an observation from two signals; as the cloudy weather and the rain obscured the mountains.

" August 13. We placed a signal on the mountain *Chaour*; but the cloudy weather prevented any observation. We found at half past eleven, a canoe which came to take us to the arm of the sea called *du Chalan*, and we arrived at the great port at half past two.

" 14. We made observations on the mountain *des Creoles*.

" 15. After vespers we went in a canoe to the plantation *de la Victoire*, at the foot of the *Bambou*.

" 16. We proceeded to make observations on the *Bambou*, and dispatched a canoe, with some of our people, to place a flag on the *Quatre Cocos*. The weather was very variable, but we were enabled to complete our observations, and to go to pass the night at the plantation *de la Victoire*.

" 17. We returned on foot to the south-east port. The canoe arrived there in the afternoon.

" 18. We went to make observations at the cocoa tree, on the point of the *Deux Cocos*.

" 19. We embarked on the canoe at the south-east port; but the wind being contrary, we arrived rather late at *Chalan*; we proceeded nevertheless to take observations at the mountain *Charou*, and from thence to sleep at the *Baraque au Gouverneur*.

" 20. We went to make observations at the point *de l'Arcade*, and the eastern termination of the base, and from thence to sleep at the *Bain des Negresses*.

" 21. We proceeded to the western termination of the base, to the point *d'Ariembel*, to that of the *Mare aux Joncs*; and from thence to pass the night at the post *Jacotet*, where the tent was pitched, and a canoe ready for our service.

" 22. We encamped in the field which is beyond Cape *Brabant*, after having passed this cape with great difficulty. It is a very lofty and steep bank of rocks, that projects into the sea, which must be scaled to get across it.

" 23. We encamped at the foot of the *Morne Brabant*. I visited the neighbouring plains, which present a pretty good space to be measured.

" 24. We formed a base at the foot of the *Morne Brabant*. M. Desny went to place a signal on the mountain of the Little Black River, and on the *Morne* of the Black River.

" August 25. We measured the base, which we found to be one thousand nine hundred and fifty-six fathom.

" 26. We observed the angles at the extremities of the base.

" 27. I proceeded to the western termination of the base of *la Savanne*. The canoe conveyed me beyond Cape *Brabant*, where I placed a signal; from thence I passed to the post *Jacotet*, and slept at the western signal of this base.

" 28. It rained throughout the day, and following night. In a momentary interval, I saw the signal that M. Desny had been to place on the *Piton de Fouge*. I slept at the post *Jacotet*.

" 29. I made observations at the point of the arm of the sea *des Citroniers*, at that of *Saint Martin*, and at the point *du Corail*; and I arrived at the tent under the *Morne Brabant*, after having passed the cape in a pirogue, and part of the remaining way in a canoe.

" 30. I made observations at the hill of *Fouge*, and returned to the tent under the *Morne Brabant*.

" 31. We encamped at the arm of the sea called *Tamarin*. We passed under an arch of stones, where the soldiers practise a kind of baptism on those who pass it for the first time. We arrived at the tent after a journey on foot, through very difficult ways, which occupied seven hours and a quarter.

" September 1. We passed over the plain of *Flicq en Flacq*, and measured a base there.

" 2. M. M. Godin and Desny squared the base. I returned in the pirogue to the north signal of the base of the *Morne Brabant*, from whence I could not see the extremity of that of *Flicq en Flacq*. I slept at the foot of the mountain of the Little Black River.

" 3. M. Godin and Desny measured the base. I ascended the mountain of the Little Black River, where I suffered four hours constant rain. The weather becoming more clear, I observed my principal angles, and descended. It was eight in the evening before I had passed the woods, and arrived at the place where I had passed the preceding night.

" 4. I returned in the canoe to the tent at *Tamarin*. In the afternoon I made my observations at the two ends of the base at *Flicq en Flacq*.

" 5. I proceeded to make observations on the *Morne* of the Black River, from which I descended with great difficulty, from the slippery state of the herbage, and

the small round pebbles with which the mountain is covered. I came to the point *de Corail* to take an observation there; and from thence I went to *Tamarin*. In the evening I made an observation at the southern termination of the base.

" September 6. We went in the canoe to encamp at the Little River; throughout the day, the mountains were covered with clouds.

" 7. We proceeded to make observations at the point *des Caves*, and that of the plain *aux Sables*; and in the afternoon at the southern entrance of the Little River.

" 8. In the morning we went to make observations at two points on the side of the river *Belle Isle*. In the afternoon we continued our way to pass the night at the foot of the mountain *du Corps de Garde*.

" 9. In the morning we made an observation on the mountain. On descending from thence, we found horses prepared to take us back to Port Louis.

" 17. We made observations at the mountain *du Pouce*.

" 19. We departed to complete our operations, which had been interrupted, at the *Coin de Mire*. From thence we went on foot to pass the night with M. de Rostaing.

" 20. We went on horseback to the *Trou aux Biches*, and from thence on foot to Cape *Malhereux*, where we found our tent, and a large canoe.

" 21. We made observations at the *Coin de Mire*; and although it was very fine, and the sea smooth, I was indisposed with sea sickness. We remained four or five hours on that islet, and from thence we went to our tent. In the evening I made an observation at Cape *Malhereux*.

" 22. At sunrise, I went to make observations at the signal of *la Butte aux Sables*; from thence we all embarked for the bay *du Tombeau*. We then proceeded to the western termination of our first base, and passed the night with M. Rostaing.

" 23. I went to make an observation at the *Piton de la Decouverte*, on account of the new flag-staff which had been placed there. I returned at half past ten to *Pamplemousses*, and from thence to the house of M. de Rostaing, where I was seized with the dysentery.

" 24. I proceeded on horseback to the *montagne Longue*, and after having made an observation there, returned to the port, where in two days my health was re-established.

" 28. I went to make observations at the flag placed at *la Decouverte du Port*, which was the last of our stations. *

" We shall interrupt our journal, at this place, in order to give a description of what is most remarkable in the Isle of France.

Brief Description of the Isle of France.

" The Isle of France, first discovered by the Portuguese, who probably carried thither the deer, goats, and monkies, which have since multiplied in it, was afterwards possessed by the Dutch, under the name of the Isle of Mauritius. The great number of establishments which that republic maintained in India, occasioned them to abandon it in 1712: and the French, who had long occupied the Isle of Bourbon, which is not more than thirty-five or forty leagues from it, did not fail to possess themselves of it.

" According to my calculation, founded on the geometrical measurement which I have made, its outline is ninety thousand six hundred and sixty-eight toises. Its greatest diameter, which is nearly north and south, is thirty-one thousand eight hundred and ninety toises; and its greatest breadth, which is nearly east and west, is twenty-two thousand one hundred and twenty-four toises. Its figure is an irregular oval; and the surface contains four hundred and thirty-two thousand six hundred and eighty acres, at an hundred perches of twenty feet in length.

" This island has two very fine harbours. The least of them, which is called Port Louis, is situate towards the middle of the western coast, and there is the principal establishment of the India Company. Ships must be towed into it, but they may sail out of it with the wind right aft.

" The other harbour, which is called the Great Port, or Port Bourbon, is situate towards the middle of the eastern coast of the island, and is very capacious and secure. Ships may enter it with a leading wind; but the departure from it is difficult, on account of the prevalence of the south-easterly winds, which blow directly into the principal of the two channels which form its openings. Here it was that the Dutch established their settlement, and built a fort, which they named Frederic Henry. Its foundations, and a part of the walls, still remained in 1753, but they have since

* The result of all these observations, inserted in the Memoirs of the French Academy, anno 1754, p. 118, will be seen hereafter, and the Map of Mauritius, at the beginning of this Work, is reduced from it.

been entirely removed, in order to erect a very handsome building for the reception of the commandant of the port and the garrison, as well as to contain the necessary magazines.

" The island is in general surrounded with rocks, and the bottom of the sea near the coast is covered with coral, madrepore, and shell-fish. There is very little real sand; and that which is found on the sea shore, is little more than the remains of shells. Its coast is lined with reefs, on which the waves break. These reefs sometimes extend upwards of a league into the sea, so that the circuit of the island may be made with great safety in a pirogue. It is only in the southern part that the sea breaks almost on the shore; this circumstance renders it inaccessible except in some places, where a canoe can be secured from the high sea.

" The Isle of France is almost entirely covered with woods, which are of an handsome appearance, particularly on the south-east side; but a passage through is rendered very difficult and troublesome, from the quantity of fern, and creeping plants.

" These plants, whose branches, like those of our ivy, wind about and interlace themselves with the shrubs and dead wood, render the forests in a great measure impassable. Nor can a passage be obtained in any part of them but by circuitous ways, which are known to few. These forests are the refuge of the Maroon Negroes.

" The animals which are found in this island are deer, that resemble those of our own country, and whose flesh is excellent during the months of April, May, June, July, and August. There are no serpents in the Isle of France, and it is said that they cannot live there; while in the surrounding islets, called the Isle *Ronde*, the Isle *Longue*, and the *Coin de Mire*, there are both adders and serpents. I do not pretend to verify this opinion; and all I can say respecting it is, that in the *Coin de Mire*, I have seen lizards twelve inches long and one broad; and that in the Isle of France, I saw only a small species running about the walls, and of the same kind as those which we have in France. My knowledge of botany, is not sufficient to justify any attempt to describe the plants of this island.

" About the tenth part of the Isle of France is cleared and cultivated. Wheat, barley, oats, rice, maize, and millet, are the grains which compose its harvest. Certain portions of land are allotted to the cultivation of Manioc, which is the food of the Negroes. In some parts there are also plantations of sugar and cotton.

" The air is wholesome, temperate, and even cold, particularly in the more elevated plantations. The heat is greater at Port Louis than elsewhere, as the neighbouring mountains protect it from the south-east wind, which prevails throughout the year. The sky is not equally serene in every part of the island. In the middle part it rains almost every day, so that the pools and rivers are constantly supplied with water; while in the north-western district, it rains regularly in the months of January, February, March, and April; and sometimes in May, June, and July. The dry season prevails through the remaining part of the year. Thus the town and the environs of the port are rendered disagreeable and unpleasant, from the dried herbage, and the aridity of the mountains, which have no trees, and are sprinkled with stones. Even during the dry season the sky is seldom clear; clusters of clouds are continually coming from the middle of the island, where it rains almost every day, as has been already observed.

" The winds come generally from the south-east, and are much less violent than at the Cape of Good Hope. There are, however, variable winds from October to April. The barometer varied six lines during the time I remained on the island. In my observatory, which was not elevated more than four or five fathom above the level of the sea, it was at the highest on the 13th of July, 1753, when it was twenty-eight inches five lines and one-third; and on the 10th and 12th of January, 1754, it was the lowest, at twenty-seven inches eleven lines and an half. On these two days there was an heavy rain and an hurricane, which was felt at the Isle of Bourbon. Throughout the year there was no sensible change in the mercury, except that it was a very small degree higher at noon than in the evening.

Continuation of the Journal.

" January 16, 1754. I embarked at the Isle of France, on the ship the Bourbon, commanded by M. Lesquelen, to go to the Isle of Bourbon. We got under way at eight in the morning, and the following day came to an anchor in the road of St. Denis, at one P. M. M. Brenier, who commanded in this island, provided me with a cottage near the government-house, and a black servant to attend me.*

" February 26. I embarked in the evening on board the Achilles, commanded by M. de Beau-briand to return to France. We got under way the 27th at ten A. M."

* The Abbé de la Caille has given no account of this island, as he remained there only forty days.

CHAPTER XIX.

Astronomical Observations made on the Isle of France, &c. &c. in the Year 1753, by the Abbé de la Caille.—Determination of the Longitude of the Island of Madeira, by the Eclipses of the Satellites of Jupiter, observed by M. Bory, Lieutenant in the Royal Navy of France, compared with those of the Abbé de la Caille, at the Isle of France, by M. de Lisle.*

"THESE observations were made with the same instruments which the Abbé de la Caille had employed at the Cape of Good Hope. The place where he fixed them in the Isle of France was expressly fitted for the purpose. Though the sky is generally clear in this island, it proved cloudy at the moment of the greater part of his most important observations; this circumstance proceeded, in a great measure, from the situation of the port, where the principal settlement of the island has been formed, which is surrounded with mountains almost always covered with clouds, which are dispersed by the winds, and successively cover the different parts of the sky.

"Article 1.—His first observation was made the 3d of May, 1753, on an eclipse of the Sun. Having regulated the pendulum by the corresponding heights of the Sun, he observed with the telesope of his sextant, which was seven feet in length, the phases of this eclipse. The largest phase was 8 digits 36 minutes.

"Art. 2.—He observed some eclipses of the satellites of Jupiter, with a telescope of fourteen feet in length, on the 25th of April, at 58′ 38″ past six in the evening. He repeated the same observation of these satellites the 16th of October, at 36′ 12″ past three in the morning; on the 1st of November, at 54′ 4″ past one in the morning; on the 1st of December, at 3^h 51′ 33″; and on the 2d of January, 1754, at 0^h 7′ 48″.

