago of small islands and coral reefs lies between the parallels of 4° 40' and 7° 40' South latitude and 70° 50' and 72° 45' East longitude; the southern and most important island Diego Garcia is situated 600 miles E. by N. $\frac{3}{4}$ N. from Saya de Malha bank, and the northern portion (Speakers bank) is separated from Addu atoll the southern group of the Maldivh islands by a channel 240 miles wide.

The chief groups of islands are Peros Banhos, Salomon island and Nelson island at the northern part; Eagle islands, Danger island and Egmont or Six islands at the western part, and Diego Garcia the southern of the archipelago.*

The central part of the Chagos group is occupied by an extensive bank known as Great Chagos bank, to the northward of which are situated Victory bank, Blenheim reef and Speakers bank, and to the southward Pitt bank, Ganges bank and Centurions bank.

The Chagos islands afford supplies of wood, water, pigs and poultry, which can most readily be obtained at Diego Garcia or Peros Banhos.

The general and most remarkable feature of this archipelago is the atoll character of both islands and reefs.

The banks in ordinary weather may be crossed by vessels provided they avoid the shoaler parts; when there is much swell the banks should be avoided.

Currents.—The set of the currents among the Chagos group varies with the winds; from the middle of December until the middle of April they set to the eastward and from the beginning of June to the end of September to the westward, varying occasionally a little north or south of these directions.

During April and part of May as also during the whole of November and December both winds and currents are variable; the greatest velocity

* See Admiralty chart:—Chagos archipelago, No. 3.

of current observed during the survey of 1837 was 2 knots an hour over the Great Chagos bank.

Tides.—Regular tides are experienced on the banks and near the islands of the Chagos archipelago, the flood stream sets to E.S.E. and the ebb to W.N.W., high water at full and change occurring at 1 h. 30 m. In some parts the current and tidal stream run obliquely towards each other or are directly opposed, occasioning variations both in direction and velocity, this in strong breezes causes a confused swell which on the shoaler parts of the banks, breaks in heavy rollers, the waves (by measurement) rising from 15 to 18 feet.

DIEGO GARCIA, the southernmost island of the Chagos Archipelago, is an atoll, about 13 miles in length north and south by about 8 miles in extreme breadth. The coral of which it consists is generally from 3 to 4 feet, and nowhere more than 6 feet above high water; but the trees with which it is thickly covered attain in several places, a height of about 150 feet. It can be seen at a distance of 10 miles. Chief amongst the trees are the cocoanut, numbering upwards of a million, the supply of oil manufactured from the produce of which, forms the only staple of export from the island.*

A steep coral reef on which the sea breaks heavily fringes the outside coast of the island and renders landing impracticable.

The shores being free from off-lying dangers a vessel may run for the island without danger, if the weather be not so thick as to prevent land being seen from a distance of 2 or 3 miles.

The island being low and sometimes enveloped by a cloud in the night great caution is requisite in running for it at such times; nor should it be approached in a dark night.

If running for it in a clear night or in the day with thick weather, when near its position a vessel should be kept under such sail as she can bear on a wind, and on sighting the island her head ought immediately to be laid off-shore.

Approaching the north end of this island the small islets at the entrance of the harbour will be distinguishable at a distance of about 3 miles, and can be approached on their northern side to within 2 cables.

The north-east entrance, or that between East island and Barton point (the north point of Diego Garcia island), cannot be recommended, the depths having apparently decreased about $1\frac{1}{2}$ fathoms since the survey of 1837; it now carries about 21 feet at low water, and is interspersed with coral patches having over them one, 2 and 3 fathoms of water.

* See Admiralty charts:—Chagos archipelago, No. 3; and plan of Diego Garcia on chart:—Principal groups of the Chagos archipelago, No. 4, scale, $m = 1\cdot0$ inch.

Between Middle and East islands there is deep water, but as the channel joins the north-east one, about a mile south-eastward of East island, it cannot be recommended.

The west entrance, which is the only safe one, lies between West island and the reef extending to the westward and southward of Middle island, this entrance is about a mile in width, and carries a depth of $5\frac{1}{2}$ fathoms.

Eclipse bay.—The lagoon of Diego Garcia island forms an extensive harbour, in the north-west part of which, situated about one mile from the West entrance, is Eclipse bay. This bay is easy of access for sailing vessels, and is protected from any heavy sea during the north-west monsoon by the reef which joins Eclipse point and West island; and from the south-east trade by the eastern portion of the main island of Diego Garcia.*

Lights.—It is contemplated to erect poles with lights at the harbour entrance, to be replaced by permanent lighthouses; also, upon Horsburgh point on the south-east part of the island.

Buoys.—A flagstaff has been erected upon West island, and buoys placed at intervals from thence to East point; steamers should leave the red buoys on the starboard hand and the black buoys on the port hand, when entering. The channel is narrow in some places, and the red buoys should be passed closely.

Anchorage in Eclipse bay may be obtained in from 8 to 12 fathoms soft clay or finely-ground coral, about half a mile from the shore.

A good anchorage may also be found in from 10 to 12 fathoms, soft coral and sand, off the Minni Minny estate in the eastern part of Diego Garcia harbour.

A shoal, nearly circular, from 30 to 40 yards in diameter, with 5 feet at low water spring tides on its north-eastern edge, 3 to $3\frac{1}{2}$ fathoms near the centre, and 5 fathoms on the south-west side; lies with Minni Minny bearing S. 58° E.; East point, S. 5° E.; Solitary palm on Marianne point, S. $60\frac{3}{4}^{\circ}$ W.

During the N.W. monsoon (from the beginning or middle of December to the beginning or end of April) a vessel should anchor on the west side of the bay under the lee of the land near Marianne point.

Directions for West entrance.—Bring Marianne point (which may be recognised by a solitary palm tree at the extreme point, and a white house with a red roof a little inside or westward of it) to bear S.S.E., and steer in upon this bearing, which will lead about 3 cables eastward of West island, in $5\frac{1}{2}$ fathoms, water, and when clear of the shoal water between that island and Eclipse point, a vessel wishing to anchor in Eclipse bay may haul in S.S.W. for the anchorage.

During the season of S.E. winds a sailing vessel should approach Diego Garcia from the eastward, and so time her arrival off the entrance to the harbour as to have the tidal stream in her favour when she can easily work in, taking care not to approach too near the reef extending from Middle island, the western edge of which is not readily discerned; the western island in the entrance is steep-to and can be safely approached when inside the channel a vessel should not stand too close over to the islands on the eastern side.

Caution.—A good look-out from aloft is necessary, the bottom being uneven and the soundings irregular.

Tides.—It is high water, full and change, at Diego Garcia island at 1h. 30m.; from 14 days' observation, springs were observed to rise 6 feet, and neaps 3 feet.

At springs the ebb stream setting N.N.W. out of the harbour, attains a velocity of 2 knots an hour, rendering it impossible for a sailing vessel to beat up to the anchorage.

Rain.—Seldom a fortnight passes throughout the year without occasional showers, but most rain falls in the months of January, February, and March, during which months the wind is reported to blow strongly from the north-west.

Communication with Mauritius takes place about three times a year by sailing vessels, but it was contemplated to have a regular service by steam vessels about the end of 1883.

Freshwater.—Europeans prefer the rain water for drinking, a good supply being kept for that purpose. By digging four or five feet, slightly brackish water can be obtained all over the island.

Supplies are rather scarce, as cattle and sheep will not thrive on the island; fish is abundant, but there is no great amount of turtle.

The fruit consists of pumpkins, bananas, and papaw.

Coal.—The Orient Steam Navigation Company (whose vessels call at the island bi-monthly) have two coaling hulks moored in the roadstead off Minni Minny, the firm of Lund & Co. also have coaling stations upon the island; and labourers have been imported for the purpose of coaling the vessels. Two coaling vessels belonging to the latter firm, are moored off East point, and are connected with the shore by a staging, ballast is plentiful, and easily worked by iron lighters.

There is also a light wooden pier at East point, alongside which steamers drawing 24 feet may go to coal.

Animals.—There are no animals or land birds indigenous to the island. Rats are numerous, and live up the cocoanut trees, doing great damage to the produce.

Amongst birds, small doves and cardinal birds were introduced some years ago from Mauritius.

Population in 1881.—There are three estates on Diego Garcia island owned by residents in Mauritius, viz., Point Marianne, East point, and Minni Minny.

Point Marianne employs 104 men, 36 women, and 37 children, and exports annually 53,833 gallons of oil.

East point employs 101 men, 35 women, and 27 children, and exports annually 72,833 gallons of oil.

Minni Minny employs 47 men, 19 women, and 25 children, and exports annually 20,853 gallons of oil.

Thus the total population amounts to 431,* and the annual exportation of cocoanut oil to 147,519 gallons.

A magistrate from Mauritius visits the island once in two years; there appears to be little or no crime; no provision is made for the education of the labourers or their children.

Pitt bank lies W.N.W. of Diego Garcia and is steep-to, the shoalest parts were found on the north-western, north-eastern, and eastern edges where soundings of 6 and 7 fathoms were obtained in several places; the least known depth on the bank is 4 fathoms which is found on the eastern edge at 55 miles W. by N. from Diego Garcia north-west extreme.

The general depth over the bank is from 15 to 20 fathoms, sandy bottom, on which good anchorage may be obtained, though under ordinary circumstances, especially at night, it is advisable not to cross the bank.

Ganges bank is a small bank having from 8 to 12 fathoms over it and lying 13 miles south-west of Pitt bank.

Centurions bank forming the south-western of the Chagos archipelago is small and has over it from 6 to 14 fathoms, it lies 17 miles south-westward from Ganges bank; heavy rollers have been observed to break on the north-east edge of this bank.

Between Pitt, Ganges, and Centurions banks are clear navigable channels, the northern 12 miles wide, and the southern 16 miles.

Egmont or Six islands are situated in the channel between Pitt bank and Great Chagos bank, they lie on the south-west side of an oval reef $5\frac{1}{2}$ miles long and 2 miles broad on the northern side of which a channel with from 2 to $2\frac{1}{2}$ fathoms in it leads to the enclosed lagoon which is much obstructed with coral reefs. The northern islands have

* This does not include the people employed in the establishments connected with the mail and other steamers, (1883).

conspicuous trees on them; there are no channels into the lagoon between the islands.*

Egmont islands are inhabited and produce considerable quantities of cocoa-nut oil; pigs and poultry abound and freshwater is easily obtained.

Great Chagos bank.—This extensive bank of soundings is in the shape of an irregular oblong, 95 miles long in an E. by N. and W. by S. direction, and 65 miles broad in a N. by W. and S. by E. direction.

The least water (from 4 to 10 fathoms) is found over a narrow belt round the edges of this bank, where it rises steeply from depths of more than 100 fathoms; within the edges the soundings increase from 15 to 45 fathoms, there are however numerous isolated heads of 6 to 10 fathoms.

Upon the northern part of Great Chagos bank is situated Nelson island, and on the western edge are The Brothers, Eagle islands and Danger island.

On the edges the bottom is composed of coral, but when within, soft clay will be found, affording in some places good anchorage; fish are abundant.

Caution.—Vessels should not cross Great Chagos bank except in cases of necessity, and then only during the daytime.

Danger island.—This low island is covered with stunted trees, is about $1\frac{1}{2}$ miles long and three-quarters of a mile broad, having a reef extending 3 miles southward from it on which the sea sometimes breaks.

Good anchorage in 17 fathoms will be found eastward of the island.

At 7 miles south-west of Danger island there is a break in the edge of the reef, forming a deep channel 2 miles wide.

Danger island lies 15 miles N. by W. from Egmont or Six islands.

Eagle islands.—These two islands lie N.N.E. from Danger island, the southern being 9 miles distant.

The northern island is covered with high cocoanut trees and has a reef extending half a mile from its south-west extremity, over which the sea breaks; the southern islet is smaller and covered with low bushes; between the two islands is a clear channel 8 miles broad where anchorage can be obtained in 7 or 8 fathoms water over sand and coral.

Supplies.—There is a village near the middle of the north-west side of the northern Eagle island opposite which is the only convenient landing place; supplies of wood, good water and poultry can be obtained here.

Three Brothers.—These are three small uninhabited islands covered with high cocoanut trees and situated 11 miles eastward of

* See Admiralty plan of Egmont or Six islands on chart:—Principal groups of Chagos archipelago, No. 4, scale m = one inch.

Eagle islands; it is difficult to land on either except Middle Brother island.

South Brother, three-quarters of a mile long, is the largest of this group, and a reef having over it from 4 to 7 fathoms extends 5 miles from it.