"Art. 3.—On the 5th and 6th of May he observed the transit of Mercury upon the Sun. On those days the weather was very variable; the intervening night was rainy, and it thundered; an uncommon circumstance in this island.

* Extracted from the Memoirs of the Royal Academy of Sciences.

" At six in the morning, Mercury came forth from the clouds which hovered over the mountains, when it had attained an altitude of $7^{\circ}\frac{1}{2}$. He then observed, with a telescope of three feet in length, that it had but just entered on the Sun's disk, and was near a spot, when the sky became cloudy, and it rained copiously till 40′ past eight.

" When the weather was cleared he made his observations with the horizontal and vertical lines, which form, in the focus of the glass of his quadrant, a radius of three feet. He had already verified their position by the horizon of the sea, as well as that of the line of collineation. The times which he gives in his tables are the true ones, and the altitudes are corrected only by the quantity with which the quadrant had increased them, &c.

" Art. 4.—Opposition of Saturn to the Sun.

" Art. 5.—Passage of Mars through its nodes.

" Art. 6.—Opposition of Mars to the Sun.

" Art. 7.—Observations to ascertain the altitude of the Pole, and the obliquity of the Ecliptic.*

" I determined the elevation of the Pole from the place where I made the observation, by the mean of four stars which pass near the Zenith; and served at the same time to verify the position of the axis of the teleseope of the sextant, in regard to the first point of the division, and by the means of the distance of the two tropics from the Zenith. In June, 1753, by five observations from γ of the female Hydra, reduced to the 1st of January, 1750, I found its distance from the Zenith to be 1° 39′ 38″,8, on one side, and by five others, reduced to the same, of 1° 42′ 22″,0, on the other side of the first point of the division; from whence it follows, that the error of the position of the axis of the telesope was 1′ 21″,6; that the real and corrected distance from the Zenith of 1″,2 of refraction, was 1° 41′ 1″,6; and that, supposing the declination of this star on the 1st of January, 1750, to be 21° 50′ 43″,8 south, as in my catalogue, the elevation of the Pole was 20° 9′ 42″,2.

" In the same month of June, the reduced distance of ε of the Crow, from the Zenith, was, by four observations on one side, 1° 5′ 22″,0, and by four on the other, 1° 2′ 42″,7; the error of the sextant was therefore 1′ 19″,7: and supposing 0″,8 of

* The following observations being very important to the cosmographic and maritime situation of the Isle of France, we have thought it necessary to insert them at large, as they have been related by the Abbé de la Caille.

refraction, and 21° 13′ 44″,6 for the declination of the star, the resulting elevation of the Pole is 20° 9′ 42″,4.

" I also found in the same month, the distance of β of the Crow from the Zenith by four observations, on one side to be 1° 52′ 16″,9 and by three on the other, to be 1° 49′ 37″,5, the whole reduced to the 1st of January 1750. The error of the telescope, therefore, was 1′ 19″,7; allowing 1″,3 for the refraction, and taking the declination at 22° 0′ 40″,0, there is for the elevation of the Pole, 20′ 9′ 41″,5.

" In December 1753, I found, by five observations, reduced to the 1st of January 1750, the distance of β from the Whale, to the Zenith, to be 0° 46′ 27″,9 on one side, and by four others, 0° 49′ 15″,7 on the other; the error of the instrument, therefore, is 1′ 23″,9, and supposing the refraction to be 0″,6, and the declination of the star to be, 19° 21′ 51″,1, the elevation of the Pole is 20° 9′ 43″,5.

" On taking a medium between the four errors which have been found, it is evident, that the sextant makes the distances from the Zenith too small by 1′ 21″,2; and it is that error to which I have attended in all the distances from the Zenith, which I have described in the preceding articles; nor shall I fail in doing the same with respect to those which I shall describe hereafter.

" I have also observed by the same sextant, and reduced to the 1st of January, 1750, five distances from ε of Orion to the Zenith; and they have given me, by a medium, 18° 46′ 15″,5: I have added 21″,5 of refraction, and the declination 1° 23′ 3″,3, as it appears in the catalogue which I have cited; from whence I conclude the elevation of the Pole to be 20° 9′ 40″,3.

" I have arranged the following detail of observations and calculations respecting the distances of the Tropics from the Zenith.

	Distances of the northern Extremity of the Sun from the Zenith.			Distances of the Sun from the Tropic.		Distances of the Zenith from the northern Extremity of the Sun in the Tropic.		
	°	′	″	′	″	°	′	″
"1753.—June 20	43	52	34,6	0	13,4	43	52	48,0
21	43	52	46,1	0	0,0	43	52	46,1
22	43	52	28,7	0	11,2	43	52	39,9
23	43	51	55,6	0	47,6	43	52	43,2
24	43	50	57,5	1	48,6	43	52	46,1
25	43	49	29,5	3	14,2	43	52	43,7
26	43	47	38,2	5	4,7	43	52	42,9
Medium						43	52	44,3
Parallax of the Sun						— 0	0	7,2
Half diameter						— 0	15	48,2
Refraction						+	1	2,4
Nutation of the axis of the Earth						+	0	7,5
Distance of the Tropic of Cancer from the Zenith						43	37	58,8
1753.—Dec. 15	2	52	48,3	9	14,1	3	2	2,4
16	2	55	26,7	6	31,5	3	1	58,2
17	2	57	41,7	4	16,8	3	1	58,5
19	3	0	48,6	1	12,5	3	2	1,1
21	3	2	1,0	0	1,0	3	2	2,0
22	3	1	52,7	0	8,0	3	2	0,7
Medium						3	2	0,5
Parallax of the Sun						—	0	0,5
Half diameter						+	16	20,1
Refraction						+	0	2,3
Nutation of the axis						+	0	8,3
Distance of the Tropic of Capricorn from the Zenith						3	18	30,7
Adding the distance of the Tropic of Cancer						43	37	58,8
The distance of the Tropic is						46	56	29,6
Obliquity of the Ecliptic						23	28	14,8
The elevation of the Pole, therefore, is						20	9	44,1

" The precise quantity of the obliquity of the Ecliptic being of the greatest importance in astronomy, I have observed the same solstical distances, with a sector of a radius of six feet, verified by the means of the stars β of the Crow and of the Whale. These are as follows:

	Distances of the northern Extremity of the Sun from the Zenith.			Distances of the Sun from the Tropic.		Distances of the Zenith from the northern Extremity of the Sun in the Tropic.		
	°	′	″	′	″	°	′	″
" 1753.—June 20	43	52	33,3	0	13,4	43	52	46,7
21	43	52	44,1	0	0,0	43	52	44,1
22	43	52	35,1	0	11,2	43	52	46,3
23	43	51	58,4	0	47,6	43	52	46,0
24	43	51	2,8	1	48,6	43	52	51,4
25	43	49	34,0	3	14,2	43	52	48,2
26	43	47	40,8	5	4,7	43	52	45,5
Medium -						43	52	46,9
*1753.—Dec. 23	3	1	17,1	0	43,3	3	2	0,4
24	3	0	15,4	1	46,6	3	2	2,0
25	2	58	39,5	3	18,6	3	1	58,1
27	2	54	10,6	7	47,2	3	1	57,8
Medium -						3	1	59,6

" Making the same reductions of these two distances as of the preceding ones, the obliquity of the Ecliptic is found to be 23° 28′ 15″,6, and the elevation of the Pole 20° 9′ 45″,8.

" The latitude of the place then which I have observed, may be determined to be 20° 9′ 42″,$\frac{1}{2}$, and in referring it to the portal of the new parish church of Port Louis in the Isle of France, 20° 9′ 45″.

" Art. 8. Observations on the length of the pendulum with seconds, at the Isle of France."

* " The observations of the month of December were made in the negative part of the limb of every instrument, in order to get the interval of the Tropics; independently of the verification of the axes of the telescopes."

Extracts of various Observations made by the Abbé de la Caille, during the Course of three different Passages, in his Voyages to the Cape of Good Hope, and to the Isles of France and Bourbon.

" Article 2.—On the variation of the needle.

" The easterly and westerly variations are attentively observed on ships at sea, whenever there is an opportunity, as well to correct the courses, as to rectify the longitude. It is well known that there are many land-falls, which are ascertained by the variation of the compass; such as the Cape of Good Hope, and the Isles of Rodriguez, of France, and of Bourbon. It were to be wished that the variations observed in all ships which make long voyages, and particularly to the Indies, were collected and carefully registered: by this means, from time to time, for example, every ten years, a new edition might be given of the marine charts, where the curves of the variations might be marked, in the manner of M. Halley, as well for the year of the edition of the charts, as for an epocha of ten preceding years. These charts would be of great use in methodising the tracks, and, in many cases, they would give the longitude to land-falls with much greater certainty than by any observation of the moon made at sea. The proprietors of armed vessels should take care also to provide their ships with a good compass; and navigators should have somewhat less confidence in their reckoning, when they perceive that they do not agree with the variation. (See the tables of variation following this observation, pages 101, 102, 103, &c. of the Memoirs of the Academy, anno 1754.)

" Art. 5.—Observations made at the Isle of Bourbon.

" They were made at St. Denis, which contains the principal establishment of the India Company. There I employed my quadrant of three feet radius, a telescope of fourteen feet, and a good pendulum with seconds."

Observations on the Latitude.

" As the Sun passed at noon too near the Zenith, I determined the latitude by the meridian altitude of six stars, three of which were on the north side, and three on the south.

		The apparent meridian Altitude to the North.			Refraction.		Northern Declination.			Height of the Equator.		
1754.		°	′	″	′	″	°	′	″	°	′	″
11th February.	Aldebaran	53	9	15	— 0	49	+ 15	59	30	69	7	56
	The Goat	23	27	20	— 2	26	+ 45	43	3	69	7	57
	β ♉ -	40	46	43	— 1	15	+ 28	22	20	69	7	48
14th February.	Aldebaran	53	9	11	— 0	49	+ 15	59	30	69	7	52
	β ♉ -	40	46	43	— 1	15	+ 28	22	20	69	7	48
							By a medium		-	69	7	52
19th February.	γ The Ship	64	14	7	— 0	31	46	37	37	69	8	47
	ε The Ship	52	8	12	— 0	51	58	43	56	69	8	43
	δ The Ship	57	2	52	— 0	42	53	49	11	69	8	39
20th February.	γ The Ship	64	14	12	— 0	31	46	37	37	69	8	42
	ε The Ship	52	8	9	— 0	51	58	43	56	69	8	46
	δ The Ship	57	2	48	— 0	42	53	49	11	69	8	43
							By a medium		-	69	8	43

" It appears, therefore, that the real height of the Equator is 69° 8′ 17″, and consequently the elevation of the Pole 20° 51′ 43″. It is also evident that the quadrant made the altitudes appear too little by 26″.

" The quarter of St. Denis being at the foot of Cape Bernard, which is the northernmost point of the Isle of Bourbon, the latitude of this Cape, which was due west of the place where I lived, at the distance of five or six hundred paces, may be determined to be 20° 51′ 43″.

Observations on the Longitude.

" February 9, 1754, at 12ʰ 34′ 7″ true time, the first satellite of Jupiter appeared to me to come forth from the shadow: it seemed rather to adhere to the body of the planet, which was in opposition to the Sun on the 1st of this month.

" February 11. At $7^h\ 2'\ 45''$ in the evening, the emersion of the same satellite.

" 13. At $15^h\ 43'\ 10''$, emersion of the third satellite. Jupiter is plunged in a thick mist.

" 16. At $14^h\ 28'\ 12''$, emersion of the first satellite in fair weather.

" 25. At $10^h\ 52'\ 16''$, emersion of the same.

" Not possessing the knowledge of all the observations which have been made, at the same time, in the different places of the world, I shall not discuss here the longitude which is to result from it. In the mean time, however, if we add to these observations, those which M. d'Après made in 1751, it may be supposed that, without any sensible error, the difference of the meridian of Paris, and of St. Denis in the Isle of Bourbon, or of Cape Bernard, is $3^h\ 3' \frac{1}{2}$, and consequently the eastern longitude $53°\ 7'$ or $8'$.

Determination of the Longitude of the Island of Madeira, by the Eclipses of Jupiter's Satellites, observed by M. Bory, Lieutenant in the Royal Navy, compared with those of M. l'Abbé de la Caille, in the Isle of France, by M. de Lisle.

" M. Bory having observed two immersions of the first satellite of Jupiter, and one of the third, at Funchal, the capital of the Island of Madeira, towards the end of the year 1753, and at the commencement of the year 1754, I compared them with those of the Abbé de la Caille, in the Isle of France, which are the only ones that I have found to correspond with those of M. Bory.

" When I speak of corresponding observations, I understand not only those which have been made precisely at the same time, for such are not to be found; but it is well known, that in the use of the observations of the satellites of Jupiter for the longitudes, particularly those of the first, the observations, which were made after two or three revolutions, may be employed, when such as are simultaneous cannot be obtained. But, fortunately, the results that I have drawn from the three observations of M. Bory, agreed within a few seconds; which justifies the use that I have made of them, in comparing them with those of the Abbé de la Caille, with the difference of two or three revolutions.

" In order to reduce to the meridian of Paris the difference which I have found in the Isle of France and the Island of Madeira, I must suppose a known longitude

between the Isle of France and Paris; but I believe that I have sufficiently determined it, by taking the medium of twenty results, which I have drawn from nine observations that M. l'Abbé de la Caille has made on the satellites of Jupiter in the Isle of France. I compared these nine observations of the Abbé de la Caille, with all the correspondent or approaching observations, made in different places, of which I have been able to obtain observations, and the longitude of which, with respect to Paris, was pretty well known. The resulting difference of longitude between the Isle of France and Paris, in taking a medium between these two determinations, was found to be $3^h\ 40'\ 45''$.

"I also examined the result of seven observations of the satellites of Jupiter, made in the Isle of France, in the year 1751, by M. d'Après, and I formed nineteen results for the difference of longitude between that isle and Paris. The mean difference between these nineteen results is found to be $3^h\ 40'\ 22''$; so that taking a new medium between the observations of M. d'Après and those of M. l'Abbé de la Caille, the longitude between the Isle of Frsnce and Paris may be computed to be about $3^h\ 40'\ 35''$; approaching somewhat nearer the results drawn from the observations of M. l'Abbé de la Caille, than those of M. d'Après.

"Supposing this longitude, the following is that of Funchal, as it results from the observations of M. Bory.

"1753—December 28.

	h	′	″
Immersion of the first satellite, observed at Funchal, by M. Bory	18	14	54
Adding for two revolutions - - - -	3; 12	55	7
The immersion should happen at Funchal 1st of January, 1754	7	10	1
It was was observed at the Isle of France 1st of January -	12	7	48
Difference of Funchal and the Isle of France - -	4	57	47
Difference of the Isle of France and Paris - - -	3	40	35
Difference, therefore, of Funchal and Paris - - -	1	17	12

" 1754—January 1.

	h	′	″
Immersion of the first satellite, observed in the Isle of France -	12	7	48
Adding for three revolutions - - - -	5; 7	23	13
The immersion should happen at the Isle of France, 6th of January	19	31	1
It was observed at Funchal, by M. Bory - -	6 14	33	19
Difference of Funchal and the Isle of France - -	4	57	42
Difference of the Isle of France and Paris - - -	3	40	35
Difference of Funchal and Paris - - - -	1	17	7
Immersion of the third satellite, observed at the Isle of France in Jan.	1; 12	32	46
Added for one revolution of that satellite - -	7 3	55	12
The immersion should happen at the Isle of France, 8th of January	16	27	58
It was observed at Funchal 8th of January - - -	11	30	0
Difference of the Isle of France and Funchal - -	4	57	58
Difference of Paris and the Isle of France - - -	3	40	35
Difference of Funchal and Paris - - - -	1	17	23

" The mean difference between these three determinations of longitude at Funchal and Paris, is $1^h\ 17'\ 14''$, or $19^\circ\ 18'\frac{1}{2}$. If, therefore, the first meridian which passes over the Island of Ferro be just 20° from Paris, as is generally conjectured, the town of Funchal should not be more distant from this first meridian towards the east than $0^\circ\ 41'\frac{1}{2}$."

The continuation of these observations may be seen p. 558, and the following pages, in the Memoirs of the French Academy, 1754.

CHAPTER XX.

Life of M. l'Abbé de la Caille.

NICHOLAS Louis de la Caille, was born the 15th of March, 1713, at Rumigni Bourgade, in the diocese of Rheims, situate two leagues from Rosoy, in Thiérache. His father was Nicholas Louis de la Caille, and his mother Barbe Rebuy; and he was allied to many ancient and distinguished families in the Laonois.

" His father, who had served in the Corps of Gens d'Armes, as well as in the Artillery, enjoyed, in 1713, an handsome revenue, and led a retired life, which he varied by cultivating the sciences. He was an excellent mechanic, and invented several very ingenious machines.

" At a very early age, the Abbé de la Caille manifested those talents which promised that he would one day be an honour to his country; but a project in which M. de la Caille had engaged, and had absorbed, in a few years, the whole of his fortune, threatened to destroy the plan which he had formed for the education of his son.

" The late Duke du Maine, however, placed him at the head of an establishment which was about to be formed in one of the American islands. He accordingly repaired to Nantes, in 1725, by order of the Prince, with the design to embark for the place of his destination; but on a sudden that plan was set aside, and he again found himself without situation or employment. The late Dutchess du Maine, then, received him into her service at Anet; where he greatly improved the revenues of his benefactress. He now renewed his attentions to the education of his son, and soon after placed him with the principal of the college of Mante, on the river Seine, who was his friend. In the year 1729 he was entered as a boarder in the college of Liseux, where he greatly distinguished himself by his literary attainments.

" His inclinations appeared at this time to be directed towards the belles lettres, when he laid his hand by chance on the Elements of Euclid; and having made himself master of them, without any assistance or instruction, his reason was captivated

by that study, and he at once devoted himself to mathematical pursuits. He soon after became the pupil of M. Cassini, was settled at the observatory, and surpassed the most sanguine expectations of that renowned astronomer. The first observations of the Abbé de la Caille are in the month of May, 1737.

" M. Cassini, proud of the assistant which he had gained, took every opportunity of declaring his rare and superior talents. M. Maraldi, who was a witness of the extraordinary capacity and progress of the young astronomer, became at once his admirer and his friend. Assisted by these two learned men, he proceeded in his career with the rapidity that might be expected from such a pupil of such masters. He unfortunately lost the former by an unforeseen accident; but the latter survived to continue his friendship and protection.

" In the month of May, 1738, he accompanied M. Maraldi who was employed to lay down the sea chart from Nantes to Bayonne; an operation in which he gave new proofs of his talents.

" M. Dominic Cassini, M. de la Hyre, and M. Maraldi, uncle of the academician of our day, had undertaken, in the year 1690, to trace a meridian from the south to the north of France : this operation was completed in the year 1718 by M. M. Cassini and Maraldi; but as the instruments of that period were less perfect than those which are in use in our time, certain errors were unavoidably blended with it, and twenty years passed away without any attempt being made to correct them. M. Cassini had indeed formed the design, and he now charged the Abbé de la Caille, and his son M. Thury, with the execution of it. This undertaking was also calculated to facilitate the execution of a geometrical description of France, which M. Cassini had been commissioned to undertake by M. Orry, Comptroller of the Finances; and which was necessarily to commence by a parallel of Paris, which M. Cassini had already begun.

" The new meridian was to be traced from Perpignan to Dunkirk. The Abbé de la Caille, therefore, set out for the former place with M. Thury, in the month of July, 1739, and he was no sooner arrived there, than he began that part of the operations particularly entrusted to him, which he continued to the end of October.

" In November he was recalled to Paris, to take possession of the Mathematical Chair in the Mazarin college ; and he then returned to Perpignan. The cold, which became excessive at the end of November, and throughout the following month,

accompanied with snows, and other attendants on an inclement season, did not cool his ardour; he accordingly passed from Roussillon into Languedoc, and from thence into Auvergne, where, in the midst of snows, he continued his scientific labours. He arrived at Paris at the conclusion of the rude winter of 1740.

" On his return to Paris, he assissted M. Cassini in ascertaining the base of M. Picard, and the direction of the meridian from Paris to Perpignan. In the month of July he took the road to Dunkirk, and suffered fresh fatigues. Occupied during the day in preparing his instruments, and fixing machines on the summits of mountains, he made his observations during the night, subject to the injuries of the open air, and frequently without the most common conveniences of life.

" In 1741, M. de Lisle, associate in ordinary to the Royal Academy of Sciences for the department of Astronomy, from the advanced period of his age, demanded his retreat; M. Fouchy passed from the place of assistant to that of associate, and the Abbé de la Caille was chosen by the Academy to replace M. de Fouchy. M. de la Caille was received in the month of May, and appeared for the first time with great eclat in that illustrious Society, by reading, at his introduction, a memoir on the calculation of the differences in spherical trigonometry;—a most profound and elaborate work.

" He presented the Academy the report of an eclipse of the moon, which he had observed at the Hermitage on the mountain of St. Victor, near Aix in Provence, the 13th of January, 1740. This report was received with great pleasure, as the eclipse had not been observed at Paris, on account of the cloudy weather.

" His admission into the Academy was the only recompence the Abbé de la Caille received for the part he took in forming the meridian; he did not obtain a pensionary gratification till after his return from the Cape.

" Before the end of 1741, he published his Elements of Mathematics, and they are considered as a *chef d'œuvre* of perspicuity and precision in the learned world. Various editions of them have appeared in France, and they have been translated into all the principal languages of Europe.

" In 1742, a comet appeared in the months of March, April, and May, and the Abbé de la Caille composed a memoir on its apparition and its course. In the same year he also formed another memoir, containing a method to find the place of the the Sun's apogee.

" On quitting his apartment at the Observatory, he felt himself, as it were, expatriated, and he therefore constructed one at the Mazarin College.

" He made two kinds of observations, the one for his own particular inquiries, and the other for public instruction: in the second class we must comprehend those which he published in 1743, on a comet that appeared in the month of February; on the conjunction of Mars and Saturn; on the passage of the Sun in the parallel of Arcturus; on the conjunction of Mars and Jupiter; on the Sun in its apogeum; on the passage of the Sun in the parallel of Procyon; on the altitude of the upper extremity of the Sun in the tropic of Capricorn; on the planet Mercury in the Sun; on the Sun in its perigeum; with inquiries concerning the place of the apogeum of that luminary.

" In the same year he published his laborious process on the meridian; but would not suffer his name to appear in the frontispiece of the work, and abandoned all the honour to his associate, who did not fail, however, to make all due acknowledgement for the essential assistance which he received from M. de la Caille.

" At length he acquired, what he so well deserved, the character of a consummate astronomer; and having, by his immense labours, acquired a most profound knowledge of his science, he determined to convey to others an acquaintance with its principles. He accordingly composed his Elements of Astronomy, and published an octavo edition of them, with figures, &c. which has been translated into the English, Spanish, and Latin languages.

" He also composed elementary Lessons of Mechanics, and the Elements of Optics and Perspective. Various other curious and admirable papers on astronomical subjects are to be found in the Memoirs of the Academy.

" In 1746, he published the first part of his Ephemeris, which comprehends ten years. There is a kind of Supplement to it in the Chronological Table, which was placed at the head of the *Art to verify Dates*. This table reaches to the year 1800. He composed the part that relates to the eclipses, which is the most important.

" In 1593, a comet had been observed at Zerbst, in the principality of Anhalt, from whose apparition new discoveries might be made in astronomy. M. de la Caille therefore gave the theory of it to the Academy in 1747, with the same accuracy as if he had himself observed it. Waltherus had, at the close of the fifteenth century, made observations at Nuremberg, and M. de la Caille, in 1749, communicated to the Academy his Memoir on Waltherus.

" He continued his unremitted labours on various branches of astronomy, to the great illustration of that science, and the honour of his country, till the year 1750, when he proceeded to pursue his researches in the other hemisphere.

" On the 21st of November, 1750, he embarked at L'Orient, on board the Glorieux, commanded by M. d'Après, and in three weeks arrived at the Cape de Verd Islands: on the 25th of January, 1751, they put into Rio de Janeiro, on the coast of Brazil, where they remained, from some repairs necessary to a small vessel which attended them, upwards of a month. M. de la Caille, however, was not idle during his abode there, but made several important observations respecting the longitude, &c. On the 25th of February they set sail from thence, and on the 30th of March arrived in sight of the Cape of Good Hope, but did not enter the road till the 19th of April.

" The astronomer was received at the Cape with all the honour due to his superior science and character. He began his observations on the 10th of May, 1751, with the parallax of the Moon, and continued them to the 25th of February, 1752. He observed Venus from the 25th of October to the 25th of the following November; and the planet Mars from the 31st of August to the 9th of October. He renewed his operations on the parallax of the Moon in the month of March, and continued them till October. In the interval of his observations he gave his attention to geography and objects of natural philosophy. He sent the details of his first operations to the Academy before his return.

" Ptolemy, who lived in Egypt, gave a catalogue of the southern stars; but that catalogue was incomplete.

" The Portuguese navigators had traced the plan of several constellations, but in such a coarse way that astronomy did not derive any advantage from them.

" In 1677, M. Halley went to the Island of St. Helena, to form a celestial chart of the southern hemisphere, and he observed but three hundred and fifty stars.

" At the commencement of the present century, the Baron Krosick had charged Peter Kolbe, a Prussian, with the same commission as that of M. de la Caille; but he did not answer the expectations of the German nobleman who employed him. Thus the descriptions of the southern hemisphere, when M. de la Caille arrived at the Cape, were nothing more than rough outlines.