A reef encircles Middle Brother, between which and South Brother is a deep channel nearly one mile wide having a rocky islet in the centre.

North Brother is separated from Middle Brother by a deep channel $1\frac{1}{2}$ miles wide.

Close south-westward of the Brothers group, a break in the edge of the main reef forms a deep channel $2\frac{1}{2}$ miles wide.

Nelson island.—This small rocky island on the northern edge of Great Chagos bank, is $1\frac{1}{4}$ miles long and about 500 yards broad; it forms two rocky hummocks 12 feet high (on which are a few bushes) connected by a low sand bank.

Deep water is found close northward of Nelson island and a deep channel about one mile broad leads close eastward of it to an anchorage in 16 or 17 fathoms on the Chagos bank.

Victory bank.—This coral bank is oval-shaped, about 4 miles long and 2 miles broad, separated from the northern edge of Great Chagos bank (westward of Nelson island) by a channel 7 miles broad.

It rises steeply on all sides and although 3 fathoms was the least depth found upon it there may probably be less over some parts.

PEROS BANHOS.—This group of islets is the largest of the Chagos archipelago and is next in importance to Diego Garcia. It forms nearly a square of 55 miles in circuit and contains 27 islands of small extent, low, and covered with cocoanut trees; these lie nearly all on the north and west sides, two only being on the east side, and four on the south side.*

Between most of the northern islands there are good channels, having in them depths of 8 and 10 fathoms.

The north-western islands are connected by a barrier reef which extends to the southward on the western side as far as the middle of the group, where there is a good channel three-quarters of a mile wide having depths of 10 and 15 fathoms in it.

The south-western islands are all connected by reefs above water, but on the southern side of Peros Banhos are several channels, and on the eastern side two.

* See Admiralty plan of Peros Banhos on chart:—Principal groups of Chagos archipelago, No. 4, scale $m =$ one inch.

Within the encircling reefs and islands are numerous steep coral heads which should be carefully avoided; they do not uncover but are easily seen, the general depth is from 20 to 25 fathoms, soft bottom.

The principal trading establishments are situated on Isle Diamond the north-western of the group and Isle du Coin the south-western islet.

The reef on the south-east side is under water except when it rises to form the small islands of Vache Marine (low and sandy) and Coin du Mire (rocky and covered with bushes).

On the eastern side of the group are two wooded islands known as Petite and Grande Coquillage with depths of 4 and 5 fathoms between them, and a good channel of 14 to 15 fathoms depth close north of the northern island.

Anchorage.—During the period of the S.E. trade wind a heavy swell rolls into the lagoon, and a vessel approaching from the southward should enter by one of the southern channels and anchor under the lee of Isle du Coin which is the south-western of the group, with the houses bearing S.W. distant about one mile.

Two islets lie eastward of Isle du Coin and are connected with it by reefs; the nearer is three-quarters of a mile distant and is covered with high jungle, the easternmost (Isle Foquet) is covered with low trees. Close eastward of Isle Foquet the reef dips below the water.

During the season of N.W. winds (December to May) the anchorage off Diamond island (the north-western of the group) is to be preferred. From this anchorage in 16 or 17 fathoms the houses of the establishment bear N.W. distant half a mile.

If approaching from the north-westward during the season of N.W. winds a vessel may enter either by the channel in the middle of the western side or through Moresby channel the first east of Diamond island.

Moresby channel is three-quarters of a mile wide and has 7 and 8 fathoms water in it, but care should be taken not to approach too near the reef extending eastward from Diamond island.

Tides.—It is high water, full and change, at Peros Banhos at 1h. 30m., rise from 5 to 6 feet.

The ebb stream sets to the westward and flood to the eastward; the ebb stream runs out of all the northern channels.

Benares shoal.—This dangerous coral shoal having depths of $1\frac{1}{2}$ and 2 fathoms over it lies W. $\frac{1}{2}$ S. distant $4\frac{1}{2}$ miles from the west extreme of Diamond island; it is about half a mile long in a N.W. and S.E. direction and seldom breaks; there is deep water between Benares shoal and the western islets of Peros Banhos.

Salomon islands.—This group consists of five large and six smaller islands connected by reefs and lying somewhat in the form of a circle 11 miles in circumference, having only one passage among them which is narrow and dangerous, situated on the north-west side.*

The western island of the group (Boddam isle) lies 14 miles eastward of Peros Banhos.

A shoal having over it a depth of one fathom divides the channel previously mentioned into two passages, the eastern of which has a depth of 3 fathoms and the western 2 fathoms.

Within the entrance the harbour is much obstructed by coral dangers.

There is a quantity of timber on these islands, fit for ship and house building, live stock can be procured at moderate prices, and good water obtained by digging wells.

Blenheim reef.—This extensive coral reef, enclosing a lagoon, is situated 11 miles north-eastward of the Salomon group.

At high water all parts of the reef are generally covered except some large blocks of coral and sand-stone on the eastern side.

At the southern part of the reef there is an opening into the lagoon, off which anchorage in 6 or 7 fathoms can be obtained; all other parts of Blenheim reef are steep-to.

Speakers bank.—This extensive and steep bank, which may be considered to form the northern bank of the Chagos archipelago, is of an irregular oval form about 24 miles long in a N.N.E. and S.S.W. direction and 13 miles broad.

The edges of this bank are the shoalest parts, having in general, depths of 6 and 7 fathoms over them; on the south-western edge there is only 4 fathoms water from which dangerous part the north-eastern islet of Peros Banhos bears S.W. by W. $\frac{1}{2}$ W. distant 20 miles and the northern of the Salomon group bears South distant 13 miles.

This part of the bank should be carefully avoided.

Within the edges, the water deepens to 15 and 22 fathoms, soft sand with some coral heads of 6 and 10 fathoms.

* See Admiralty plan of Salomon islands on chart:—Principal groups of Chagos archipelago, No. 4, scale $m = 1 \cdot 0$ inch.

CHAPTER VI.

SEYCHELLE ISLANDS.

Variation in 1884 - - - - 5° Westerly.

This extensive group of islands and rocks is situated on a bank, which within the depth of 100 fathoms extends 200 miles in an E. by S. and W. by N. direction and is 90 miles broad at the northern part, gradually tapering to the southward.*

Originally discovered by the Portuguese in 1506 and named *Ilhas de Mascarenhas*, they were first colonised by the French in 1742 and named after Mahé de la Bourdonnais, the then governor of Mauritius, subsequently the name was changed to that of *Seychelle*, after Viscount Hérault de Seychelles. They passed into the possession of Great Britain in 1794.

The islands were partly examined by Captain F. Moresby, R.N., in 1821-2, and afterwards in more detail by Captain W. F. W. Owen in 1825, since which, numerous partial examinations have been made; but the southern limit of the extensive bank from which they rise has not yet been accurately traced.

The principal islands are known as Mahé, Praslin, and La Digue, besides which there are many others of lesser extent and importance.

The larger islands are mostly high, well watered, and covered with trees, among which the *Coco de Mer* (growing only upon Praslin and Curieuse islands) is the most remarkable.

These islands are under the superintendence of a Chief Civil Commissioner (assisted by a Board of Commissioners) who is appointed by the Secretary of State, but is subordinate to the Governor of Mauritius, from whom he receives his instructions.

There are 80 islands under the control of the Seychelles administration, including the *Amirantes*, *Cosmoledo* group, *Astove*, and *Aldabra*; the total population in 1880 amounted to 14,035.

The currency is the India rupee; the imports in 1880 were valued at 444,663 Rs. and the exports 412,382 Rs. of which the sum of 304,016 Rs.

* See Admiralty chart :—Seychelle group, No. 721.

was for cocoanut oil; the other principal exports are cocoa, coffee, rum, and vanilla. The tonnage of shipping entered in port Victoria in 1880 amounted to 92,744 tons.

The inhabitants are now turning their attention to the cultivation of spices and vanilla, the soil being well adapted to their production.

Several useful timber trees grow on these islands, among which may be mentioned the Takamaka, excellently adapted to all purposes of ship and boat building; the Capucin, a hard wood almost indestructible either by water or atmosphere; and the Bois de Natte, rivalling the finest mahogany in making furniture.

There is a public hospital at port Victoria, and the quarantine station is upon Long island.

The American whalers have almost entirely deserted these islands, consequent upon the unproductive nature of the whale fishery during the past few years.

Before communicating with the islands, it is necessary to obtain pratique at Mahé.

Wind and weather.—The south-east trade wind blows from May until the middle of October, which forms the fine season, the wet season or that of the north-west monsoon is from the middle of November or beginning of December until the month of April; during these months the wind blows from N.W. to W.S.W., and in December and January much rain falls, hurricanes are of very rare occurrence.

Currents.—The direction of the currents among the Seychelle islands varies with the winds; in February and March it runs to the eastward at the rate of 2 miles an hour and frequently more, during the south-east trade it sets to the westward with a velocity at times of 30 miles a day.*

Seychelle bank.—The depths over the extensive bank upon which the Seychelle islands stand, are irregular, varying from 14 to 45 fathoms, with occasional spots of much shoaler water, especially at the eastern and western parts; the northern edge is marked by Bird and Dennis islands. The positions of these various shoaler portions of the bank are best ascertained by reference to the Admiralty chart and only some of the more dangerous will be mentioned in this work.

The soundings on the northern part of Seychelle bank afford a valuable guide to vessels pursuing the southern track between India and the Red

* Lieutenant Taylor, H.M.S. *Cossack*, 1869, remarked that vessels bound to the southward from the Seychelles should not attempt to pass to windward of the islands and reefs lying between Seychelles and the north end of Madagascar, the winds being variable, the weather frequently thick and hazy, the currents strong and uncertain, apparently for a great part of the year. The *Cossack* experienced the strong westerly current very unequally, and twice in proceeding from Seychelles to Madagascar had to use steam to ensure the safety of the vessel.

sea, enabling them to make the high island of Praslin or La Digue, and thus to use either Bird or Dennis island as a point of departure.*

Andromache shoal.—In 1835, H.M.S. *Andromache*, when proceeding from Mohilla to Mauritius, anchored on a shoal to which a position has been assigned 23 miles W.S.W. from Bird island. This shoal was examined in a boat, and the least depth found was 5 fathoms.

Swan shoal.—The position of this danger, over which there is a depth of 3 fathoms, was determined by the whaler *Swan* and communicated to Captain Owen in 1825. It is considered to lie 41 miles W.S.W. from Bird island.

Dupont shoal, of $3\frac{1}{2}$ fathoms, lies 18 miles S.W. by W. $\frac{3}{4}$ W. from Swan shoal.

Seagull shoal.—In 1882, H.M.S. *Seagull* obtained a depth of $5\frac{1}{2}$ fathoms upon the extreme western part of the bank, in lat. $4^{\circ} 41' 45''$ S., long. $54^{\circ} 10' 50''$ E.

Topaze bank.—This extensive coral bank having over it depths of 7 to 11 fathoms, was examined in H.M.S. *Topaze* in 1820, the eastern part lies close within the 100-fathoms line and the western edge is about 5 miles eastward of Frigate island.

Le Constant bank.—The existence of this bank was reported in 1844, and is said to extend from 12 to 15 miles north and south, and from 18 to 20 miles east and west. The least depth found was 11 fathoms coral, reported to lie in lat. $6^{\circ} 19\frac{1}{2}'$ S., long. $56^{\circ} 17'$ E., approximate.†

MAHÉ ISLAND.—This island, the most important of the Seychelles, is the south-western of the principal group; it is 16 miles long in a N.N.W. and S.S.E. direction, and from 2 to 5 miles broad, being thickly wooded and traversed throughout by a range of hills which at the northern part attain an elevation of 2,975 feet, and is intersected by numerous deep ravines. The eastern side of the island is fringed with coral reefs, and the principal port of the Seychelles (port Victoria) is situated on the north-eastern side.

BARACHOIS or PORT VICTORIA.—This secure anchorage lies westward of a group of small islands, the largest of which is St. Anne island, (high and wooded, with a conical hill rising from the centre,) with Cerf and Long islands. The principal entrance lies between St. Anne and Mahé. The channel between St. Anne and Moyenne islands, (St. Anne channel,) is not considered safe to navigate without the assistance of a local pilot. H.M.S. *Brisk* passed through this channel into port

* Renseignements Nautiques sur quelques îles éparses de l'Océan Indien Sud, 1879.

† Nautical Magazine, 1846, page 45.