" He began to observe the southern stars the 6th of August, 1751, and continued that labour till the same month in the following year. He beheld, in all their lustre,

large stars which were not known to the astronomers of Europe but by their nebulous shapes.

" M. de la Caille had directed his first attentions only to the stars of the first, second, third, and fourth magnitude: having, however, a favourable opportunity, he determined to include within his calculation those of the fifth, sixth, and seventh magnitude.

" On the 17th of February, a very thick and unwholesome fog arose at the Cape, and M. de la Caille was affected with all the disagreeable consequences of it. He however recovered in the same month of the year 1752, in which he died in the year 1762.

" As soon as he had completed his catalogue of the southern stars, he compared it with the planisphere which had been laid down by M. Halley in 1677; and he found that he surpassed by 9450 stars that of the English astronomer.

" After having examined the planisphere of Halley, as well as those of Ptolemy, and the Portuguese pilots, M. de la Caille found place for fourteen new constellations, better furnished, and more exact than those of the ancients, which required a general reformation.

" On the 8th of March, 1753, he embarked on board the French ship the Puissieux, bound for China, and which was to touch at the Isles of France and Bourbon. During the passage from the Cape to the Isle of France, he made an experiment which has proved very useful to sailors, of a simple method of finding the longitude at sea. He has inserted it in his Ephemeris, as well as in another of his works, and it may be considered as one of the most important services which he has rendered to mankind. He arrived at the Isle of France the 18th of April, forty days after his departure from the Cape.

" An account of his operations in the Isle of France are to be found in the Memoirs of the Academy of the year 1754, and in his Historical Journal. He embarked the 15th of January, 1754, for the Isle of Bourbon, and arrived there the following day. After he had fulfilled the object of his mission, he embarked the 27th of February following on board the Achilles, and returned to France.

" On the 15th of April the ship came to an anchor before the Isle of Ascension. M. de la Caille remained there only five days, but he availed himself of the opportunity to determine the position of the place; a very important point for ships on

their return from India to Europe. He re-embarked on the 20th of April, and arrived at L'Orient on the 4th of June, after a very fortunate voyage.

" On the 28th of the same month he returned to Paris, after an absence of three years and eight months; when, his first care was to digest his observations, and compare them with those of his correspondents, in order to put the last hand to the great work of his mission. He first detached 1936 stars from his general catalogue, which the Academy placed in its Memoirs. He deferred giving his observations on it to the year 1760, in order that nothing should be wanting which might advance their perfection. A great part of this important work was printed at the expence of the author, who had not, however, the satisfaction to see it finished.

" Besides the two parts of the relation of his voyages, M. de la Caille enriched the Memoirs of the Academy with many important pieces. In 1757, he presented to the public his work entitled *Astronomiæ Fundamenta*; one of the most important that had ever appeared on that science, and which proves its author to have obtained a complete knowledge of the two celestial hemispheres. It consists of a quarto volume, which is followed with Observations on the Refraction of the Stars, and Solar Tables of the same author, which appeared in 1758.

" In 1759, he presented various memoirs to the Academy on very important subjects of astronomy; and in 1760 he formed the design to determine a certain number of zodiacal stars; and invented an instrument for the purpose of carrying it into execution. He observed six hundred zodiacal stars during the two years 1760 and 1761.

" In the month of June in the same year, M. de la Caille had begun a great work, which occupied all his attention, when he was attacked by the disorder of which he died. It was a Course of Observations on all parts of the Heavens, relatively to each other; from whence a degree of certainty in operation would result, which must be of the utmost utility to astronomers.

" He maintained a constant correspondence with the most distinguished astronomers and mathematicians of every part of the world. His correspondent at Pekin was Father Benoit, his former pupil, who was become a resident in the palace of the Emperor of China, in that city.

" In 1761, he paid his academical tribute of five important memoirs; and he read before the assembled Academy, a Discourse on the Progress of Astronomy during the thirty preceding years.

" He had long been solicited by his friends to augment the treasures of literature, by an history of astronomy, from its origin to his own improvements in that science; and he constantly resisted their entreaties, till the voice of the public demanded this important work at his hands: but death, which too often interrupts human projects, stifled this admirable design at the moment of its conception. What such a work would have been, may be conceived from the character of the man who had undertaken it; and that he did not live to complete it, must be regretted by all who are interested in the advancement of science, and the improvement of mankind.

" M. de la Caille had completed his forty-ninth year, when his constitution began to give way, and at the end of February, 1762, he was attacked by the same disorder which he had suffered at the Cape in February, 1752; and on the 21st of March he departed this life, at the same age as his father, and in the same month in which he was born. It would be needless to describe the universal regret which followed the loss of a man equally dear to science and to virtue."

CHAPTER XXI.

Extracts from the Observations of M. Le Gentil, Royal Academician, respecting the Southern Hemisphere, &c.; in a Series of Letters to M. de la Nux, Correspondent of the Royal Academy of Sciences, at the Isle of Bourbon.

Isle of France, Feb. 6, 1761.

**** "I AM occupied in calculating for *Rodriguez*, the transit of Venus over the Sun, on the same principles employed to calculate it for Paris. I have found that, at the moment of the entrance of Venus, the centre of the Sun should be elevated above the horizon of *Rodriguez* near 2 °.

"The calculation of M. de la Lande, founded upon somewhat different principles, affords me some encouragement; for this Academician has found it to be near 8°: and as to the corrections that M. de la Lande has made of the astronomical tables of M. M. Cassini and Halley, which you must have seen in the Ephemeris of 1761, that I have sent you; do they appear to you to be well founded? In short, may I not at least suspend my judgment as to the preference which ought to be given to his calculation, or mine?

"Another cause renders the moment of the entrance of Venus very doubtful and uncertain at *Rodriguez:* you know, as well as me, that in the seas which surround your isles, the months of June, July, and August, form a season when strong gales from the south-east to the east-south-east prevail, and which are seldom accompanied with a clear and serene sky; so that it very seldom happens that the Sun can be seen at its rising, and not often till it has attained a considerable degree of elevation; because these gales render the horizon misty, or form a range of clouds considerably above it. Such are my doubts respecting the Isle *Rodriguez* as a place to observe the entrance of Venus on the Sun; but it is very probable that I shall myself visit that island, as it is now the 6th of February, and I am without the hope of any other resource."

Isle of France, June 23, 1761.

* * * "I have found an observation on the departure of Venus, made by our friend M. de Seligny,* and I have made use of it to determine the meridian where I was when I observed Venus. This officer, who is a very good and zealous astronomer, has an excellent pendulum with seconds, and knows how to employ it."

On the high Seas.

"The ships which go to China having got to the 118th meridian of Teneriffe, on the 34th or 35th parallel, are then very near the land of New Holland, and consequently enough to the east not to be in a situation to miss the Strait of Sunda, but from ignorance or neglect. It is also at 118° of longitude that these vessels begin to turn, by the aid of the south-east wind, towards the island of Java, and endeavour to stand in to the middle of it. This precaution is absolutely necessary, in order to get to the windward of the strait, for if a ship gets to the leeward, it is very improbable she would be able to enter it; the voyage would be lost; and the only resource that is left would be to proceed to the windward, in order to gain the Strait of Malacca, if the season should not be too much advanced.

"We entered into the line of the south-east winds, which we found towards 30° of latitude. While we kept the latitudes of 34° and 35°, we had very high seas; but if the waves were very high, they were at the same time so long, that their extremities were lost in the distance, in the same manner as those which are found on the other side of Africa when we have passed the tropic of Capricorn, to double the Cape of Good Hope. When we had got into the variable winds we had no more of these long waves, but found in their place a short divided sea.

"The European seas are also very long, as well as all those which extend from this part of the world to the Cape of Good Hope. These long seas are not so dangerous as the short ones. Off the Cape of Good Hope the sea is almost always agitated by enormous waves, which encounter each other in two and sometimes three different directions; forming the highest seas as yet known in any part of the globe. Seamen who have passed Cape Horn in bad weather, and the Cape of Good Hope, have universally declared, that if the waves ran equally high at Cape Horn as they do at the Cape of Good Hope, the former would be absolutely impassable, because the wind blows there with greater force. When you have doubled the

* M. de Seligny was an officer in the sea service of the India Company.

Cape of Good Hope, and have got up to 30° of latitude, in the Ethiopic Ocean, you no longer meet with any of these long seas of Europe, and of the west of southern Africa. In this ocean the waves are short and divided. These seas frequently strain the ships much more than the long waves, particularly after a gale, as the wind increases the division of these waves, so as to give them the shape and size of sugar loaves, which proves always very distressing, and sometimes very injurious to ships.

" The reason why the sea is so high at the Cape of Good Hope, and that it is less so at Cape Horn, appears to me to be as follows: beyond the former cape, between the Tropics, and in the different parts of India, the sea forms, as it were, a kind of bay, sprinkled with isles and comprehended within coasts, which, though at a great distance from each other, are the cause, nevertheless, of the periodical winds which blow there. The sea, therefore, may be said to be confined between those parallels.

" When you are once got to the Cape of Good Hope, the waters appear to be no longer in a state of confinement, but are entirely free, and left, as it were, to themselves, through an immense space of latitude and longitude. The west winds are then at liberty to extend themselves, and to raise up the sea at the Cape, while the immense bank at the point of this Cape contributes, with the wind, to swell the waters of this part of the ocean.

Birds.

" I remarked that the *Damiers* quitted us at 30° and some minutes of latitude, and that we found them also in the same degree; so that these birds do not go as far as the tropic. It appears that they delight in the west winds, and that the nature of the general winds drives them from their limits.

" The *Paille en Cul* is altogether different. It would be curious to know the precise latitude which forms, as it were, the boundary of these *Damiers*.

" We found ourselves on the 23d of June in the latitude of the *Trialles*, at 125° of longitude; the charts place them in 119°. During the night, we run on short tacks in the offing, from the fear of falling in with them. We passed the whole of the 24th without seeing any thing; and I thought it very singular that we did not even see any birds, which are certain indications of land or insulated rocks. We saw two *Paille en Culs*; but it is well known that these birds are frequently seen at

fifty leagues from their habitation, and this distance does not prevent them from returning thither every evening: though they will sometimes pass the night on the upper yards of ships which they chance to meet."

On the Voyage to China.

Pondicherry, October 1, 1768.

"With respect to the supposed passage to China by the north-east, I shall consider two points:—The reality of the passage,—and the advantage which the commerce of Europe might derive from it.

"In the first place, I am firmly persuaded that no such passage exists; and I am of opinion that the Dutch have proved its non-existence, in their third voyage, particularly in the vicinity of the North Pole.

"With respect to the advantages that Europeans might derive from these voyages, I cannot discover any; and I think that voyages from France to Canton by the north-east, would be almost as long as they now are by the Cape of Good Hope.

"I will suppose, for a moment, that this passage exists during a month, or five weeks at most, in the year; that is to say, during a part of the months of July and August; with this restriction, nevertheless, that there would be certain years in which this passage would open and shut a little sooner or later.

"This being agreed, I do not hesitate to declare, that a ship which should make her voyage to Canton in China by this passage, and should return by the same, would employ seventeen or eighteen months.

"Now the voyages to China by the Cape of Good Hope, including the time which ships employ in different ports, are only from seventeen to eighteen months; nothing therefore would be gained by the supposed passage. We will endeavour to illustrate this idea.

"It is impossible to enter into the Chinese Seas from any quarter but by the assistance of the monsoons.

"These winds are regulated there, as they are in the Indian Seas; that is, they blow from west to south-west and by south from the middle of May to the middle of October, and during the rest of the year they blow from the north to the north-east by east. The times are ascertained when ships are to arrive in their respective regions.

" The ships arrive in China in August and September, and depart from thence, at the latest, in the early part of February.

" This monsoon is not exclusively possessed by the Chinese Seas, but extends beyond the Island of Formosa to the Seas of Japan.

" The Dutch at Batavia, the only Europeans who send a ship to Japan, and consent to be insulted once a year by the Japanese, to be the exclusive possessors of its commerce,* are very attentive in the middle of the west monsoon, in order to double the Cape Bajador in the Phillipine Islands, and to pass through the strait which is formed by them and the coast of China. This vessel returns to Batavia with the north-east monsoon.

" The Chinese junks, so ill calculated to resist strong gales, and which, of all the vessels in the Eastern seas, have the greatest occasion for regular winds, are very careful not to undertake a voyage against the monsoon. Several of these vessels go from Emouy to Manilla, where they arrive at the latest in April, and return from thence the latter end of August or the beginning of September. Without this precaution they would not be able to reach Emouy, whose position at the entrance of the channel is such, as to be inaccessible to all vessels coming from the Chinese Seas or Manilla, during the season of the north-east winds.