Victoria in 1861 carrying not less than $4\frac{1}{2}$ fathoms water, the reefs on both sides being plainly visible.*

LIGHT.—A lighthouse, built of coral, 42 feet high, painted white, is situated 70 yards inside the edge of the coral reef at the south side of the entrance to the harbour channel. Care must be taken not to mistake the lighthouse for a conspicuous white tower situated on the mainland shore northward of the town.

A fixed *red* light, visible 9 miles, is exhibited from the lighthouse between the bearings of South through West to N.W. $\frac{1}{2}$ N., except where obscured by the adjacent islands. A red sector of light is also shown over the anchorage in port Victoria, between the bearings E.N.E. and N.E. $\frac{1}{2}$ N.

Night anchorage.—By means of a bearing of this light, an anchorage can be obtained at night to the north-west of St. Anne island, whose bold peak presents a good object; but a stranger is not advised to attempt to pass the buoys; they are too small to be seen at night.

To enter Port Victoria.—On rounding the northern end of St. Anne's island, a red and white chequered buoy with staff and ball will be observed bearing W. by S., distant $1\frac{1}{4}$ miles from the north point of the island.

Leave this buoy at a distance of about 100 yards on the starboard hand, and a black buoy with staff and half-ball, which lies $2\frac{3}{4}$ cables to the south-east of the chequered buoy, on the port hand.

Steer S.W. by S. until Beacon island is in line with the south point of St. Anne island, then keep these objects in line astern, which will lead between two buoys placed on 3-fathoms patches on either side of the entrance to the inner harbour channel, and will lead a vessel in until the lighthouse bears S.W. Thence the lighthouse—which, as before remarked, is 70 yards inside the edge of the reef—the posts on the reef, and the eye, must be the guides to the inner anchorage.

A mooring buoy belonging to the Messageries Maritimes Company is placed in 12 fathoms water 4 cables N.E. by E. of the lighthouse. Vessels anchoring in the vicinity of this buoy should give it a berth of half a cable; the anchors lie east and west.

The Inner harbour, a basin in the coral reef, is of irregular shape. The channel into it is 200 yards wide, and has well defined and steep edges.

With the two following exceptions the harbour is clear of detached rocks: one of 12 feet N.E. $\frac{1}{2}$ E., $1\frac{1}{4}$ cables from the Long or Victoria pier end, and another of 14 feet S.E. $\frac{1}{2}$ S., three-quarters of a cable from the

* See Admiralty plan:—Approaches to port Victoria, No. 722, scale $m = 1.75$ inches.

pier. These are both small and do not generally show, but they are clear of the most convenient berths.

Vessels entering the harbour should leave all the chequered red and white buoys and beacons upon the starboard hand, and all the black buoys and beacons upon the port hand.

Caution.—The posts erected on the points of the coral reef bordering the harbour channel are not unfrequently washed away and are not always promptly replaced. The buoys in the outer anchorage are very small, and are not kept painted.

Pilot.—A government pilot is sent out to vessels, upon the signal being made that he is required.

Position.—The observation spot on Hodoul jetty is situated in lat. $4^{\circ} 37' 15''$ S., long. $55^{\circ} 27' 36''$ E.

Pier.—Victoria pier, 1,050 yards long, is built over the shore reef to the inner harbour, and is terminated by a T head, at present used as a coal dépôt. A vessel can lie alongside, but would require careful mooring to keep her off the reef, which projects under water. There are no bollards for securing.

Supplies.—Coal may always be obtained, and a contract exists for the supply of H.M. ships. Provisions are not plentiful; beef is scarce and poor in quality, mutton unattainable; pork and poultry are cheap; fish is both cheap and good, and one species only is poisonous, that resembling the sardine. Green turtle of fine quality are kept in ponds until required for the market. Vegetables are to be obtained in moderate quantities, consisting chiefly of sweet potatoes and pumpkins. Oranges, bananas and pine apple are plentiful.

Water.—Water of an excellent quality (price two shillings per ton) is conveyed by a pipe to the landing place, two-thirds of the way along Victoria pier. Boats can fill up on either side of the pier at high water, but the northern side dries at low water springs.

Mails.—The mail steam vessels of the Messageries Maritimes Company call at port Victoria on their way to and from Aden and Mauritius once a month, except during the south-west monsoon (or from May to October) when they call only on their return voyage to Aden.

Tides.—It is high water, full and change, at port Victoria at 4h. 15m.; springs rise $5\frac{1}{2}$ feet; neaps 3 feet.

Outer Anchorage.—The outer anchorage is with the lighthouse on the reef, at the entrance to port Victoria bearing between W. by S. and S.W. by W. $\frac{1}{2}$ W., and the west extreme of Cerf island S.S.E., the holding ground is good, although there are several rocky patches scattered about.

The swell is sometimes felt in this anchorage; the south-easterly wind seldom blows hard, but in the north-west monsoon, heavy gusts come off the high land.

Coast.—Off the south point of Mahé there is a small rock above water, upon which the sea generally breaks heavily; the western coast of the island is broken up into several bays, where there is good anchorage during the south-east trade winds, but heavy squalls come over the high land, while it is moderate and steady upon the eastern side; cape Ternuy is a conical hill, planted to the summit with cocoanuts, and southward of the cape are the islands Thérèse and Conception. The landing in North-west bay is bad, with the exception of that at Belle Ombre in the south-west part, where a pathway leads to port Victoria. The north-west point of Mahé has become an island, and has a conspicuous tree upon it; the passage between the island and the north point of Mahé is used by native craft, but should not be attempted by strangers.

Port Glau, upon the western side of Mahé, is not adapted to large vessels. H.M. Gun-vessel *Teazer* moored in this port in August 1870, and found perfect security.

Shoal.—A shoal having 9 feet over it is said to lie about 3 miles south-west of Conception island.

Silhouette.—This island, 2,473 feet high, lies W.N.W. distant 12 miles from the north-west point of Mahé; it is precipitous and well wooded, the inhabitants cultivating fruit and vegetables for the market at Mahé. There is temporary anchorage in the southern part of a small bay upon the north-east side of the island in from 15 to 17 fathoms, half a mile off shore, the water shoals quickly to the fringing reef, which extends about 2 cables from the beach. Landing is difficult, and at times impracticable, the best place is opposite the planter's house in the south-west part of the bay.

Requins bank, the depth upon which is not stated, is reported to lie nearly mid-channel between Silhouette and Mahé.

North island, of moderate elevation lies $3\frac{1}{2}$ miles northward of Silhouette island; when seen from the northward it has a bare appearance, having some straggling trees upon the summit, being a marked contrast to Silhouette island. The establishment is upon the north-east side of the island, where there is anchorage in 15 fathoms, but rather close to the shore. Landing is difficult in a ship's boat, but native canoes are available.

PRASLIN ISLAND, the next in size and importance to Mahé of the Seychelle group, lies 20 miles north-eastward of that island; it is about 3,000 feet high and wooded, affording good anchorage in Curieuse bay on the northern side at all seasons. The south-west side of Praslin island is foul for some distance from the shore, and several small islets and

rocks lie westward and northward of it. It is not safe to anchor south of Praslin between the months May to November. In December 1870, H.M.S. *Teazer* found good anchorage in the first small bay southward of the Grande Anse. La Blague bay is deep and may be approached with safety.

Curieuse island, is a small island northward of Praslin, having a channel between them, from one half to a mile wide; upon this island is the establishment for "lepers," sent from Mauritius and its dependencies.

Curieuse bay.—Good anchorage can be obtained at all seasons with Booby island bearing N.W. $\frac{1}{4}$ W. and the south extreme of Curieuse island N.E. $\frac{1}{2}$ E. A shoal extends $1\frac{1}{2}$ cables from the south-west side of Curieuse island, at the outer extremity of which is a rock with 2 feet over it at low water having 3 fathoms around. Isle St. Pierre its own breadth northward of the north extreme of La Digue island (just showing clear of Praslin island) leads south of the rock.*

A shoal of 4 fathoms lies E. by N., distant half a mile from the south point of Curieuse island, and rocks extend N.W. from St. Pierre island.

A rock nearly awash at low water is said to lie midway between St. Pierre and Bat islands.

There is a good boat passage through the reef westward of Bat island, and good landing. Boats can take in water towards high tide only, at the south-west part of the bay.

Aride island is a barren rock about 500 feet high, and lies N. by W. about 5 miles from Praslin, and a small island named Booby island lies $2\frac{1}{4}$ miles from Praslin upon the same bearing.

Adriens shoal, this shoal is stated to lie with Aride and Booby island in line, bearing N. $\frac{3}{4}$ W. midway between Booby island and the north-west point of Praslin island, and to have a depth of $3\frac{1}{2}$ fathoms over it, its position however, has not been accurately determined.

Cousins islands, are two small low islets, the southern of which lies 3 miles from the south-west side of Praslin; there is a safe channel between the islets, also between the northern Cousin and Praslin island. Between the South Cousin and Trompeuse rocks, the channel is foul and unsafe for navigation; half a mile W.N.W. of the North Cousin is a coral patch having from $2\frac{1}{2}$ to 4 fathoms over it.

Whale rock, this dangerous rock, which covers about half tide, lies N. by W. distant $2\frac{1}{2}$ miles from the North Cousin.

* See Admiralty plan:—Curieuse bay, No. 723, scale $m = 1.0$ inch.

The *Brisk* in 1861, anchored in 11 fathoms in Curieuse bay with the north extreme of Praslin island bearing N.W. $\frac{3}{4}$ W., and east extreme of Curieuse island N.E. by N.

La Digue Island, lies E.S.E. nearly three miles from Praslin, it is surrounded by a reef and landing is difficult; there is good anchorage in 10 fathoms upon the north-west side of the island close to the establishment.

Ave Maria, is a small islet lying E. by N. $\frac{3}{4}$ N., distant nearly $1\frac{1}{2}$ miles from the east point of Praslin; a bank extends one cable from the south-west side.

The Wash.—This dangerous bed of rocks lies midchannel between the east point of Praslin and the north extreme of La Digue island; they are difficult of detection except at low water springs, great caution is necessary when in their vicinity, and when intending to anchor off the establishment on La Digue island.

Félicité island, is one of a group of islands and rocks lying north-eastward of La Digue island, having a clear passage upon the north-east side of that island. The largest or Félicité island is government property, and contains a quantity of the valuable timber, Takamaka. The establishment is upon the north-west point, and there is anchorage in a small bay between the island and the rock northward of it, in 9 fathoms, at a quarter of a mile off shore. The other islands are known as Mary Anne Island, and the Sisters; a bed of rocks extends southward from the Sisters, but they are mostly above water.

A shoal of $1\frac{1}{2}$ fathoms lies one mile N.W. of the western Sister island.

Mellow rock.—This rock uncovers at low water and is reported to be situated 5 miles north of the Sisters islands.

Frigate Island, is the easternmost of the Seychelle group and has an elevation of 550 feet; it is extensively cultivated for sugar, the establishment being upon the eastern end of the island, where rum is distilled for export to Mauritius.

There is good anchorage upon the N.E. side of the island, also upon the S.E. side; which is used during the north-west monsoon. H.M.S. *Teazer* found good holding ground in 8 fathoms and from that to 11 fathoms northward of the rock at the east extreme of the island, from a quarter to three quarters of a mile from the rock. Wild pigs and pigeons were abundant.

Care and a knowledge of the passage through the reef, is necessary for landing, the reef appearing as one unbroken line.

A reef of rocks over which the sea breaks, is stated to extend from the south-west part of the island; Noddy rock lies half a mile north, and Letot island 2 miles W.S.W. of Frigate island.

Recif island, is on a line from Frigate island to port Victoria; it is about 150 feet high and has a remarkable white rock like a building upon its summit, and is the resort of innumerable sea birds.

Chimney rocks, lie S. by E. $\frac{1}{4}$ E. distant $5\frac{1}{2}$ miles, from La Digue island.*

Renommée rocks, which cover at half flood, lie W. by N. $\frac{3}{4}$ N., distant 2 miles from Chimney rock.

Shark and Alligator, are two rocks above water, formerly known as the Requins; they are between 2 to 3 cables apart and lie about $2\frac{1}{2}$ miles southward of the south point of Praslin island.

The Brisans, are two low rocks above water, lying N. $\frac{3}{4}$ W. nearly 4 miles from St. Anne island; a coral patch having 6 fathoms over it lies three-quarters of a mile N. by W. of these rocks; there is good fishing in their vicinity.

Mamelle islet, 40 feet high, has two paps upon it, and lies N. by E. $\frac{3}{4}$ E., distant 7 miles from St. Anne. A rock with 6 feet on it, upon which breakers are seen; except in calm weather; is stated to lie W.N.W., distant about 2 cables from Mamelle islet, also a sunken rock is reported to lie about one cable north of it; the exact position of these dangers has not been determined.

Madge rocks, which cover at high water, lie N.N.E. $\frac{1}{4}$ E. distant $4\frac{3}{4}$ miles from Mamelle islet. There are two rocks, between 2 and 3 cables apart N.E. and S.W. of each other; the peak of St. Anne island seen well open to the westward of Mamelle islet, leads to the westward of these dangers.

Trompeuse rocks, situated midway between Madge rocks and South Cousin island, are stated to be awash, and are often mistaken for the Madge rocks; vessels are not recommended to navigate between Trompeuse and the South Cousin island, the channel being intersected with dangers.

DENNIS ISLAND, the north-eastern of the Seychelle group, is 20 feet high and covered with trees; lying near the edge of the bank of soundings, it forms a good point to make when passing these islands; shallow water extends about a mile from the south and east sides, and about 2 miles to the northward.

Light.—A fixed white light, elevated about 60 feet above the sea, and which should be visible in clear weather from a distance of 12 miles, is exhibited from a lighthouse on Dennis island.

The lighthouse is built of wood, painted white, and stands on a tripod.

* It is stated in Horsburgh's Directory, Vol. I., 1864, page 204, that "About $1\frac{1}{2}$ miles east of the rocks called the Chimneys" "there are several rocks at the water's edge on which the French Frigate *Regenère* was nearly lost, and to the N.E. of the Chimneys, about $1\frac{1}{2}$ miles distant, lie several rocks under water." Vessels should avoid this locality.

Bird Island is situated upon the north edge of the bank; it is about one mile in diameter, and fringed with a coral reef, drying at low water upon all sides except the west, where there is a steep sandy beach, upon the centre of which stands a conspicuous tree, double the height of any other part of the island. The tree is visible 9 miles distant and appears like a steamer's funnel smoking when first sighted, and was ascertained to be in lat. $3^{\circ} 43' 6''$ S., long. $55^{\circ} 12' 32''$ E.*

A narrow fringe of bushes surrounds the littoral; the centre part being covered with coarse grass. Fishermen occupy the island occasionally, but it is not permanently inhabited. H.M. Surveying vessel *Alert* anchored in $6\frac{3}{4}$ fathoms, sand and coral, with the conspicuous tree bearing N.E. by E. distant $1\frac{3}{4}$ miles, and upon a bank extending a long distance westward from the island, upon which many shallow patches were observed, so that it would be unadvisable to cross it at night.

Landing can be effected upon the west beach, also through a cut in the reef upon the south side of the island. Water can be obtained by digging about 5 feet in the sand, but it is of indifferent quality.

Zoroaster shoal, a coral bank of 7 fathoms least water, was passed over by the brig of that name, in lat. $5^{\circ} 0'$ S., long. $56^{\circ} 40'$ E. Apparently there was less water on some spots.†

Gilbert Shoal.—This shoal is reported to have been passed over by the brig of that name in 1873; depths of 6 to 10 fathoms were obtained about 2 miles in north and south direction, over what appeared to be a circular shaped bank, position given lat. $5^{\circ} 8'$ S., long. $55^{\circ} 43'$ E.

PLATTE ISLAND.—This low wooded island is situated 64 miles S. by W. from Mahé south extreme, and is separated by deep water from the south-west side of the Seychelle bank. The island was visible from the masthead of H.M. surveying vessel *Shearwater* from a distance of 12 miles.

Extensive reefs surround the island, extending upon the northern and western sides for a distance of 3 miles and upon which the surf breaks heavily. There are two passages through the reefs upon the north-west side, they are intricate and suitable for small vessels only, the water is quite smooth within the basin formed by the outer reefs and landing is safe and easy.

* See Admiralty chart :—Islands and reefs between Seychelle islands and Madagascar, No. 724.

† Sailing Directory for the Indian Ocean, A. G. Findlay, 1882.

EA 8758.

When visited by H.M.S. *Teazer* in 1870, there were no people upon it but many wild dogs, and great numbers of sea birds; the *Teazer* anchored about 2 miles westward of the island in 5 fathoms.*

La Perle reef.—A dangerous shoal known as La Perle reef, said to have 12 feet least water, lying to the south-west of and distant 10 miles from Platte island, was examined in 1875. The danger appeared to consist of a reef about 3 miles in length, N.W. by N. and S.E. by S., but of little width: no dry sand or rocks were visible. A small isolated patch has been reported a mile or two farther westward, but was not seen by the *Shearwater*. The vessel anchored in $7\frac{1}{2}$ fathoms, $1\frac{1}{2}$ miles from a long line of breakers, but the swell was too heavy to allow a boat to venture nearer the breakers than at a distance of several hundred yards, where there was 4 fathoms. The breakers were not continuous, and were observed especially in three spots about a mile apart.

La Perle reef appears to be on the southern extreme of a bank of soundings connected with Platte island; on this bank 14 fathoms was obtained. Commander Wharton places the centre of La Perle reef in lat. $6^{\circ} 1' S.$, long. $55^{\circ} 17\frac{1}{2}' E.$

COETIVY ISLAND, examined by Commander Wharton in 1875, is about $5\frac{3}{4}$ miles long, $1\frac{1}{2}$ miles wide, 40 feet high, and covered with coconut trees; it has several sand hills, but none are higher than the trees. The island is fringed by a reef which, at the south end, extends 3 miles from the shore. The reef is dry at low water, and breaks heavily; there is deep water close to its east and north sides; but on the west and south-west sides a bank of soundings, with 5 to 20 fathoms, sand and coral, extends 2 to 6 miles from the shore of the island; this bank may plainly be seen.

There is anchorage anywhere on the western side of Coetivy, but the most convenient for communication is off the settlement near the centre of the island. Anchor in 10 fathoms with the huts bearing East, 7 cables distant, and north-west extreme of the island N.E. by N. The shore reef is broken at this part, and a boat can land on the sandy beach, but care must be taken to avoid the shoal patches which lie at a quarter of a mile from the shore.

The population, consisting of 60, are all employed by the proprietor, who exports oil to Mauritius.

Position.—The north end of Coetivy is in lat. $7^{\circ} 6' S.$, long. $56^{\circ} 17' E.$; Hodoul jetty, Mahé, Seychelles, being in $55^{\circ} 27' 36'' E.$

* H.M.S. *Ariadne* in 1825 anchored in 9 fathoms, with the north-east extreme bearing east, distant 2 miles; between this anchorage and the island numerous coral heads were found having over them not more than 9 feet.

Bank.—A coral bank, having over it a depth of 11 fathoms, is reported to lie about 10 miles W.N.W. from the settlement on Coetivy island. This bank is said to extend about ten miles in a north-east and south-west direction.

Fortune bank.—This extensive bank lying E. by S., about 30 miles from Coetivy, has depths of 9 to 14 fathoms upon it, and has not been examined in detail; it is possible therefore, that less water may be discovered upon it. H.M.S. *Nisus* in 1813 passed over the position of this bank and carried soundings of from 12 to 14 fathoms about 3 miles in north and south direction.

CHAPTER VII.
 AMIRANTE ISLANDS,
 INCLUDING ALPHONSE, BIJOUTIER, AND ST. FRANCIS
 ISLANDS.

Variation in 1884 - - - - 6° Westerly.

The Amirante islands are situated upon an extensive bank between the parallels of $4^{\circ} 50\frac{1}{2}'$ and $6^{\circ} 16'$ South latitude, and between $52^{\circ} 50'$ and $53^{\circ} 24'$ East longitude; the Isle Des Roches, although forming one of the group, is situated upon a separate bank.*

The southern island was discovered in 1770, by Durosland, commanding the brig *P'Heure du Berger*, and the northern islands in 1771 by M. de la Bolière, on board the brig *P'Etoile du Matin*. The group was partially examined and charted in 1821-2, by Captain Moresby and Lieutenant Hay of H.M.S. *Menai*, and the position of the islands and the limits of the banks were accurately determined by Captain Maclear in H.M. surveying vessel *Alert*, in 1882.

The bank is of sand and coral, 89 miles long N.N.E. and S.S.W., and from 6 to 23 miles wide; it partakes of the submerged atoll character, the shoal water being upon the edges, leaving a basin of deeper water within.

There are twenty-one islets and cays above high water, four of which, viz., Poivre, Des Roches, D'Arros, and St. Joseph, are permanently inhabited, the remainder are occasionally occupied or visited by fishermen employed collecting turtle and curing fish.

The navigation of the whole bank is dangerous and should be avoided, unless special business calls a vessel upon it; the land is low, no one of the islands being more than 15 feet above high water exclusive of the trees; the coral patches are so steep as to render the lead of little service when approaching these dangers.

Tide.—The tidal streams were found to be tolerably regular, high water at full and change all over the bank at 5 hours, springs rise about

* See Admiralty charts:—Seychelle group, No. 721: Islands and reefs between Seychelle islands and Madagascar, No. 724.

8 feet. The streams near the islets and shoals, take the direction of their edges, but as a general rule, the flood stream sets to the north-westward, and the ebb to the south-eastward, the streams turning at high and low water, and the greatest rate observed was $2\frac{1}{2}$ knots per hour.

Wind and weather.—During the *Alert's* visit to the Amirante islands and the examination of the bank (March–April, 1882) fine weather was experienced, light variable winds and calms, with occasionally squalls of rain, the latter as a rule at night.

AFRICAN ISLANDS, consist of two sandy islets covered with low bushes ten feet above high water, standing upon a coral reef $2\frac{1}{2}$ miles long north and south and one mile wide upon the extreme north-east part of the Amirante bank; the south islet is the largest and at low spring tides they are joined by a ridge of sand.

One mile to the East and North of the islands there is no bottom with one hundred fathoms; but to the west, a level bank extends 4 miles, with depths of 10 to 17 fathoms, when it suddenly deepens to 160 fathoms.

The observation spot upon the north extreme of North islet was ascertained to be in lat. $4^{\circ} 52' 26''$ S., long $53^{\circ} 23' 46''$ E.

These islets are very dangerous to make upon a bearing west of South; in daylight they were seen 6 miles, but at night, a vessel would be upon the eastern reef without seeing them. From the observation spot, upon a clear night, but without moon, the breakers could not be seen 3 cables distant, neither could the island be seen from the ship 8 cables distant under the same circumstances.

Anchorage.—The *Alert* anchored 8 cables west of North islet in $7\frac{3}{4}$ fathoms, indifferent holding ground; in that position the vessel was sheltered from the long south-easterly swell, and landing was easily effected except at low water.

Tide.—It is high water full and change at African islands, at 5 hours, springs rise 8 feet, at the anchorage regular tidal streams were experienced, flood to the southward, ebb to the northward, half a knot per hour.

EAGLE ISLAND.—This island is nearly circular, three-quarters of a mile in diameter, 18 feet above high water, covered with bushes and coarse grass, also a few young cocoanuts and pandanus trees. The coast is fringed by a reef, extending 3 cables upon the south side, and about half a cable upon the north side, where there is a steep sandy beach at high water, and easy landing at that time.

Pumpkins were growing in profusion, around some ruined cottages near the centre of the island, many domestic fowls now run wild were seen, also numbers of the African partridge. Cotton was growing all over the island.

The observation spot upon the north-east point of the island is in lat. $5^{\circ} 6' 23''$ S., long. $53^{\circ} 18' 54''$ E.

Anchorage.—The best anchorage is upon the north-west side of the island, half a mile off shore; the holding ground is not good, but the Zemire reef breaks a good deal of the swell.

Tide.—It is high water full and change at 5 hours, springs rise 8 feet, at the anchorage the flood stream sets to the southward, ebb to the northward one knot per hour.

Between the African islets and Eagle island, the general width of the bank is 7 miles, with an average depth of 17 fathoms, upon the western side is a shoal of $5\frac{1}{2}$ to 7 fathoms; a good look-out from aloft is absolutely necessary, the bottom is plainly visible in 12 fathoms.

Zemire reef.—This reef lies E.N.E. distant $1\frac{1}{2}$ miles from Eagle island; there is a passage between them, which should not be used unless in case of necessity. The reef is 4 miles long N.E. and S.W., and $1\frac{1}{2}$ miles wide, it dries in patches at low water and is steep-to upon its western edge, upon which a heavy surf rolls.

Note.—It is not advisable to navigate between Eagle island and St. Joseph except in daylight and fair weather, the ground being foul in patches over the whole area.