" According to these certain and invariable rules, which no one acquainted with the subject will hesitate to admit, I will suppose that a ship has opened the north passage by the middle of August, it cannot, nevertheless, enter the Chinese seas by Cape Bajador before the month of September, when the west monsoon has not quite ceased, and the east monsoon has not begun to blow. When this ship is arrived at Canton, it will be obliged to remain there till the middle of May in the following year, at a great expence and charges; as it cannot leave that port to get

* The Dutch cannot come to an anchor on the coasts of Japan: their ship remains at a small island appropriated for that purpose, at the distance of some leagues from the continent. No sooner is the ship come to anchor than the Japanese go on board, take possession of the sails and helm, and carry them on shore. The Dutch then present the invoice of the cargo to certain commissioners, who set their own price on the articles it contains, as well as on those which are to be given in barter. The Dutch are entirely passive in this commerce: the Japanese unload their ship, and furnish it with a new cargo, according to their pleasure, without any observation being made as to the articles it contains, or the quality of them. The sails and helm are then returned, with an order for the ship to get under way as soon as it can be refitted for that purpose.

back to the seas in the vicinity of Japan till the return of the west monsoon. This vessel will have but two months at most to arrive at the entrance of the northern passage, and if unfortunately it should meet with any obstacles or delay during that period, it will risk the arriving too late at the passage, and find it shut.

"It appears indeed to me, that obstacles are not only possible, but probable; because beyond 40° of latitude, whether northern or southern, the winds are variable, as is well known; and even blow oftener from the north-west to the south-west, than from any other point of the horizon. Now, the west or north-west winds, which are very good winds for the outward voyage, would oftentimes prove contrary on the return: but supposing a ship should meet with every favourable circumstance, she cannot clear the passage and get back to France before the end of September: thus, as she must have taken her departure, at the latest, in the first week of May in the preceding year, the voyage will last seventeen months, without even allowing not only for possible but even probable delays.

"The French ships which sail to Canton by the Cape of Good Hope, take their departure in the beginning of January, and return about the end of June in the following year, which forms a period of eighteen months, including near two months stay at the Isle of France.

"They might also, instead of putting into the Cape, draw their refreshments from the Straits of Sunda; the ships might in that case leave France in the months of February or March, so that the voyage would not be more than fifteen or sixteen months, allowing for accidents. It appears, therefore, that the voyage by the north-east would be the longest by a month or six weeks.

"If it is objected to me, that the ship which I suppose to have gone to China by the north passage should return to France by the Cape of Good Hope, and consequently the voyage would not occupy more than fourteen months, and that so far from losing a month or six weeks, as I have supposed, that space of time, on the contrary, would be gained; I shall answer, that it is not certain, allowing the ship to arrive in China in the month of November, that it can complete its cargo for Europe before the middle of January, when it is absolutely necessary for her to leave China, (if she is to put in any where), in order to double the Cape of Good Hope: I will however suppose, that she may be able to sail from Canton, from the 15th to the 20th of January, and that thereby the voyage, would be shortened a month or forty days;

but I shall beg leave to ask, if the time thus gained would counterbalance the risks and dangers that are inevitable in the navigation by the north? and if it would be prudent to suffer two ships, worth upwards of three millions of livres, which is the value of the China cargoes, to return by that passage?

"The navigation by the Cape of Good Hope is so certain, that a common seaman is qualified to take a ship to China by that course, and bring her back to France in good condition.

"By the north, however, the most skilful and experienced seaman will find it a difficult undertaking to conduct a ship to China; but even if the voyage should be successful, it cannot be denied that it would be almost as long as that by the old course of the Cape of Good Hope."

Navigation from the Isle of France to Cadiz

* * * * "Don Joseph de Cordova fitted up for me on board his frigate, a large chamber, which was equal in size to two of those which I had before occupied. We set sail from the Isle of France the 30th of March, 1771, having very fine weather, and constant winds from the south-east to the east, till we reached the Mozambique Strait.

"We had passed considerably to the south of the coast of Africa, where the tempests are much more frequent, being in the parallels of 37° to 38°, than along the coast. I have been informed by very experienced seamen, that along the coast of Africa there is a strong current that runs to the west, at least, during this season, and that in 37° or 38°, and beyond, the current runs to the east, that notwithstanding the violent winds which always blow from the western quarter, are in direct opposition to the current; the current continues its course to the west, and enables ships to double the Cape in the teeth of the winds, while in 37° and 38° the wind and the current take the same direction.

"The ships which return from India, with a view of doubling the Cape in the winter, must not get to a great distance from the land. They may keep in the offing during the night, but in the day they must approach the shore, and, if possible, never lose sight of it; so that they may double it by the aid of the current: but if, on the contrary, from a mistaken apprehension of getting too near the coast, they drive away to the south as far as 37° or 38°, these ships will have both winds and

currents to encounter, and consequently risk a failure of their design to double the Cape.

"This manœuvre gives a probability to the voyages of the ancient Egyptians round Africa, as mentioned by Herodotus; for the smaller the size of the vessel, the greater is the facility of doubling the Cape, even in the most unfavourable season; because, from its drawing but little water, it can approach nearer the land, and take refuge from any violent gale, in some creek or bay; or shelter itself under some cape, as the winds never pass the south-east point of the compass, and calms never fail to succeed, and continue during three or four days, as it happened to us. During this interval the winds blow very faintly from the south-east to the north; they then get to the north, where they seem to recover their strength to prepare another tempest; but, in the interval, the little vessel quits its place of refuge, and takes advantage of the fair weather.

"M. de Flacour, in the last century, in order to get back from Madagascar, doubled the Cape of Good Hope in a small sailing boat. I have no doubt of the truth of this relation; and it was, probably, the same kinds of boats, or at least vessels of the same size, which the Egyptians employed; for it is not stated that they were governed by the seasons in these voyages.

"We had, as far as the Tropic, changeable winds, that varied from north-west to south-west.

"In this vast extent of seas I observed a very singular phænomenon, which I find very difficult to explain.

"We had some very blowing weather from the north to the west-north-west, which was always announced by an heavy sea, that, several previous days, appeared to come from the south-west quarter; and I have often remarked that the strength of the north-west wind was always in proportion to the swell of the south-west sea.

"I should not perhaps have given any attention to this fact, if M. de la Londe, an old officer in the naval service of the East India Company, had not first suggested it. He told me, when we were passengers together on board the Indian, that being at anchor at the Cape of Good Hope, a heavy swell from the south-west, which lasted two days, made him apprehend a violent gale from that part of the horizon; but, on the contrary, the gale proceeded with uncommon fury from the south-east.

"On the 31st of July, at five P. M. we saw Cape St. Vincent, and in the evening of the following day we came to an anchor at Cadiz."

Inclination of the Needle of the Compass.*

Although the inclination seems to be the first property of the magnet, the observations on that subject have been neglected, either because their utility have not been perceived, or for want of proper instruments.

" M. l'Abbé de la Caille being possessed of better instruments than any of his predecessors, and employing all that precision which is known to have accompanied his operations, found no inclination at $11\frac{1}{2}^{\circ}$ south latitude. With the individual compass of M. l'Abbé de la Caille, eighteen years after him, I found no inclination in nearly the same situation, or at $10\frac{1}{2}^{\circ}$. This fact, therefore, is incontestible.

" When M. l'Abbé de la Caille gave me his compass, he engaged me to repeat the observations which he had made; because, in presenting it alternatively to the north and the south, he found, to the south of the Line, an inequality in the inclination as far as 3°; and he did not believe that this difference arose, as M. Bernoulli thought, from any defect of equilibrium in the original construction of the instrument.

" On observing with the utmost care, and in repeated experiments, the inclination in the Isle of France, we determined the difference to be from 2° to 3°.

" The fleur de lys to the north	-	-	53° 37′
——————— to the south	-	-	52 14

" That great astronomer observed the inclination in his voyages, but they are confined to the Isle of France. It appears that he entertained no idea of the manner in which the compass is affected in the Ethiopic and Indian seas: nevertheless, he must have been surprised on finding the inclination of the compass at 52°; while he observed it to be about 20° in the same latitude as the Isle of France, on this side of Africa.

M. de la Caille perhaps imagined, that this difference of 32° might proceed, in some measure, from the difference in the longitude of the two places where he had made his respective observations, as that amounted to about seventeen hundred leagues.

" In the year 1762, when I was in the Bay of D'Antongil, in the Island of Madagascar, in $15\frac{1}{2}^{\circ}$ of south latitude, I observed the inclination to be 46°, and consequently, that the needle could not be horizontal at the latitude of $11\frac{1}{2}^{\circ}$, as M. de la Caille had seen it in nearly the same latitude, on the other side of Africa.

" In the year 1766, I repeated this observation, on board one of the King's ships,

* For the variation, see the Chart of the Ethiopian Archipelago, p. 362.

the Bon Conseil of sixty-four guns, bound to Manilla, when I was in the latitude of the Bay of Antongil, and found the inclination near 40°; which makes 7°, or $7\frac{1}{2}$° of difference with that which I had observed in that Bay; but I was then near twelve hundred leagues to the east of it. It is certain, therefore, that the inclination of the compass cannot be of any use in finding the longitude; nevertheless, I soon perceived that the needle would not become horizontal till we had passed the line, and had even advanced a little into the northern hemisphere.

"I continued my attention to the needle till I saw it horizontal; I continued it also in the Straits of Sunda, where the sea being as smooth as a glass mirror, the deck of a ship is as steady a position as the earth itself; and there is every opportunity to repeat observations. Under the line, the inclination was about 15°; and the needle was horizontal at 8° north latitude.

"Thus the loadstone has no inclination at $10\frac{1}{2}$° of south latitude in our ocean, and at 8° of north latitude in the Indian seas; that is to say, in the seas of Siam and Camboia. I have arranged a very comprehensive table of my observations, and in the margin I have marked, with the different degrees of latitude, my distance from the land at every observation.—The result of them is as follows.

"In returning from Manilla to Pondicherry, on board a Portuguese ship, by the Straits of Malacca, between $1\frac{1}{2}$° and 4° of north latitude, where the sea is smooth and tranquil, I traversed them with the compass in my hand, to Negapatam, in 11° north latitude. From the observations which I made at this time, I found that the needle is horizontal in these seas, in $10\frac{1}{2}$° of latitude near the Peninsula of India, nearly the same as it is on this side of Africa, in $10\frac{1}{2}$° south latitude. This is about 2° more to the north than I had seen it, in the Seas of Siam and Camboia, when I was on board the Bon Conseil.

"It was my intention to verify, on my return into these seas, when I should have got into $8\frac{1}{2}$° of latitude, my observations on board the Bon Conseil, but that was not possible. We were driven onwards by the north-east monsoon, which is a very strong wind in these latitudes. The sea there runs very high, and we had the wind abaft. Besides, our ship was very heavy, and as it rolled, the water frequently dashed in through the gang-ways. I attempted to make some observations, but the motion of the ship was so violent, as to render every endeavour of that nature impracticable.

" It was not till we had got into 4° of latitude, that the sea would allow me to make the first observation on the inclination of the needle; we then approached the Strait, and were in a small archipelago, where the sea was more tranquil.

" My observations from that time, till we arrived at Negapatam, are very exact, and serve reciprocally to verify each other; for when we had once got out of the Gulf of China, my observations were confined between 4° and 11° of latitude: now, as the course of the ship was several times in the same latitude, I had frequent opportunities to verify my observations.

" When I passed from Pondicherry to the Isle of France, on board the Company's ship the Dauphin, I continued to make my observatioas with the same care that I had given to those which had preceded them. The needle became horizontal at $8\frac{1}{2}$° north latitude; very nearly the same as I had seen it in the seas of Siam and Camboia; and it is to be remarked, that in these two positions, I was from fifty to sixty leagues from the great continent.

" On the coast of Coromandel I found no inclination in $10\frac{1}{2}$° of latitude, and I was half a league at least from the coast: so that these 2° of difference that I found in the Indian Sea, proceeds probably from the vicinity of the great continents.

" When we arrived at the line, in the same ship, the Dauphin, I found the inclination 18°; and at $15\frac{1}{2}$° south latitude, which is that of the Bay of Antongil, I found the inclination 45° I have observed already that it was $46\frac{1}{4}$° in this Bay; but, on board the Dauphin, I was six hundred leagues to the east of it. The inclination, therefore, from the meridian of the Bay of Antongil from the place of my reckoning, was but $1\frac{1}{4}$°; then it is only $1\frac{1}{4}$° for six hundred leagues difference in longitude. The difference was much greater on board the ship of war, the Bon Conseil, it being about 6° for eleven or twelve hundred leagues; but I was then very near the Isles of Sunda, which might in some degree, affect the inclination.

" It would be equally curious and interesting to know the effects in the South Sea, between the Philippine Islands and America, in the northern part of that vast ocean; where there are only a few small islands scattered here and there, in an extent of longitude of two thousand leagues. It appears by an observation of Father Fueillée, made at Lima, that the needle should be horizontal at about 8°, 9°, or 10° of north latitude.

Fueillée, made at Lima, that the needle should be horizontal at about 8°, 9°, or 10° of north latitude.