Shoals.—At 2 miles South of Eagle island is a shoal with $2\frac{1}{2}$ fathoms upon it, and 3 miles W. by S. from that island there is a shoal which looks shallow, but the boats could not find less than 6 fathoms over it.

At 8 miles S.S.W. $\frac{1}{2}$ W. from Eagle island, a depth of 4 fathoms was found upon an apparently extensive bank.

D'ARROS ISLAND.—This island is 86 feet high to the tops of the trees which show as a large square clump long before the remainder of the island is seen. It stands upon a separate reef from the St. Joseph group, from which it is divided by a deep channel one-third of a mile wide.

The island is one mile long east and west, by half a mile wide, and is surrounded by a reef extending a quarter of a mile from the shore except upon the north side, where there is 26 fathoms, at a cable from the beach.

A Frenchman with his family and nine negroes resided, and were planting cocoa-nuts and vanilla; the island produces pumpkins and a little fruit; wild poultry and partridges can be obtained. The landing place is opposite the boat-house in the middle of the north beach, a small cut in the reef admitting a whale-boat at low water.

The observation spot of the *Alert* was upon the north-east point, and is in lat. $5^{\circ} 24' 23''$ S., long. $53^{\circ} 18' 26''$ E.

Water.—There is good water in wells near the beach at the settlement.

Anchorage.—The anchorage is not good; the *Alert* anchored in 20 fathoms, coral, 4 cables N.W. from the boat-house on the middle of the north beach, but there is less water further off. Between the ship and the shore there was 30 fathoms water. A spit of 2 to 3 fathoms extends N.E. half a mile from the island; care must be taken in bringing up, that the easterly stream does not drift the vessel on it, but it generally shows by rippings.

Tide.—It is high water full and change, at D'Arros island, at the anchorage at 5 hours, the flood stream sets to the westward, ebb to the eastward, 2 knots per hour at full strength.

Shoals.—At $2\frac{1}{2}$ miles N. by E. $\frac{1}{2}$ E. from D'Arros island there is a shoal of $2\frac{1}{2}$ fathoms, apparently extending 4 miles N. by E. $\frac{1}{2}$ E., where there is a depth of 5 fathoms.

At 5 miles W. by S. from D'Arros island, a depth of 4 fathoms was found on a bank of some extent.

Between D'Arros and Eagle islands, the bank varies from $4\frac{1}{2}$ to 13 miles in width east and west; it is full of shoal patches and must be navigated with great caution. A vessel should always anchor at night in that locality, the weather and sea permitting; if not, an offing from the bank should be made.

ST. JOSEPH ISLAND.—This island lying S.E. by E. $\frac{1}{2}$ E., distant $3\frac{1}{2}$ miles from D'Arros island is a mile long and a quarter of a mile wide, and crescent-shaped, with its concave side to the westward.

It is the largest of a group of eight islets, and stands upon the eastern edge of a coral reef $3\frac{1}{2}$ miles long N.W. and S.E. by two miles wide, and is 80 feet above high water to the tops of the trees. On the N.W. extreme are the dwellings of the people attending the cocoanut plantations, and who are now introducing the vanilla plant. Fowls, turkeys, ducks, geese and pigs were in abundance.

There is a lagoon $1\frac{1}{2}$ miles long, and half a mile wide within the reef, and a boat passage into it at a quarter flood tide, just south of the small sand bank lying half a mile S.S.W. of Isle Ressource or the north islet of the group; small vessels of 5 feet draught could enter at high tide.

Isles Ressource and Fouquet, are upon the north-west part of the reef between St. Joseph and D'Arros islands, they are planted with cocoanuts and are 40 feet above high water to the tops of the trees.

Benjamin, Carcassaye, Pelican and Chien Islets, lie upon the south edge of the reef, and are mere sand cays covered with bushes, from 10 to 20 feet above high water.

Isle Poule, is a sand-bank which covers at high water, but has two bushes on it about 10 feet high.

Channel.—The channel between D'Arros and St. Joseph group is clear and deep, having 30 fathoms in it. The reef extends west, half a mile from Isle Ressource, and a spit extends N.E., half a mile from D'Arros island, the tide runs through it with considerable strength, and it is not recommended for general navigation; the edges of the reef are difficult to make out, unless the sun is in a favourable position.

There is no good anchorage around St. Joseph group.

POIVRE ISLANDS.—These islands are the most important, although not the largest of the Amirante islands; they are three in number, upon a coral reef 3 miles long north and south and 2 miles wide, which dries all over at low tides. The islands are covered with trees, chiefly cocoanuts; they also have groves of casuarinas, which attain a height of 75 feet above high water, the southern island is the largest, and the western very small.

North island.—The establishment and head quarters of the farming operations in all the Amirante islands is upon the north-east extreme of North island, and is situated in a picturesque grove of casuarinas. About 70 work-people are employed pressing cocoa-nut oil and cultivating vanilla; the islands also produce pumpkins, maize, tomatoes and a few fruits, and abound with wild rabbits and pigeons. The high clump upon the north-east extreme of North island, was ascertained to be in lat. $5^{\circ} 45' 14''$ S., long. $53^{\circ} 19' 25''$ E.

Anchorage.—The *Alert* anchored in 20 fathoms, sand and coral, with the establishment bearing S.E., distant $2\frac{2}{5}$ miles. The manager of the estate pointed out, that there was better holding ground in 7 fathoms; with a white pillar on the north beach bearing S. by E., distant $1\frac{1}{2}$ miles, also that in strong north-westerly winds, vessels anchor to the eastward of the reef, having a clear view between the north and south island. The *Alert* had no opportunity of corroborating this statement.

Landing.—The landing is through a circuitous passage in the reef, not to be discovered by a stranger, and the rollers are heavy and dangerous. By lying off and making a signal the people will put out and show the way in. A similar pass is stated to exist upon the south-west side of the island, but no assistance in entering would be found there.

Water.—There are some wells of good water at the establishment, but sufficient only to supply a small craft.

Communication.—A barque under contract with the Seychelles government visits Poivre three times annually, trading to Seychelles and Mauritius.

Tide.—It is high water full and change, at Poivre islands, at 5 hours, springs rise about 6 feet.

Bertaut reef.—This reef lying N.W. $\frac{3}{4}$ N., distant $6\frac{1}{2}$ miles from Poivre islands, is about 3 miles in diameter; upon its southern part is a small sand cay, and the south edge breaks heavily.

ISLE DES ROCHES.—This island lies E. $\frac{1}{2}$ N. distant $20\frac{1}{2}$ miles from Poivre island, upon the south edge of a coral bank of the atoll character, quite separate from the Amirante bank.

Des Roches island is $3\frac{1}{2}$ miles long E. by N. and W. by S., and half a mile wide, fringed with coral reef drying at low water which extends a full mile from the eastern extreme, and half a mile from the west and south sides. It makes from seaward, when upon Northerly or opposite bearing, as three islands, a high clump of casuarinas 118 feet above high water occupying the centre, and a similar clump at the east and west extremity of the island, the remainder being covered with bushes and cocoanuts. A few people engaged in planting vanilla and rearing poultry, occupy the establishment on the centre of the north beach, which was ascertained to be in lat. $5^{\circ} 40' 56''$ S., long. $53^{\circ} 41' 11''$ E.

The bank is nearly circular, 10 miles in diameter, with shallow water around, with the exception of one small opening N.W. distant 8 miles from the centre of the island; which is the only place fit for a moderate sized ship to approach from. Knolls of coral under water upon which there is usually much swell, make crossing the bank except through the pass exceedingly hazardous.

Shark rocks.—This extensive bed of rocks occupying the northern portion of the bank lie N. $\frac{1}{2}$ E. distant about 7 miles from the island, two patches of 9 feet were found upon it.*

Directions.—When bound for Des Roches island, a sharp look-out from aloft is the best guide, the shoal water shows quite plainly. Bring the centre clump to bear S.E., and steer for it on that bearing, observing that the tidal stream sets strongly over the reef and across the pass, 9 fathoms will be obtained on the ridge, the water then deepens to 17 and 14 fathoms up to the anchorage.

Anchorage.—The lagoon in the centre of the bank is 6 miles in diameter having from 14 to 17 fathoms water. The *Alert* anchored in 12 fathoms, N.W. distant 7 cables from the observation spot. There is no anchorage upon the south side of the island.

Landing, can be effected without trouble at the boat-house of the establishment, except in strong north-west winds; at that time the people of the island use a gap through the reef upon the south side.

* Captain Bertaut of Poivre islands, reports that a small pinnacle rock, upon which he obtained 12 feet, lies N.N.E. $\frac{3}{4}$ E. distant 10 miles from Des Roches island, and that it is a separate danger from those on Des Roches bank, having no bottom at 50 fathoms close around.

Tide.—It is high water full and change at Des Roches island, at 5 hours, springs rise about 6 feet, the stream is slight at the anchorage, but near Shark rocks the flood sets to north-westward and ebbs to south-eastward, nearly a mile per hour.

ETOILE CAY.—This cay lies W. by S. $\frac{1}{2}$ S. distant $18\frac{1}{2}$ miles from Poivre islands, upon the western edge of the Amirante bank. It is a small sand cay 2 cables in diameter, upon a coral knoll extending half a mile N.N.W. and S.S.E. There are a few scattered bushes upon its northern edge 15 feet above high water, but no trees.

BOUDEUSE CAY, is a small sand bank about $1\frac{1}{2}$ cables in diameter, with some coarse grass upon the summit 15 feet above high water. It lies S.W. by W. $\frac{1}{2}$ W. distant 34 miles from Poivre islands; shoal water extends half a mile east of the cay, and a bank with 6 to 10 fathoms on it extends 6 miles between the bearings N. by E. and N.E. by E. This cay is the westernmost of the group.

MARIE LOUISE ISLAND.—This island lies upon the south-east edge of the Amirante bank, and is three-quarters of a mile long north and south, by one-third of a mile wide. It is low and sandy, covered with bushes, and fringed with coral reef extending a quarter of a mile off shore, upon which a heavy surf breaks, so that landing is rarely practicable.

It makes well during daylight, having a conspicuous row of casuarina trees 90 feet above high water upon its north-west side, and when seen upon a northerly or opposite bearing they are in line, and look like a square tower, which is seen some time before the remainder of the land. A small clump of cocoanuts stand near the casuarinas, but are much lower; as this island is the only one of the southern group having trees upon it, they serve well to identify it. The north-west point was ascertained to be in lat. $6^{\circ} 10' 22''$ S., long. $53^{\circ} 9' 14''$ E.

The *Alert* anchored one mile north of Marie Louise island in 17 fathoms; the holding ground is indifferent and the island affords no shelter whatever.

Tide.—It is high water full and change at Marie Louise island at 5 hours, rise about 7 feet, the streams turn at high and low water, flood to the westward, ebb to the eastward 2 knots per hour at springs. During flood tide an eddy is formed to the westward of the island for about $1\frac{1}{2}$ miles off it, setting directly towards it.

ISLE DE NEUF, lies S.W. by W. $\frac{3}{4}$ W. distant nearly 7 miles from Marie Louise island, and is three quarters of a mile long W.N.W. and E.S.E. by a quarter of a mile wide. It is a low sandy islet, with a coral outcrop upon the beach slope, and a few bushes upon the north-west side about 18 feet above high water, it is fringed with coral which extends one mile in a south-westerly direction, and the sea breaks upon a spit a mile

further west in 4 fathoms. The island is difficult to make out even in daylight.

Shoal.—A shoal $1\frac{1}{2}$ miles long N.W. and S.E., very narrow and having 3 fathoms over it, lies S.W. by W. distant 3 miles from Marie Louise island, or nearly midway between that island and Ile de Neuf. The shoal has a clear passage either side of it, and its position is generally indicated by tide rippings.

ALPHONSE ISLAND.—This island situated 46 miles southward of the Amirante bank, in lat. $7^{\circ} 0' 30''$ S., long $52^{\circ} 45' 13''$ E., lies upon the north-west part of a coral reef about 2 miles long W.N.W. and E.S.E. A conspicuous clump of casuarina trees is situated upon the south-east part of the island, the remainder being covered with cocoanuts. The establishment numbers 29 people, who are engaged in cultivating cocoanuts and vanilla, rearing poultry and collecting turtle for the Seychelle and Mauritius markets. The island of St. François is also cultivated by the same people.

Upon the South and South-east side there is a large basin with depths of 10 fathoms in it, the passage into which bears south from the centre of the island; 15 feet at high water was obtained by the *Alert's* boat when coming out. The small vessels which visit the group, anchor in a very unsafe position about $1\frac{1}{2}$ miles N.E. of Bijoutier island, and during strong S.E. winds a small craft may anchor close to the reef upon the north-west side of Alphonse island, but there is no other anchorage around the group.

Water.—Good water can be obtained from wells at the establishment.

Bijoutier island, is upon the northern part of an extensive reef drying in patches at low water, separated from Alphonse reef by a deep channel through which the tide rushes with considerable strength and forms several eddies. The island is small and circular in shape, covered with bushes, and has a solitary coconut tree upon its centre. There is no ship passage into the lagoon, which is so obstructed by sand banks that a boat cannot get from Bijoutier island to St. François island at low water.

St. François island.—This island is the southernmost of the group, and is a mere ridge of sand about three-quarters of a mile long north and south, and is under cultivation for cocoanuts by the people of Alphonse island.

CHAPTER VIII.

ISLANDS NORTHWARD AND NORTH-WESTWARD OF
MADAGASCAR.

PROVIDENCE ISLAND.—This island which is 2 miles long north and south by one-third of a mile in its widest part, lies upon the northern part of Providence reef. It is well wooded chiefly by cocoanuts, and an avenue of casuarina trees 50 feet above high water, traverses the centre of the island from east to west, under the shade of which is situated the village. When visited by H.M. surveying vessel *Alert* in 1882, there were 32 inhabitants, engaged in cultivating cocoanuts, vanilla and maize, also a few vegetables and fruits. The western extreme of the village was ascertained to be in lat. $9^{\circ} 14' 4''$ S., long. $51^{\circ} 2' 22''$ E.*

The reef is 24 miles long in a north and south direction and about 5 miles wide near the centre; besides Providence and Cerf islands, there are many sand cays, also banks that dry at half tide, distributed over the reef. At a distance of one to $1\frac{1}{2}$ miles from its western edge no bottom could be obtained at 100 fathoms. The eastern side of the reef was not examined from seaward, and consequent upon the prevailing south-east winds and heavy seas it is rarely approachable. Upon that side, there are several openings, but they are all of the nature of a cul-de-sac, and no passage, even for a boat, could be found anywhere across the reef at low water.

Cerf Island (South banks).—This island, locally known as South bank, is one of a number of sand cays situated upon the southern part of Providence reef. The crew of the French frigate *L'Heureuse* escaped to Cerf island, after the wreck of their vessel upon Providence reef in 1763, afterwards getting to Providence island, where they remained two months and gave the island the name it now bears.

These sand cays are about 7 feet above high water and almost destitute of vegetation; they are visited occasionally from Providence island, for the purpose of collecting turtle, the people having erected some small huts and a turtle-pen upon them, rendering them visible about 5 miles distant.

* See Admiralty plan:—Islands and reefs between Seychelle islands and Madagascar, No. 724.

Anchorage.—The most convenient anchorage to communicate with Providence island, is in 19 fathoms, sand and coral, with the village boat-house bearing S.E. by E., and the north extreme of the island N.E. $\frac{1}{2}$ E., bearing in mind that the water shoals very rapidly. The most sheltered anchorage is in 10 fathoms, with the northernmost of South banks bearing S.E. by S., distant 2 miles, the bottom here is more level and anchoring ground extends farther from the reef. The south-easterly winds blow quite nine months of the year, but in January and February, when the north-west winds are violent at times, it is stated that vessels can anchor to the eastward of Providence island.

Landing.—Landing is attended with risk at all times, but in fine weather, it can be effected over the fringe reef with the village bearing E. by S.

Tide.—It is high water at Providence island full and change at 6 hours, springs rise about 8 feet. Upon the west side of the reef, the flood stream was observed to run to the southward, and ebb to the northward at the rate of $1\frac{1}{2}$ miles per hour, the streams turning at high and low water. The residents state that during the north-west monsoon, the direction of the tidal streams is reversed.

St. Pierre island.—This island lies W. by S., distant 19 miles from Providence island. It is one mile in diameter and about 40 feet above high water, covered with bush, and two cocoanut trees stand upon the north-west extreme in lat. $9^{\circ} 19' 10''$ S., long. $50^{\circ} 43' 33''$ E. St. Pierre island has no fringing reef, the sea breaks directly upon a low cliffy coast, and rushing with great force into the numerous caverns, is in turn thrown high into the air, giving the appearance of whales "blowing."

No bottom could be obtained at 100 fathoms within half a mile of the coast, and there is no anchorage for a ship.

Wizard Reef.—This reef lies $22\frac{1}{2}$ miles N. by E. from Providence island and is three miles long east and west by one mile wide; upon the western part three rocks show at low tides, and a depth of 23 fathoms was obtained on the eastern side.

FARQUHAR ISLANDS.—This group formerly known as João de Nova forms an atoll $11\frac{1}{2}$ miles long in a north-east and south-west direction, but the central lagoon being shallow, with numerous dry banks and patches, affords no shelter except to small vessels. The largest islands of the group, situated on the eastern side of the reef, are low, with a few bush-covered sand hills 30 to 50 feet high. The reef which fringes the group appears tolerably steep except in the north-west part, where a sand bank of 6 to 12 fathoms, plainly visible, extends westward $3\frac{1}{2}$ miles. The outer edge of the bank lies W. by N. nearly 5 miles from Trois isles;

eastward of Trois isles the bank extends 3 to 8 cables from the shore, and shoals rapidly from 20 to 5 fathoms.*

There is good anchorage on the bank off the entrance of the lagoon channel, except during the hurricane season, December to April inclusive. The best berth is in 7 fathoms, sand, with Race point bearing South, and the north extreme of the north island E. $\frac{1}{2}$ N. Here the tides run strongly, the ebb to the west, flood E.N.E.; the flood is the stronger of the two streams. Little or no swell was found at this anchorage, although the sea was heavy outside. South-east winds prevail from April to October, during the remainder of the year the winds are variable.

Trois isles, on the north-west reef, are mere specks of islands bush-covered; there are really six islets, but three are bare and almost awash at high water. Goelette, on the south-east side, is low and bare, with a small sand hill. The reef extends 5 miles W.S.W. of Goelette, and 4 miles S.W. by W. of the western wooded Trois isle, where there is another shallow break in the reef.

Lagoon.—The entrance to the inner harbour is situated at the west end of the north island. The harbour is small, and, except in cases of emergency, for vessels drawing more than ten feet practically useless, on account of the narrow crooked entrance and the rapidity of the tides. Probably the least water in the channel is 3 fathoms, but there are numerous coral heads on which the depth may possibly be less.

Tides.—It is high water full and change at 4 hours, springs rise 7 feet, neaps 5 feet.

Settlement.—The islands are at present (1878) leased by a Mauritius firm, who have about 40 people employed, and have planted a considerable number of cocoanuts. The chief settlement, named Grand Poste, is at the west end of the north island, where a stone house with a flagstaff stands on a sand hill 35 feet high.

Position.—The stone house at Grand Poste is in lat. $10^{\circ} 6' 45''$ S., long. $51^{\circ} 10' 21''$ E.

Turtle and fish abound; boobies and terns breed in great numbers on the islands. Freshwater may be obtained by digging.

Rajaswaree shoal.—This reported danger on which heavy breakers are said to have been seen is considered to lie in about lat. $11^{\circ} 25'$ S., long. $52^{\circ} 2'$ E.

McLEOD BANK, formerly known as the Marquis of Huntly bank, was discovered in 1818 by the ship of that name, Captain D. McLeod bound to Bombay with the ship *Duke of York* in company. The bank was sounded over for a distance of 7 miles in a N. by E. direction and the

* See Admiralty plan:—Farquhar islands, No. 718, scale $m=0.8$ inch.

least water obtained was 10 fathoms in lat. $9^{\circ} 57' S.$, long $50^{\circ} 20' E.$ This bank has not been closely examined.

COSMOLEDO is an atoll or coral formation of oval form, $9\frac{1}{2}$ miles east and west, and 7 miles across. Eight low coral islands and many islets lie on the ring surrounding the central lagoon, which is shallow and in most places much encumbered by rocks. The edge of the reef is everywhere steep-to, and on an average a quarter of a mile outside the islands.*

There are two passages through the reef: one leads into a shallow part of the lagoon; the other is narrow, ill-defined, and on the weather side during the south-east trade, at which time a heavy swell sets into it. During the other part of the year it might possibly be used by a vessel drawing 16 feet water.

Cosmoledo is uninhabited, there being no water. It is visited from Seychelles in search of fish and turtle, both of which are abundant. The *Fawn* turned 15 turtle in three nights, in July 1878, which is late in the season.

Menai Island the largest and westernmost of the group, is $1\frac{3}{4}$ miles in length. In the centre are tall mangroves, which reach 60 feet above high water; at the south end, a clump of trees form an apex 45 feet high, and on the north-east part there is a ridge of sand hills about 40 feet high, with stunted casuarinas on it; elsewhere the island is low and covered with thick bush with open grassy spaces. A few cocoanuts have been planted near Johannes point, but (1878) are still small, and do not show to seaward. Wild goats and fowls are reported to be on the island, but were not seen by the crew of the *Fawn*.

Johannes point is of rock, appears to project considerably when seen from the southward, and has two trees standing alone on its extremity. During the south-east trade, landing can be effected at high water in the bay to the northward of Johannes point, and even at low water by landing on the higher outer edge of the reef and wading, but at times there is too much swell for this.

Anchorage.—The only anchorage outside the reef during the south-east trade is on a narrow strip of soundings a little northward of Johannes point. The *Fawn* anchored in 13 fathoms, coral, with the west extreme of Menai island S. $21^{\circ} W.$, the north extreme S. $73^{\circ} E.$, Observatory islet showing just clear, and the trees on Johannes point S. $16^{\circ} W.$ The vessel's stern was in 40 fathoms when swung off from the island, but the anchor held well with fresh winds from south-east.

The currents were strong here; the ebb sets to the north-east, augmenting the ordinary set of the equatorial current round the island. The flood at neaps barely neutralized the set, at other times it ran to the south-west.

* See Admiralty plan:—Cosmoledo group, scale $m = 1.0$ inch, No. 718.

At this anchorage the sea is smooth, with but very little swell. If desirous of entering the lagoon from here in a boat, the best passage over the reef is just to the north of Middle islet, where there are 3 feet, at high-water neaps.

Observatory islet, to the eastward of the north part of Menai island, is in lat. $9^{\circ} 41' 20''$ S., long. $47^{\circ} 32' 25''$ E.

Tides.—It is high water full and change at Cosmoledo, at about 4h. Om.; springs rise about 8 feet, neaps range 2 feet.

North islands are two islands together, of which the western is half a mile long, 25 feet high, rocky and covered with bush; the other is small and low.

Goelette island, to the north-east, is very low and half the size of the western North island, from which it is distant $4\frac{3}{4}$ miles.

Polyte island, the easternmost island, is a mile long north and south, and has a small hummock at its southern end.

Wizard island, at the south-east corner of the group, is 2 miles in length, with a hill 55 feet high at its north end, where two or three white sand spots show through the bushes. The island is covered with bushes, but no trees. Off the south-east corner are indications of anchorage ground for the north-west season, but it could not be sounded by the *Fawn*. On this island the *Merry Monarch* was wrecked in 1874, on her way from India to Boston.

Pagoda is a small low island.

South island is $1\frac{3}{4}$ miles in length, with some sand hillocks, covered with bush, and towards the western end are some high mangroves; it is the southernmost island.

South-East passage is midway between Wizard and Pagoda islands. A 6-fathom channel, about 250 yards wide, leads in a general direction N. $\frac{1}{2}$ W. for half a mile; it is then divided into two by a reef awash at low water, and the eastern channel runs with a depth of $3\frac{1}{2}$ and 4 fathoms, for $1\frac{1}{2}$ miles further to the N.N.E., but it is not straight, and the eastern reef is the plainest. It then opens into the clearest part of the lagoon, which has a depth of $3\frac{1}{2}$ and 4 fathoms.

Caution.—This passage from its shallowness is not at all easy to distinguish from the adjacent shoals, as the reefs at the sides are not steep-to. The water is so clear that the bottom, 5 fathoms deep, is almost as distinct as it is at 2 fathoms, and it cannot therefore be recommended.

During the south-east trade, the wind and sea set straight into it, and although the water becomes smooth after passing the line of breakers, it is very rough at the entrance. In the north-west monsoon season, it is prac-

ticable with care for a vessel drawing 16 feet. The tides are strong in the passages.