"M. de la Condamine found at Quito, in 0° 13′ south latitude, that the variation was 15° and 17°, which answers exactly to the observation that I made on the ships the Bon Conseil and the Dauphin, in the Indian Seas; from whence it follows, that the variation cannot subside but towards 8° or 9° of north latitude. It appears to me then probable, that in the whole of the South Sea, in an extent of two thousand leagues, which I have just mentioned, the needle is horizontal at about 9° of north latitude.

"It is only then in our ocean, which is so straitened by Africa and America, in which the variation would subside in the southern part of the globe: it is therefore the two great continents of Africa and America which change the direction of the magnetic matter, so that there should be no variation somewhere under the Equator, in Africa and America."

CHAPTER XXII.

Extracts from a Letter of Baron Grant, relative to the Isle of France.—Observations on India.—Brief Account of Pondicherry, &c.

LETTER XIII.

Isle of France, October, 1754.

* * * * IF it were not that we apprehend a war, and the sudden arrival of our enemies, it would be no common folly to leave so delightful a climate as this.

When I first arrived at Mauritius, I heard the inhabitants observe, that nothing was to be done by way of advancing one's fortune; and an ordinary maintenance was all that could be expected. My experience, however, is in direct opposition to such a declaration; and I perceive that every year the revenues of the inhabitants increase. If I had not a family and relations in France, whom I love and long to see again, I should be very well contented to finish my days here; but having had the misfortune this year to lose the most amiable of wives,* and my second son being dead lately of the small-pox; these cruel accidents determine me to prepare myself for my departure; and, in the mean time, to send my only son immediately to France.

We have received the pleasing assurances that M. David, our Governor, will return; he is impatiently expected here, and will be received with the sincerest pleasure by us all. I have no reason to complain of M. Bouvet, his brother-in-law, whom he appointed to occupy his situation till he should return, or a successor be named; on the contrary, I feel myself indebted to him for many acts of attention and civility. We understand there is a difference among the Directors respecting the return of M. David; we shall however know their decision by the ships whose arrival is now the object of our impatient expectation. The harvests have very generally failed throughout the island. I am this year the only fortunate cultivator in it: I sowed two thousand two hundred pounds of corn, and have gathered sixty-six thousand. * * * * &c.† GRANT.

* She was a lady of the family of Grenville, whom Baron Grant married in the year 1746.

† We suppress, in the Letters of Baron Grant, many observations which would be no more than repetitions of the different authors cited in this Volume.

Observations on India, in a relative View to the Isle of France.

Though the immediate object of this Work is the Isle of France, it is so connected with India, as well as the principal points on the various coasts of the Indian Ocean, that some account of the Peninsula of Hindostan seems to be necessary, in order to elucidate what has been already said, and will hereafter be mentioned. I shall therefore add, to the notes of my father, a brief detail of the principal events which have passed there, since the Isle of France may be supposed to have had any connection with it, from its subjection to the power of France.

Pondicherry being the principal establishment which the French possessed on the coast of Coromandel, and the centre of all those operations, I will first give a short account of the origin of that establishment.

Pondicherry.

The first project for a French East India Company was formed under Henry IV. by Gerard le Roi, a Flemish navigator, who had made some voyages to India in Dutch ships. The King, by letters patent in 1604, granted to him and certain associates very encouraging privileges, and an exclusive trade for fifteen years: but this scheme was not carried into execution. Five years after he formed a new association, and obtained other letters patent, dated 2d of March, 1611. Four years however passed away without any enterprize being undertaken: some merchants of Rouen, therefore, solicited the transfer of these privileges to them, and engaged to fit out a certain number of ships for India in the course of the year 1615. The associates of Gerard immediately opposed this demand; when the King, to conciliate the interests of these two Companies, united them by letters patent, dated 2d of July, 1615.

It is not known, with any degree of certainty, that their navigators reached India; but it can be ascertained that, in 1616 and 1619, they set sail towards the southern coast of Africa; and it is probable that the French then landed for the first time in the islands of Madagascar and Mascaregnas, of the latter of which they took possession some years after.

In 1642, a new commercial company was formed under the auspices of the Cardinal de Richelieu, which took the name of the Company of Madagascar. It made some progress in that island, established a colony of an hundred French

people, and built a fort there, in a place called *Folenbaren*, in 25° 30′ south latitude. During the ten years, which was the period allotted by the patent to its exclusive privilege, the Company sent several vessels to Madagascar, and expended considerable sums of money, without deriving any advantage from it. Its funds being exhausted, the Marshal de la Meilleraie, and M. Fouquet, possessed themselves of the privileges of the Company. The first fitted out several armaments at his own expence; but his designs were interrupted by his death, in 1664, though they proved of great utility to the new Company. Chamargou, Governor of the island for the Marshal de la Meilleraie, and from whom he held his commission, pushed on the conquests begun by Flacour, La Roche Saint André, and other navigators: he completed the submission of the whole country, and exacted tribute of two hundred thousand islanders, although his whole force did not exceed an hundred and sixty adventurers.

The inconsiderate zeal of a priest of the mission of Saint Lazarus, was attended with very unhappy consequences to the colony. An idolatrous Prince of the country, who had hitherto been a friend of the French, having refused to embrace the Christian religion, the missionary, instead of alarming him with the anger of heaven, threatened him with the vengeance of the French. The exasperated Prince immediately sacrificed the priest and a person who accompanied him; and forty French people were also massacred by a party of his soldiers, who had formed an ambuscade for that purpose. Those who escaped the same fate, were the victims of disease; and the establishment of Madagascar was menaced with approaching ruin.

The deplorable state of this colony induced M. Colbert to form a new Company, not only to re-establish the affairs of Madagascar, but to extend the commerce of France to the East Indies. Nine principal merchants, with a Secretary of the Council as their President, were charged with the direction of the Company in the capital, and other arrangements were made in the provinces. The King, in the edict of establishment, dated the month of August, 1664, engaged to lend three millions of livres to the Company, without interest, or the reservation of any part of the profit during ten years; and at the same time charged himself with any loss that might be sustained during that interval. But the edict also exacted, that each of the proprietors of stock should furnish, at least, the sum of a thousand livres;

and to render the Directors more attentive to their functions, those of Paris were obliged to subscribe at least twenty thousand livres, and those of provinces the moiety of that sum.

The first armament was completed in the month of March, 1665. It consisted of four vessels, which were sent to Madagascar, now named the *Isle Dauphine*. M. de Beausse, who went with the squadron, was appointed the Governor. Orders were also given to examine, in their way, the Isle Mascaregnas, as well as a neighbouring isle, of which the French had possessed themselves some years before, and had been named the *Isle de Bourbon*. Twenty passengers, whom the squadron now left there, laid the foundation of that establishment, which France has possessed from that period.

The differences that took place at Madagascar, between the officers of the new Company, and Chamargou, the agent of the house of Mazarin, prevented those advantages which might otherwise have been derived from this first expedition.

The following year the Company fitted out twelve merchant ships, which were escorted by four of the King's ships, commanded by the Marquis de Mondevergue, who was invested with the rank of Admiral and Lieutenant General in all places beyond the line. Caron and De Faye, two experienced merchants, were on board this fleet. Mondevergue arrived the 10th of May, 1667, in sight of Madagascar, and came to moorings in the road of Fort Dauphin. Though the French had been upwards of twenty years established in this place, it was in such a miserable and neglected state, as at once to astonish and mortify the new Governor. De Faye and Caron were charged with the direction of all commercial concerns; but these new agents soon perceived, that the hopes which had been excited respecting the trade of Madagascar had no foundation whatever, and that this island could yield no advantage but as a magazine for the merchandize of India. The report from these persons was dispatched for the information and instructions of the Company; and, in the interval, the squadron set sail for Surat, and in 1668 the foundation was laid of the first factory that France possessed in India.

M. de la Haye succeeded to the Marquis Mondevergue, who had not conducted himself to the satisfaction of M. Colbert, and arrived in the road of Fort Dauphin, in 1670, with a fleet of nine ships, which carried from thirty-four to fifty-six guns. He experienced the same obstacles that his predecessors had done, from Chamargou and the other colonists of the island, who were always caballing in opposition to the

interests of the new Company. He therefore abandoned Madagascar, and passed with all the troops that he had brought from France, to the Isle of Bourbon. Although this last establishment had not been formed more than five years, there were already four plantations. This colony has continued to increase from that period: in 1717, it contained two thousand inhabitants, of which eleven hundred were slaves. Their number has since doubled.

With respect to the Island of Madagascar, the Company, after a prodigious expence in maintaining their establishment there, were forced to abandon it. Chamargou, supported by De la Case, another famous adventurer, supported his authority during his life; but, after the death of these two brave men, the French colony was entirely ruined. Some have attributed its destruction to the Dutch, who, in a descent which they made at Fort Dauphin, towards the year 1672, massacred the greatest part of its inhabitants; others pretend that the natives of the island prevailed on the slaves who cultivated the plantations of the French, to murder their masters.

After the French had abandoned Madagascar, Surat became the favourite establishment of the Company. They had however formed other factories in India: the principal ones were in the province of Bengal, on the banks of the Ganges; at *Mirzeou*, in the kingdom of Vizapour; at *Balliepatan* and *Tilseri*, in the country of Cananor; at *Alicote*, in the territory of Calicut; at *Masulipatan*, in the kingdom of Golconda; and, lastly, at *Pondicherry*. It was in 1670, that the Company established this last factory, about the middle of the Coromandel coast, in a place which was formerly called *Boudoutscheri*; and here they determined to erect the principal entrepôt of their Indian commerce. The Governor of the country made a grant to them of some ground near the sea, where they first built a spacious edifice, which served as a factory. In 1676 he permitted them to fortify it, and even sent them three hundred Indian soldiers to augment their feeble garrison, which consisted only of sixty men. New buildings were now erected, and an offer of certain exemptions soon filled them with inhabitants; so that this settlement began to display a promising aspect. The first fortifications were planned by M. Martin, who had been sent out by the Company to take upon him the care of this establishment; but they were inconsiderable, as may be readily imagined when the expence of them did not exceed seven hundred écus.

In 1680, the famous Sevagi, who was the sovereign of a part of Vizapour, having subjugated the province of Gingi, threatened the French factory with an

irruption; but was diverted from his design by a present of five hundred pagodas, and engaged to grant to the colony several additional privileges; which were accompanied, however, with some exactions on his part, which he was afterwards induced to set aside. In 1686, M. Martin added two large warehouses built with bricks, as well as several other edifices. Two years after, he caused a strong wall to be erected on the western side, which has since been continued to the eastern side. This wall was flanked with four towers, on each of which was placed six pieces of ordnance.

The French had scarce begun to fortify themselves in this post, when the Dutch came to besiege them by land and sea, with such a superior force, that the town was obliged to capitulate on the 6th of September, 1693. It was however restored to the Company four years after, by an article in the Treaty of Ryswick. On the return of the French to it, they found the government house was finished, and the fortifications strengthened by six bastions. Sixteen thousand pagodas were paid to the Dutch to reimburse them for these expences. M. Martin, who was continued in the exercise of his former functions, added several new works to protect the government house from every possible attack; and received a garrison of two hundred Frenchmen, to whom he joined three hundred Topases, or Indian soldiers: about the same time a Sovereign Council was established in the town.

Pondicherry now began to be a place of importance. M. Martin informed the Company, in 1699, that he had added an hundred new houses to the town, for the purposes of receiving foreigners who might wish to establish themselves there; and in the beginning of the present century there were already from fifty to sixty thousand inhabitants.

From the year 1700 till the Regency, the commerce of the Company was in a very languishing state. Indeed, from the year 1686, the Farmers General had laid a most exorbitant duty on the linen and other Oriental merchandize which was imported into France. According to the edict of 1664, which was the work of M. Colbert, each piece of linen, consisting of ten ells, was to pay no more on its entrance than eighteen sous. The other articles of merchandize were subject to a moderate tax, and the highest imposts did not amount to three per cent.

After the death of M. Colbert, the rates were so much advanced, that, independent of the old duties, six livres were exacted for every piece of cotton, twenty livres

per ell for all stuffs embroidered with gold or silver, fifty sous for plain taffetas and satins, and thirty sous for stuffs made of the bark of trees. Afterwards the sale of this kind of merchandize was entirely prohibited in France, and, for some time, muslins even were refused entrance into the kingdom.

On the other hand, the government permitted several merchants in the maritime towns to engage in the trade to India, by means of the Company's ships, on paying a moderate freight, &c. &c. In short, the Company received so many severe blows, that the symptoms appeared of its approaching downfall: so that in 1708, being totally incapable of preparing any armed force, application was made to M. Crozat to fit out two ships for India. The Company reserved fifteen per cent. on the sale of their merchandize, and two per cent. on the prizes that might be made. Four years after it engaged on the same conditions with the merchants of St. Malo, to whom it abandoned its trade. At this period it owed, in France and India, upwards of ten millions of livres; and its factory at Surat was so involved in debt, that no French ship would venture to anchor in the road, from an apprehension of being arrested for the debts of the nation. The Company nevertheless solicited, in 1714, a renewal of its privilege, which was about to expire, and which it had enjoyed during a course of fifty years. It obtained a prorogation for ten years, and made no other use of it than to sell commissions and brevets to the best bidder. The French commerce to India, therefore, when carried on in this precarious manner, and oppressed as it was by very burthensome conditions, diminished from day to day, and could not support any degree of competition with foreign nations.