South-West passage, between South and Menai islands, is about the same breadth and depth, and rather steeper on either hand than the above, but it unfortunately leads into a very shallow and foul part of the lagoon, and is therefore useless except as a boat passage. In the south-east trade it is tolerably smooth at the entrance, but the sea takes the vessel upon the beam.

The Lagoon is much encumbered with shoal patches and banks, but there is a tolerably clear space towards its north-east side with $3\frac{1}{2}$ and 4 fathoms water.

Astove island.—This island is considered to lie in lat. $10^{\circ} 6' 30''$ S. long. $47^{\circ} 45' 42''$ E. It is visited occasionally by a small vessel from Seychelles, for the purpose of collecting turtle; a kedge with hawser attached is sent by boat to the fringe reef upon the leeward side for this craft to ride by, there being no anchorage. Approaching the island from the south-east it makes as several small islands or hummocks, covered with brushwood, off the south point is an isolated rock; the breakers were seen to extend half a mile from the south-east point. The fringing reef extends about 2 cables upon the eastern side, and upon the northern a reef extends alongshore about two miles, the remainder of the island appeared steep-to. About 2 miles from the south point, upon the eastern side of the island a flagstaff and two conspicuous coconut trees were seen.

ASSUMPTION ISLAND, nearly $3\frac{1}{2}$ miles in length, is low and covered with tangled bush, except some sand hills on the south-east side, the highest of which is about 60 feet above the sea. The island appears steep-to on all sides with but little reef, though discoloured water extends about a mile off the south-east point with apparently 10 fathoms or so over sandy bottom.*

The hummock near the south-east extreme is in lat. $9^{\circ} 46' 20''$ S., long. $46^{\circ} 31' 7''$ E.

Anchorage.—The *Fawn* during the south-east trade found very indifferent anchorage in 13 fathoms, sand, with the south-west extreme of the island S. 54° W., top of the highest sand hill S. 11° E., and the north-west extreme of the island N. 23° E. Here there was not room to swing, but there was no current, and the vessel lay head to wind in perfectly smooth water, with 28 fathoms under the stern.

The island is uninhabited, but there were signs of fishing parties, and in July, turtle were swarming.

* See Admiralty plan :—Assumption island, scale $m = 1.0$ inch, No. 718.

ALDABRA, the largest of the islands to the north-west of Madagascar, is an elevated atoll or coral formation 19 miles east and west, and $7\frac{1}{2}$ miles across, with a nearly continuous chain of islands on the reef. Aldabra is useless for habitation; its surface is of sharp jagged coral with no sand on it, and covered with a thick tangled bush difficult to get through. Mangroves are everywhere eating the coral away inside the lagoon, and the clumps which grow in places to a considerable height give an appearance of tree-covered hills and fine forest.*

In a few places casuarinas grow, and there are several sand hills on the south side. The true surface of the island is about 20 feet above high water, the sand hills do not exceed 50 feet, nor the highest mangrove clumps 80 feet. The fringing reef is everywhere narrow, never exceeding 3 cables from the shore, and is steep to all around except to the eastward, where a bank extends off for some distance.

The island has probably never been inhabited, and perhaps never will be, but it is visited by parties from Seychelles for fish, turtle which abound, and also for the large land tortoise which in this island alone in all the Indian ocean still survives, but in very diminished numbers. The north-west monsoon, the best season for fishing, is also the mosquito season, when these insects swarm in intolerable numbers. Water is only to be obtained in the cavities of the rock where the rain collects, and only in a few places.

The Lagoon is very shallow, being impassable at low water springs, even for boats, except in places. The reef is broken in four places, but the passages are all shallow except the north-west, which is a navigable channel. Small vessels can pass through this latter channel into the lagoon, which has a limited space of 4 fathoms water, but the upper part of the channel is tortuous and narrow, and large vessels should anchor in the channel itself about $1\frac{1}{2}$ miles from the entrance.

Anchorage.—In the south-east trade it is possible for a vessel to anchor off the western point of the island close to the reef, but the space here scarcely allows for swinging towards the shore, which may happen if the wind falls light or veers far to the southward.

A better place is off the eastern shore of the main channel, where a vessel may anchor in 11 fathoms, with the north extreme of Middle island S. 82° E., the west extreme of the east point of entrance S. 31° E., and the north extreme of West island bearing West. In this position a vessel will be in the line of the flood stream into the lagoon, but not the ebb which sets on the western side of the channel.

In the other season an anchorage will probably be found off Hodoul point, the eastern extreme, as several casts of 13 fathoms were obtained in

* See Admiralty plan:—Aldabra island, scale $m=1\cdot0$ inch, No. 718.

the *Fawn* when passing half a mile from the shore, though circumstances did not admit of completing the soundings, but there was no sign of shoaler water here.

Main Channel.—The main channel into the lagoon is a deep canal eading between West and Middle islands, with the reef dry on either side at low water, and even at high water well defined. The entrance points are of rocky cliff with thick groves of casuarinas on them; the channel which continues for $1\frac{3}{4}$ miles in a southerly direction, is about 260 yards wide, the sides steep-to, and the channel clear with from 7 to 12 fathoms water, when at the distance mentioned it is divided into two channels, both deep, but only half the breadth of the outer part.

The eastern channel runs in for $2\frac{1}{2}$ miles, when it is lost at the entrance of the lagoon in innumerable patches of coral, with 3 to 5 fathoms between them, but too intricate for navigation. The western channel also leads into the lagoon, and is similarly lost in coral patches.

Throughout the channel and its different branches the tide runs with great velocity. At springs the stream runs $6\frac{1}{2}$ miles an hour, with scarcely any slack water; at neaps it runs $2\frac{1}{2}$ miles an hour.

The Anchorage is in the main channel, outside where it divides, and about $1\frac{1}{2}$ miles from the entrance. A vessel should moor in about 9 fathoms, coral bottom, with Round Apex open southward of the south-east point of West island; open hawse to the eastward without swivel and with a good scope of cable, the holding ground being bad, and the velocity of the tides rendering it not improbable that the anchors may start. The trade wind will generally cause the vessel to swing the same way and keep the hawse clear. It is perfectly smooth here, but the strength of the tide makes it a most inconvenient anchorage, especially for boats alongside the vessel.

Tides.—It is high water, at full and change, at 4h. 0m.; but the flood stream runs about 1h. 15m. after high water, and the same at low water. Springs rise about 8 feet, and neaps range about 3 feet.

West Island, like all the other islands, is covered with dense bush, and much broken and indented on the lagoon side by mangrove creeks and swamps. Its western shore is the only long sandy beach in the islands, and here the turtle lay their eggs. The observation spot on the eastern side in a sandy bay is in lat. $9^{\circ} 22' 35''$ S., long. $46^{\circ} 14' 52''$ E.

South Island, which extends the whole length of the group, a distance of 19 miles, is nearly all faced with low coral cliffs, about 15 feet high; this sea face is more barren than elsewhere from the spray and sand which is continually being blown over it. In a few places there are low sand hills about 50 feet above the sea; the remainder of the island is jungle

with rocky surface and mangrove swamps, the tops of the mangrove clumps being 50 to 80 feet high.

West Channel between West and South islands is shallow, and only passable by boats at high water when the sea is smooth. It is obstructed by many small islets.

East Channel, between Middle and South islands, is passable at all times by boats; it is a narrow deep pass through the coral, about three-quarters of a mile in length, and the reef on either side is dry at low water.

Middle island is similar to the others, but with casuarina trees on its extremities.

Cocoa-nut island is the only suitable place for building a house. It lies in the lagoon opposite the east entrance, and has a sandy area with long grass, a small cocoanut grove, and some fine casuarinas. The crew of the *Fawn* planted 50 cocoanuts in 1878; there is no fresh water.

GLORIOSO ISLANDS, standing upon a nearly circular bank about eleven miles in diameter, are nearly joined at low water by a dry reef 9 miles long in a N.E. and S.W. direction.

These islands are of a coral conglomerate formation; raised about 30 feet above high water, and have very little soil.

Isle Glorieuse, is the largest of the islands, nearly square in shape $1\frac{1}{4}$ miles in extent each way, it is covered with trees, which attain a height of 40 feet above high water.

It was inhabited by 27 people in 1882, but it was proposed to abandon the settlement in consequence of the unproductive nature of the soil, and the destruction of the crops by the ravages of the rats which overrun the island. The wells all give brackish water, but turtle are plentiful.

Isle du Lise, is upon the north point of the reef, elevated about 35 feet above high water, the northern side is cliffy, and the south point terminates in a sand hill which is the highest part of the island. It is not inhabited, for there is no water; a salt lagoon occupies the centre of the island, nearly dividing it north and south.

The observation spot upon the west extreme was ascertained to be in lat. $11^{\circ} 30' 2''$ S., long. $47^{\circ} 22' 47''$ E.

Verte rocks, situated upon the reef $1\frac{3}{4}$ miles east of Glorieuse island, are small, and only 3 feet above high water; this portion of the reef is very dangerous, for it rarely breaks except at low water, giving the appearance of a passage through the reef. The wreck of a large vessel laid against Verte rocks in 1882.

South rocks, are similar to Verte rocks; they are situated one-third of a mile south of Glorieuse island, with which they are connected by a coral ledge dry at low water.

Reef.—A reef extends $3\frac{1}{2}$ miles N. by E. from Glorieuse island; vessels approaching the bank from the westward should not bring the west extreme of Glorieuse island to bear westward of S. by W. $\frac{1}{2}$ W., until Isle du Lise bears S.E. by E.

Anchorage.—Northward of Isle Du Lise the bank extends $4\frac{1}{2}$ miles; the *Alert* found good anchorage in 8 fathoms, clean sand, over a level bottom with Isle du Lise bearing S.S.E., distant 8 cables. Off Isle Glorieuse the anchorage is bad, the bottom being foul and uneven.

Tide.—It is high water at full and change at 5 hours, springs rise about 10 feet, but the tides appeared irregular, it being high water at the same time, during the five days of the *Alert's* visit. The tidal stream was very slight, the flood running to the west and the ebb to the eastward.

Current.—Between lat. 10° S. and Glorioso islands the current sets strongly to the westward, and in the month of May it was found setting in that direction nearly 3 knots per hour.

The residents of Glorieuse state that the southerly winds do not reach them until June, that calms are frequent, and that rain is a rare occurrence with them.

APPENDIX.

RÉUNION ISLAND.

Variation in 1884 - - - - 12° Westerly.

The island of Réunion, situated 100 miles S.W. by W. from Mauritius, is 38 miles long in a N.W. and S.E. direction, and 28 miles wide. It is of volcanic formation, the Fournaise or Grand Brûle still showing some activity. Lofty mountains separated by valleys intersect the island; the highest peak of the central range, the Piton des Neiges (Snow Peak) attains an elevation of 10,069 feet.*

First discovered by the Portuguese about 1507, it was colonized by the French in 1642, and by them named Bourbon. Since 1815 it has formed a colonial possession of that nation.

The island is divided into two parts (locally known as the Windward and Leeward parts) by an imaginary line drawn from Point des Galets to Grand Brûle.† The weather side is the most fertile, that to leeward being subject to long droughts.

Réunion possesses hospitals at Saint Denis and Salazie, numerous educational establishments, bank, a museum of natural history, a library, an agricultural society, &c. A railway opened for traffic in 1882, connects St. Louis and St. Benoit.

The population according to the census return in 1881 numbered 169,493, the total value of importations in the same year amounted to 30,592,186 francs, and the exportations to 17,329,041 francs, and the total tonnage of shipping entered was 71,070, excluding the Messageries steamers.

The principal products are sugar, rum, coffee, tobacco, and vanilla; tea is also successfully cultivated, and the silk-worm thrives well; an important industry has lately sprung up in the cultivation of fibre resem-

* The description and directions are chiefly derived from the French publication, *Renseignements Nautiques sur quelques îles éparses l'Océan Indien Sud*, 1879. See Admiralty chart:—Réunion island with plans, No. 1,497.

† This division appears arbitrary, the south coast being more exposed to the prevailing south-easterly winds than the north coast.

bling the Aloe. Most of the cattle required for home consumption are imported, but all tropical and some European fruits grow well.

Vessels from abroad must be entered at either St. Denis, St. Paul, or St. Pierre, where permits are granted to visit the remainder of the coast. Shipping have to work their cargoes by means of launches belonging to boating establishments, of which there are 18 distributed around the coast, and landing is effected by means of stages. The pilotage fees are compulsory.

Both a British and a French steamer perform a monthly voyage between Mauritius, Réunion and Madagascar and back. The "Maurice-Réunion" Company run a first-class steamer from London every 45 days, via the Cape of Good Hope, to Mauritius and Reunion, returning via Bombay.

Climate.—The climate of Réunion is considered healthy, notwithstanding that the last few years a malarious fever known locally as "accès jaune," ending in speedy death, has given cause for much anxiety. The hot and rainy season is from November to May, followed by the fine season, when the heat is tempered by the strong south-easterly winds. At St. Denis the mean barometric pressure is 29.921 inches, and the mean temperature is 77°. Snow is seen every year for a few days on the Piton des Neiges.

Winds.—From April to December, the wind blows continually between E.S.E. and S.S.E.; the breeze generally freshens at 9 a.m., decreasing at 4 p.m. The nights are generally calm, and if otherwise you may expect that it will blow strong the following day. If during the day the breeze is moderate and falls early, a light land breeze may be expected during the night.

The winds are generally very fresh during June, July and August. The general S.E. winds continue during December to April, but they are more moderate and interrupted by calms and winds from West and N.W. It is at this season that heavy gusts and hurricanes occur. After these gusts there is often a calm or west wind, which is always of short duration, and soon followed by those from south-east.

Rollers (Ras-de-Maréé).—Rollers, which prevent all communication with the shore occur at intervals, particularly from December to April, and are thought to be the effect of distant hurricanes. It has been further observed that they give warning of an approaching hurricane before any other indication is appreciable. These rollers, however, seldom last more than 24 hours.

Current.—The current usually follows the coast one way or other, without there being any apparent cause for the changes in direction and force; they sometimes attain a velocity of 3 knots.

Anchorage.—There is no sheltered anchorage on the coast of Réunion, for until the artificial port, in course of construction, at Point des Galets, is completed, vessels must work their cargoes in the open roadsteads. The best is that of St. Paul upon the north-west side of the island; off the north coast the holding ground is good, but the sea increases upon approaching the east coast. Upon the south-east coast the winds blow onshore, in addition to which the holding ground is decidedly bad. Early in December, vessels must take up their off shore berths, and upon the appearance of bad weather, between November and April, they must at once proceed to sea.

ST. DENIS, situated upon the north point of the island, is the principal town, also the seat of the government, and contains 32,000 inhabitants.

The landing of both passengers and cargo is effected by means of swing bridges extending over the surf which at all seasons rolls upon the shore.

The Barachois, is a small port about $2\frac{1}{2}$ acres in extent, where small coasters seek refuge. The entrance requires to be constantly cleared of obstructions thrown in by the swell, and no stranger should attempt to enter.

LIGHTS.—Two fixed lights are exhibited at an elevation of 85 feet above the sea, from a flagstaff on the Barachois. The lights are vertical; the upper light red, the lower white, and they should be visible in clear weather from a distance of 7 miles. Beyond 5 miles these lights blend and appear as one.

Anchorage.—During the bad season, vessels anchor north-west of the town in from 10 to 17 fathoms, but during the fine season anchorage is taken up nearer the shore. The roadstead is open to winds from E.S.E. round by north to W.S.W., and a heavy sea is thrown in. When about to anchor, it must be remembered that the current frequently sets towards the Point des Jardins, and when waiting for a pilot, to "heave to" with the ship's head off the land.

Signals.—When boats are not permitted to communicate with the shore, a white flag with a blue square in the centre is hoisted on the topgallant yard of the harbour department flagstaff; if the hoisting of the flag be accompanied by the firing of a gun, it indicates that all vessels are to weigh and proceed to sea.

At night, three lights shown at the gaff, accompanied by the firing of a gun, signifies, prepare for weighing. Four lights shown at the gaff, accompanied by the firing of a gun, signifies, weigh and proceed to sea.

Tide.—It is high water full and change at 12h. 22m., springs rise $2\frac{1}{2}$ feet.

St. Marie bay, is situated $5\frac{1}{2}$ miles E.S.E. from St. Denis; anchorage may be obtained in 7 fathoms, black sand, but there is no shelter from northerly winds.

Le Cousin rock.—This sunken rock with a depth of 6 feet over it lies $1\frac{1}{2}$ cables off shore, N.W. by W. $\frac{1}{2}$ W. distant one mile from Point des Haziers; cape Bernard in line with St. Denis church leads northward of the rock.

BEL-AIR POINT.—Light.—A fixed white light is exhibited at an elevation of 148 feet above high water from a lighthouse situated upon Bel-Air point, and should be visible in clear weather from a distance of 18 miles. The lighthouse is 66 feet high, coloured white with a black lantern.

Marianne rock, lies near the shore, one mile W. by S. from the anchorage at St. Suzanne.

St. Suzanne.—Vessels anchor off the landing place at St. Suzanne in 14 fathoms during the winter months, but in the fine season the anchorage is in 8 fathoms with the landing place bearing about S.W. by S.

St. Benoit.—This town situated on the north-east coast of the island contains about 17,000 inhabitants. The anchorage off it is considered indifferent, being in 20 fathoms water, bad holding ground. The landing stages have been destroyed, and landing can rarely be effected.

Bourbier.—Vessels getting becalmed, endeavour to anchor off Bourbier, to avoid being set upon the point of the river Mât, off which there is no anchorage; a depth of 17 fathoms will be found with the storehouses of cape Fontaine bearing W.S.W., and St. Benoit church S.S.W., in the fine season the anchorage is in 11 fathoms with St. Benoit church bearing S. by W. There is a landing place at Bourbier.

St. Rose.—Anchorage in 24 fathoms can be obtained upon a level bottom off St. Rose between point Bonne-Espérance and port Caron, with the sheers of the landing place in line with the middle storehouse at Varangue. The anchoring ground is limited, so that ships must moor, and it is steep-to from the offing side.

Coast.—Near the south-east coast of the island is the Pic du Volcan, elevated 8,613 feet, also the Fournaise or Grand Brûle, the latter being an active volcano. This part of the coast is devoid of vegetation; streams of lava burning without noise, descend to the sea. Between St. Rose and St. Pierre there is no safe anchorage.

St. Pierre.—This town is situated on the south-west side of the island. Anchorage can be obtained in the roadstead in from 27 to 23 fathoms with the church of St. Pierre bearing N.N.E. $\frac{1}{2}$ E., and seen in

line with the ravine. This anchorage is much exposed to the swell, and vessels should always be prepared to make sail and proceed to sea upon the appearance of a south-westerly wind. The bottom is hard, and often causes the loss of anchors and cables.

A natural dock called the Grand Basin, is situated between the shore and the barrier reef, and the construction of a wet dock having an area of about 10 acres, the entrance to which is through the west barrier reef, has been commenced. The Eastern pier will be 1,030 feet in length, and a West pier will also be constructed to shelter the entrance from the westerly swell.

Light.—A fixed red light is exhibited at an elevation of 72 feet above the sea, from a lantern upon a mast at the Harbour Office. The light should be visible in clear weather from a distance of 4 miles.

Tide.—It is high water full and change at 12h., springs rise $3\frac{1}{2}$ feet.

Etang.—There is anchorage off Etang in 19 fathoms, southward of the line of direction of the Ravine des Avirons. When the wind sets in from seaward, a heavy sea quickly gets up, and vessels in the road should at once proceed to sea. When communication with the shore is prohibited, a white flag with a blue square is hoisted upon the harbour flagstaff.

The entrance to the barachois of Etang Salé (Saltpond) is difficult and dangerous; the sea taking a ship upon the beam when entering.

St. Leu.—The anchorage off St. Leu is not good, the holding ground is indifferent and the least depth a vessel may anchor in, is 23 fathoms. There are however, two landing places at St. Leu.

St. Gilles.—Vessels anchor off St. Gilles in 20 fathoms, with cape Noir bearing E.N.E., and Point des Aigrettes N.E. by N.

ST. PAUL.—This town situated upon the north-west coast of the island contains about 27,000 inhabitants. The roadstead is the only good one in the island, and only that during the season April to the middle of November. The winds are then generally from the south-west, and follow the line of the coast. Vessels moor during this season in 14 fathoms, with the port flagstaff bearing S.E. During the winter months the wind is mostly from the N.E.; berths are then taken up further from the shore in 20 fathoms with the port flagstaff bearing S. by E. The holding ground is good everywhere.

When the sea is too heavy to permit of landing at St. Paul, it can nearly always be effected at Trou du Cuisinier.

Light.—A fixed red light is exhibited, from a lantern, upon the mast at the landing place at an elevation of 62 feet above high water. The light should be visible in clear weather from a distance of 4 miles; other lights of the coast are however liable to be mistaken for t.

Tide.—It is high water full and change at 1h. 7m., springs rise 4 feet.

POINT des GALETS (Shingle point).—This low point, projecting from the high land, is steep-to, vessels being able to pass it at one cable distant. When the peak of Cimandef, 7,303 feet in height, is seen in the ravine of the River des Galets, a vessel will be to the westward of the point. The above mark is usually visible at night, and is useful in recognising the bay of St. Paul. The current sets strongly past the point.

Dock.*—A wet dock of 40 acres in extent is in course of construction at Point des Galets. The entrance, 262 feet wide and 39 feet deep, is towards the bay of St. Paul. The outer harbour is 1,163 feet long, by 820 feet wide, and has a depth of 26 feet over that part appropriated to vessels of war. Point des Galets will be connected by railway with St. Pierre and St. Benoît.

* The dock will be completed in 1884.

TABLE OF POSITIONS.

Place.	Particular Spot.	Latitude South.	Longitude East.
Seychelle Islands	- Bird island, centre of west beach.	3 42 59	55 12 32
" "	- Port Victoria, Hodoul jetty.	4 37 15	55 27 36*
African islands	- North island, north extreme.	4 52 26	53 23 46
Eagle island	- North-east point	5 6 23	53 18 54
D'Arros island	- North-east point	5 24 23	53 18 26
Isle des Roches	- Centre of north beach	5 40 56	53 41 11
Poivre island	- North island, north-east point.	5 45 14	53 19 25
Marie Louise island	- North-west point	6 10 22	53 9 14
Alphonse island	- South-east point	7 0 30	52 45 13
Coetivy island	- North extreme	7 6 0	56 16 58
Diego Garcia	- Middle island	7 13 30	72 23 50
Providence island	- West extreme of village	9 14 4	51 2 22
St. Pierre island	- North-west extreme	9 19 10	50 43 33
Aldabra islands	- West island, observation spot.	9 22 35	46 14 52
Cosmoledo islands	- Observatory islet	9 41 20	47 32 25
Assumption island	- Hummock near south-east extreme.	9 46 20	46 31 7
Astove island	- Centre of island	10 6 30	47 45 42
Farquhar islands	- Stone house, Grand Poste.	10 6 45	51 10 21
Agalega island	- North-west extreme	10 21 30	56 32 0
Glorioso islands	- Isle du Lise, west extreme.	11 30 2	47 22 47
Tromelin island	- North extreme	15 51 37	54 27 46
Cargados Carajos	- Establishment island	16 26 35	59 37 35
Rodriguez island	- Point Venus	19 40 23	63 26 15†
Mauritius island	- Cooper island, Martello tower.	20 8 37	57 29 32‡
Réunion island	- St. Denis, Pt. des Jardins	20 51 30	55 27 35

* Meridian distances from Zanzibar and Rodriguez island.

† As determined by the "Transit of Venus Expedition," 1874.

‡ Meridian distance from Rodriguez.

TIDE TABLE.

Place.	High Water at Full and Change.	Rise.		Remarks.
		Springs.	Neaps.	
	h. m.	ft. in.	ft. in.	
Mauritius, northern coast	0 30	3 0		
„ Port Louis -	0 30	3 0	2 0	
„ Grand Port -	0 30	3 0		Uncertain, <i>see</i> page 19.
Rodriguez island - -	0 30	5 6	1 6	
Cargados Carajos shoals	2 0	4 0		
Chagos banks - -	1 30			
Diego Garcia - -	1 30	6 0	3 0	
Peros Banhos - -	1 30	5 0		
Seychelle islands, Port } Victoria - - }	4 15 ?	5 6	3 0	
Curieuse island - -	5 10	7 0		
Amirante bank - -	5 0	8 0		
Providence island - -	6 0	8 0		For tidal streams, <i>see</i> page 61.
Farquhar islands -	4 0	7 0	5 0	
Cosmoledo islands -	4 0	8 0		
Aldabra islands - -	4 0	8 0		
Glorioso islands - -	5 0 ?	10 0		<i>See</i> page 69.
Réunion, St. Denis -	0 22	2 6		
„ St. Pierre - -	12 0	3 6		
„ St. Paul - -	1 7	4 0		

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