Two particular companies had obtained the privilege to carry on a maritime trade, the one at China, and the other at Senegal. The China Company had been established in 1660, and was renewed in 1698; but it was not more successful than the East India Company. The Senegal Company was more modern, and was occupied principally in the traffic of Negroes for the West India plantations.

In 1717 a new association appeared, to which that of Senegal was united, and assumed the name of the Western Company; because it proposed to confine its trade to the West Indies and America. Two years after, all the commercial societies of the kingdom were united, and formed but one Company, which still preserved the name of the India Company, as it was described under that title by the edict of its establishment. This edict declared, among other articles, that the

new Company should have the exclusive privilege of trading in all the Indian and South Seas, and possess various other subordinate advantages, necessary for encouraging its trade and advancing its interests.

When the Western Company was first instituted, the fund of an hundred millions of livres had been created in shares of fifteen hundred livres each, bearing an interest of ten per cent. Previous to the publication of the Edict of Union, these funds became so popular, that they rose to an hundred and thirty per cent. These were not only preserved in the new project, but the India Company was permitted to increase these funds twenty-five millions of livres. Though they were not so advantageous as the others, subscriptions were offered to the amount of fifty millions.

In 1720, bank-bills succeeded to the funds, and factitious riches multiplied. The Company enjoyed a moment of splendour, and dispatched for India three vessels laden with very valuable cargoes. The Directors at Pondicherry, who were ignorant of what had happened in France, were astonished, when their trade had been in such a languishing state, to receive so great an abundance of ammunition and merchandize, with a considerable quantity of gold and silver specie. The greatest part of these riches were employed to pay the debts that the old Company had contracted at Surat, Camboia, Bengal, and other parts of India. The returns, however, to these cargoes were but moderate.

The bank-bills, however, disappeared; several thousands of shares were burned; the resources and the hopes of the Company vanished together; and in the course of 1721 and 1722, it was not in a condition to send a single cargo to the Indies. This interruption of its commerce excited the raillery of all Europe. At length, in 1723, two ships were fitted out for Pondicherry; and though their cargoes were not very valuable, the Directors of the several factories, and the people employed under them, were all paid, and the debts of the old Company were finally extinguished.

Though the French commerce was in an actual state of disgrace, in 1723, Pondicherry was strengthened by new fortifications, and the number of inhabitants was considerably increased. The walls, which were now begun on a design to inclose the town within them, were to be completed, in part, at the expence of the Company: the remainder was to be defrayed by the inhabitants, who submitted, for that purpose, to a poll tax of two sous per month.

In the course of the following year the India trade recovered itself, and was evidently gaining strength under the administration of M. Orry. M. Dumas, who

was appointed Governor of Pondicherry in 1735, obtained of the Mogul, permission to coin money in this town; and he struck every year, from 1736 to 1741, when he returned to France, from five to six millions of rupees, by which the Company derived an annual gain of four hundred thousand livres.

In 1739, a Nabob, named Sander Saib, put the French in possession of the town of Karikal, of the fort of Karcangeri, and some other domains in the principality of Tanjour. Karikal is two leagues from the Danish settlement of Tranquebar, and twenty-five from Pondicherry. It was an ancient town, and had been a very considerable place. It had five mosques, fourteen pagodas, and from five to six thousand inhabitants: it is situated on an arm of the great river Colsain, which is capable of receiving vessels of two or three hundred tons burthen. The fortress of Karcangeri is within cannon-shot of Karikal, and half a quarter of a league from the sea. The French, for their accommodation, destroyed a part of its fortifications, which consisted of eight large ancient towers. The domain of Karikal contains, in a circumference of five or six leagues, ten small towns; the most considerable of them is called Titoumale, which contained two thousand five hundred inhabitants when the French took possession of it. The country is excellent, and produces a great deal of rice, cotton, indigo, and various grain: its inhabitants fabricate a considerable quantity of stuffs, cotton, and painted linens. The revenue of this territory, comprehending the farm of tobacco and betel, with the duty on imports, amounts annually to ten thousand golden pagodas, which is equivalent to an hundred thousand French livres.

The war which was kindled on the Peninsula of India, between the Nabob of Arcot and the King of the Mahrattas, at the period when the French made the acquisition which has been just mentioned, gave them a very favourable opportunity of increasing the colony of Pondicherry. The Nabob of Arcot, the ancient ally of France, was conquered and killed in a bloody battle, on the 20th of May, 1740, and his country was laid waste by the Mahrattas. His widow, and all the women of his family, accompanied by their children, and a prodigious number of fugitives, came to seek an asylum at Pondicherry, whither they brought every thing which they had saved in gold and silver, in jewels, and valuable furniture. M. Dumas received them with all the attentions and respect due to their rank, their unfortunate situation, and the friendship which the late Nabob had always manifested to the French people. This humane, generous, and grateful regard, had like to have involved him in a

war. The Mahratta General being informed of the place where the family of the Nabob had retired, addressed two threatening letters to the French government, demanding the payment of certain tribute, which he pretended that the French owed to the King his master; to pay, besides, five hundred thousand rupees, and to put into his hands the widow of the Nabob of Arcot, with the fugitives, and their treasure, their elephants, horses, and all their equipage.

M. Dumas having rejected these propositions, a detachment of fifteen or sixteen thousand Mahratta troops advanced as far as the large village of Archionac, which is but a league and an half from Pondicherry, and pillaged, in their passage, Porto Novo, the English factory at Gondelour, and other European habitations. The firmness which the French displayed, a diversion which the King of Golconda made in their favour, and other fortunate circumstances, saved Pondicherry. It is said that some bottles of liquor sent to the Mahratta General determined him to retreat.

The Court of Delhi, which protected the old Nabob of Arcot, was so well satisfied with the conduct of the French in this war, that Nisam-ul-Mulk, the first minister, wrote a letter of thanks on the occasion to the Governor of Pondicherry, and accompanied it with the present of a very costly robe, in the name of his master. Some time after, M. Dumas was advanced to the dignity of Nabob, which was also settled upon his children and family.

In the same year, 1741, the son of the Nabob of Arcot, as a mark of his gratitude for the very kind treatment which his mother, &c. had received at Pondicherry, sent a *Paravana* to the French Governor, by which he ceded personally to him, and not to the colony, the Aldées of Archionac, of Tedouvana-tan, of Villamour, and some other districts, situate to the south of Pondicherry. These lands, which M. Dumas sold to the Company, considerably augmented its territorial dominion in this part of India.

The foreign commerce of France was carried, in 1742, to the highest degree of importance that it ever attained. Seven ships were sent to India, with cargoes to the value of twenty-four millions of livres; so that to prevent the market from being overstocked, a large part of it was necessarily consigned to the magazines. A more powerful marine, at this time, would have fixed for ever the prosperity of the French East India Company,* and, consequently, preserved them from the losses and disgrace which it has since sustained.

* See the accounts of M. de la Bourdonnais's operations, Chapter VI. p. 208, and following.

Pondicherry * is situated near the middle of the Coromandel coast, in about 12° of north latitude. According to the last enumeration, it contained an hundred and twenty thousand inhabitants, including Christians, Mahometans, and Gentoos. Its exterior form is square, and upwards of a league in circumference; its plan is regular, as the Governors have always marked out the ground to such persons as applied for permission to erect houses. Its streets are broad and straight, and its principal one, which runs from south to north, is a thousand fathom in length. The houses are contiguous to each other; those of the Europeans are built of brick, but do not rise above one story: this circumstance proceeds from two causes, the scarcity of timber, and the fear of hurricanes, which are not uncommon on this coast. Those of the Indians and the Moors are formed of clay baked in the sun, and covered with a kind of lime, made of calcined oyster shells: Their common length is eight fathom, by six in breadth, and each of them contains from fifteen to twenty persons. The courts are planted with palm and cocoa trees, beneath whose shade the weavers and other manufacturers fabricate those beautiful works which are imported into Europe from India. In these courts, or on the platforms on the tops of the houses, the Indians pass the night, on a single mat, and almost naked.

The Governor's house is a very handsome edifice, and equal to the finest hôtels of France. This officer is attended by twelve horse guards, and three hundred foot soldiers, which are called Pions. On days of ceremony he is carried by six men in a palanquin, whose canopy and pannels are adorned with a rich embroidery, and various ornaments in gold. This pomp is necessary in a country where the power of a nation is determined by the exterior splendour of those who represent it.

The Jesuits have a fine college in the town, where twelve or fifteen religious persons of that order are maintained at the expence of government, who teach reading, writing, and mathematics. The foreign missionaries and the capuchins have also an establishment there. The Gentoos have two pagodas, where they enjoy without restraint every indulgence their faith requires. They, indeed, create the wealth of the town and the country; are industrious and sober, of a mild demeanour, and submissive in the extreme, provided their laws, customs, or prejudices, are not opposed. Their best workmen do not receive more than two French sous per day, and with that moderate gain they maintain their families. Boiled rice and unleavened cakes baked in the ashes are their only nourishment. The first of these

* This account was written in the year 1756.

nutritious articles is very common here, notwithstanding the drought of the country; and it is to the labour and industrious disposition of these people, that the country is indebted for its abundance. As rice does not grow but in water, they contrive, by artificial means, the result of their labour and ingenuity, to give the plantations all the moisture which they require.

Pondicherry possesses vast magazines and warehouses, six principal gates, a considerable citadel, thirteen small forts or bastions, with a formidable artillery, consisting of upwards of four hundred pieces of cannon.

It is to be lamented that so fine a town is without a port, and that the sea affords only a shallow road before it; so that it is absolutely necessary to send boats to the distance of a league, to receive and carry the various articles of merchandize. In every other respect its advantages are great and numerous, and its produce abundant as to the necessaries and luxuries of life.

CHAPTER XXIII.

Abstract of the Life of Haider-Aly-Khan, &c.

About the year 1728, Cuttulich Khan, Soubah or Governor General of the Decan, sent Termamond Khan, an officer of reputation, and a Patan by birth, to deprive the Nabob Abdoul Ressoul Khan of his government of Sirpi, which is a province on the frontiers of the kingdom of Maissour. That prince, determined to try the fortune of arms, assembled his troops, and went forth to meet his competitor; and, after a very bloody battle, the Nabob of Sirpi was defeated and slain. Among the dead was Fatty Naick, father of Haider Aly, an excellent warrior in the service of the Nabob.

In consequence of this victory, the Patan Termamond Khan was received in Sirpi, and acknowledged as Nabob of that country. Fatty Naick left two sons and a daughter; the eldest was named Saber Naick and afterwards Ismael Saib, and the other Haider Naick, who was at that time a child of ten years old. He was born at Divanelli, a fort situated between Oscota and Colar. They had an uncle, with whom the eldest entered into the service of the King of Maissour. As to Haider Naick, he was always kept in the vicinity of the districts where his brother and his uncle served. At this early age he was bold and enterprising, untractable, and overbearing; he could neither read or write, nor would he receive instructions from any one.

Carrasorri Nanderauz, brother-in-law of the King of Maissour, as well as his first Minister and General of his army, was one of those who had assembled the troops of their masters to join the Soubah Nazerzing, and enter with him into the Carnatic, in 1750, against Mustapha Jung, who designed to get possession of the Soubahship of the Carnatic, to which he laid claim under the will of the last Soubah, his uncle.

Haider Naick, who was now a robust young man of about twenty-five years of age, assumed the name of Haider Aly; and being tired of the idle life which he had led, collected fifty or sixty Pions, or fusileers, with five or six horsemen, and proceeded

to offer his services to Nanderauz, by whom he was well received. In about four years, he had acquired sufficient credit to raise five hundred infantry, clothed and disciplined in the European manner, with two hundred cavalry, and a couple of field pieces.

In 1754, in an engagement between the troops of the English East India Company and those of the Nabob of Arcot, he displayed great judgment and spirit in a *coup de main*, by which he possessed himself of thirty-five of the enemy's waggons, loaded with arms, ammunition, and the baggage of the officers.

In 1755, he was sent at the head of three thousand infantry and fifteen hundred cavalry, with four pieces of artillery, against the Polygars, or mountaineers of the country of Maissour, who had failed in the payment of their tribute. In this expedition his success exceeded his utmost expectations; though it was the fruits of his treachery rather than his military prowess. Under the pretext of engaging in a treaty, he got possession of several of their chiefs, and exacted from them about ten or twelve lacks of rupees; one half of which he sent to the King of Maissour, and the other he kept himself. The King, however, as well as his Minister, felt a considerable degree of resentment at the audacious conduct of Haider, and wished to find an opportunity to lessen the credit he had gained in the army, and to crush him before he should become more formidable.

As he had every reason to suspect the designs that were forming against him, he employed every means in his power to strengthen and increase his authority; and the money which he had amassed was equal to that object, more particularly as troubles were breaking out in the country of Maissour.

In 1760, Gopalsauz, a Mahratta chief, entered into Maissour with ten thousand infantry and twenty thousand cavalry, to lay siege to Bangalore, a very strong place, and well defended. The King of Maissour proposed to the Mahrattas to purchase their return to their own country, with fifty lacks of rupees. Haider Aly, however, whose views did not look to peace, persuaded the King to break off the negociation, and obtained permission of him to conduct his army against the Mahratta power.

The two armies met, but, after a partial engagement, the negociation was renewed, and the Mahrattas retired into their own country with fifteen lacks less than had been originally proposed by the King of Maissour, who rewarded the services of Haider Aly, by giving him the title of Bahader, and appointing him commander

in chief of his army, in the place of Nanderauz, who took refuge in the fort of Maissour.

About six months after the late Minister and General had quitted Seringapatam, the old King, his brother-in-law, died; and Haider Aly employed every art to gain the affection and friendship of his young sovereign. His first object was to induce him to suspect his uncle; and, having succeeded in that particular, he obtained an order to put himself at the head of his troops to reduce the fort of Maissour, and, in a short time, invested it. This place, however, being strongly fortified and well defended, held out for three months, when Nanderauz agreed to give it up, on condition that he should receive in exchange the government of Carrour, which is a district at about twenty coss to the west of Seringapatam.

Haider having been hitherto so successful in his projects, and having contrived also to remove his adversary to such a distance from the court, began to enjoy all the authority that his rank as Minister and General gave him, as well as to indulge the belief, that in this situation he was superior to any reverse of fortune.

The young King however had, from various quarters, and particularly from his uncle, who maintained a secret correspondence with him, been informed of the ambitious designs of his Minister, and began to entertain serious apprehensions of a revolution. He accordingly won to his interest a very artful person, of the name of Canderon, who had been placed about his person as a spy; but having been offended at the insufferable haughtiness and tyrannic disposition of Haider Aly, assembled the guards by the order of the King, made himself master of a part of the ramparts, which were near Haider's residence, and fired upon it. The latter, astonished at this enterprize, of which he had not the least suspicion, and having every reason to apprehend that the troops which were in the town had been prevailed upon to take part against him, he instantly mounted his horse, and fled away with some of his friends and domestics, leaving his wife and family behind him, to find a refuge in the fort of Bangalore, of which Ibrahim Saib, his uncle, was Governor.

Previous to his being attacked as I have already mentioned, he had sent to Pondicherry, Mucktom Saib, his brother-in-law, a brave officer, with five thousand infantry and three thousand cavalry; but when he fled to Bangalore, he dispatched an express to Mucktom, to desire that he would join him with all possible expedition. The King had also sent a special messenger to the Rajah of Bunt-bing, a Mahratta chief, and whose residence was at no great distance from the route which

Haider Aly's detachment must take, with a promise of fifteen lacks of rupees if he would intercept them. The Rajah accordingly began his march, with four thousand foot and seven thousand horse, to effect this purpose; and a short time after, he was joined by Canderon, whom the King, at the same time, had detached with three thousand foot and three thousand horse to effectuate the same design.

They soon met Mucktom Saib, who had advanced to the village of Auchitty Dungham, about twelve coss from Bangalore, where he threw up entrenchments, being resolved to defend himself to the last extremity: nor was he without hopes that his brother, Haider Aly, would make an effort to come to his assistance. Haider, however, who suspected what was passing, did not venture to quit Bangalore. He, nevertheless, accepted the offers of Mir Pharsula Khan, a very brave soldier, who proposed to conduct a convoy of provisions and ammunition to Mucktom; but, notwithstanding his courage, he lost the whole of it, and with difficulty rejoined Haider Aly.

A month had already elapsed under these circumstances, when the Mahratta chief received the news of the death of his king, Nanna, and consequently entertained some design of returning to his country. Haider, who had received notice of this circumstance, offered him three lacks of rupees to put that design in execution. He agreed to the proposition, and immediately set out on his march homewards.

Haider having succeeded in this important point, began by confirming his authority in Bangalore, and then set forwards with the few troops which he could collect, to attack his former friend and present enemy, Canderon; but the latter thought it prudent to retreat to Seringapatam, whither Haider and his brother, Mucktom Saib, attempted to follow him. The country however being against them, and refusing to supply them with provisions, they were obliged to abandon their enterprize.

It was in this critical circumstance that Haider Aly determined to execute a project that required all the courage which he possessed. He took ten confidential persons with him, and hastened to throw himself at the feet of Nanderauz, who was returned to court. He wept, acknowledged his offences, and demanded pardon. The good old man, won by his demeanour, and touched with his declarations of sorrow, was persuaded that he had no other view than to re-establish himself in his former post. Canderon, however, had put himself at the head of some troops, with a determination to maintain his new dignity; but was attacked and defeated by Haider, and with difficulty escaped to inform the King of the combination that had

been formed, by his uncle Nanderauz and Haider, against him, and the consequences that would result from it.

After this battle a part of the King's troops entered into the service of Haider Aly, by the persuasion of Nanderauz, who, at the same time, published a manifesto, addressed to the Bahadars of Maissour, assuring them that his friend, had no ill design against the government, nor any other views in collecting an armed force than to restore himself to the office of Duan, of which he had been unjustly deprived. In short, he was so blinded by the arts and flattery of Haider, as not to perceive the mischief he was doing, not only to himself, but the King, his nephew.

Haider, in consequence of these orders, which were so favourable to his designs, and having won over all the districts in the environs of the capital, which he had put under the direction of persons in his confidence, dismissed the old Nanderauz, who was no longer of any use to him, to his government of Carrour.

Haider now assembled his troops, paid them half of the money which was due to them, and promised them the rest as soon as he should be re-established in his post. The troops, therefore, who did not imagine that he had any other design than to get rid of his enemy, Canderon, marched to besiege the capital of their own country; which was soon blockaded in such a manner as to cut off all communication from without.

The place remained in a state of blockade during a month, when Haider Aly found means of assuring the King of his submission and fidelity: the latter, therefore, determined to open the gates to him, to receive him as Duan, and deliver up his enemy to his disposal. He was, however, no sooner admitted into the town, than he placed sentinels at the gates of the palace, of the magazines, &c. made the King, in a manner his prisoner, and himself master of the treasure, with which he paid the troops, and made presents to the officers who had served him in his rebellion. He then shut up his enemy, Canderon, in a cage, and after exposing him for some days in the capital, sent him to close his life in that deplorable state at Bangalore. The cage with the bones are seen at this day, in the market-place of that town.

Haider Aly remained in the capital during six months, in order to regulate the affairs of the country, and to establish himself in his new government. These transactions took place in the year 1763.

Termamond Khan, who had been named the Nabob of Sirpi in 1728, by Nizam

el Muluch, dying in 1740, the Mahrattas, whose districts bordered on the territory of Sirpi, raised some troops, and, after having reduced the whole country, invested the town of Sirpi, which is the capital of it. Delar Khan, the successor of the late Nabob, having neither the courage nor the means to defend it, gave up the place, and consented to retire into a small district near to Colar.

The conquest of Sirpi and all its dependencies by the Mahrattas, gave great uneasiness to the Soubah, who, in consequence of his alarm, sent his brother, Basaletzing, with an army, to drive them from Sirpi. As Ascotah, a frontier town of Maissour, was the first which he found upon his march, he accordingly invested it. Though the garrison did not consist of more than seven hundred men, armed after the manner of the country, the place resisted for two months the vigorous efforts of the Soubah's army.

Haider Aly, who was ever ready to profit of any opportunity which offered to aggrandize himself, dispatched Mir Phasula Khan to Basaletzing, brother of the Soubah, to offer him five lacks of rupees, if he would yield to him the government of Sirpi with its dependencies. He required the aid of the Mahratta troops to take the town, but he undertook to subdue the country with his own.

As soon as the treaty was signed, and the money paid, Haider set out with his troops to join the party with which Basaletzing had provided him. He renewed the attack on Ascotah, reduced the place in a few days to capitulate, garrisoned it with his own troops, and proceeded to besiege Sirpi, which surrendered in about a month. After this event the army of the Soubah returned to Adony.

Haider met with few obstacles in reducing the rest of the country to submission, except the Polygars, or mountaineers of Chinnabalaporam, who, in the space of two or three months, had killed at least a thousand of his people. As his expedition against them was not only attended with great loss, but also with considerable expence, and having been frequently attacked by the Mahrattas while he was before Chinnabalaporam, he proposed to Chinnapah, chief of the Polygars, to retire with his army, on condition of being paid five lacks of pagodas. These propositions were received, and he accordingly returned with his troops to Divanelly, about the distance of three coss,* on the road to Maissour.

Morarou, one of the Mahratta chiefs, who had assisted in the defence of Chinna-

* The *coss* is an itinerary measure of India of about half a league, or thirteen hundred and thirty-five fathoms.

balaporam, at the request of Chinnapah, left there about five hundred of his troops to strengthen the garrison, and departed for his own country with the rest of his troops. The Polygar chief also returned to Nanderauz, the place of his general residence.

Haider Aly, instructed in every thing that related to those people, returned by long marches to satisfy his desire of vengeance against the Mahrattas, and renewed the siege of Chinnabalaporam, which he took in ten days. The Polygar troops being returned into their own country, and the Mahratta chief being at too great a distance to afford any relief to the garrison; he mutilated a great number of them in order to terrify the rest, and facilitate his future enterprizes.

Having given the command of the place to one of his relations, he engaged in the pursuit of the Mahrattas, and, by forced marches, overtook them at Podgaconda; when, by a fierce and instant attack, he defeated their army, killed a considerable number of them, and made many of the principal officers prisoners. Morarou, after his defeat, retired to Gutty, his capital. Haider Aly, satisfied with having forced his enemy to a retreat, took possession of such part of his country as it was convenient for him to annex to his new acquisition of Sirpi, and were equal to the annual produce of three lacks of pagodas.

He had no sooner executed the project he had formed, to recover the ancient district of Sirpi, than he began his march against the Polygar chief of Chittercol Durgam, whom he soon reduced to submission, and not only compelled him to pay three lacks of rupees, but to furnish fifteen hundred cavalry and ten thousand infantry, to assist him in another enterprize which he had in view.

In order to render what follows more intelligible, it is necessary to revert for a moment to a former period.

The Rajah of Bednor, a fertile country, surrounded with lofty mountains and extensive forests, which render all access to it extremely difficult, had named his son, Chinavar Appiah, to be his successor; and, in consequence of this nomination, this child, who was no more than nine years of age, had been acknowledged as sovereign at the death of his father; so that every thing which regarded the government of the country was transacted in his name.

A year had passed away, and things remained in this situation, when the Queen meditated a design on the life of the young Prince, in order to place her brother on the throne. A friend of the young Rajah contrived to remove him to a

distance from the Court, and sent him secretly to the Polygar chief of Chitticol Durgam. The young Prince had already been eight years under the care of the Polygar chief, when Haider attacked him. This circumstance suggested to Haider the idea of subjecting the country of Bednor; as he now could attain that object without difficulty, under the pretext of re-establishing the young Prince: and this ambitious project he finally effected, on condition of paying forty lacks of rupees to Mahaderon, and twenty to his Minister.

Haider now left the government of Bednor to the care of his son, Tippoo Saib, and established Lala Thean, who had espoused his sister, as governor of a fortified place in that neighbourhood. He sent also Mir Saib, whose sister he had married, to the government of Sirpi; he gave the command of the fort and district of Maissour to Mir Pharsula Khan, and that of Seringapatam, the capital of the Maissour country, to Mucktom Saib. Ibraim Saib, his uncle, was continued in his government of Bangalore; and Amian Saib, his nephew, was employed to defend the valley of Burmal.

These arrangements being made, Haider Aly proceeded with a strong detachment towards the coast of Malabar, where he entered into a treaty of alliance with a petty prince named Ali Rajah, and, with the assistance which he received from him, he laid siege to Calicut, the capital and residence of the King of the Naires. This place held out during three months, and in the end obtained an honourable capitulation.

About the same time Mir Saib, the Governor of Sirpi, found means to make himself master of Chinnapah, chief of the Polygars; and, notwithstanding his most solemn engagements to the contrary, he sent him prisoner to Bangalore, where he died of a broken heart: while Haider, in order to secure his son, who was a young man, had him circumcised by force, and instructed in the principles of the Mahometan religion.

The King of Calicut was of the sect of the Bramins, and being very much attached to the principles of his religion, he could not permit himself to have any personal communication with the Mahometans. He therefore refused, but with the utmost civility, the visit that Haider Aly proposed to make him. He, however, sent a Bramin to demand the quantity of corn necessary for him to support his daily charities. The following day Haider sent him sufficient for five hundred persons; the next day a still less quantity, and continued to diminish the boon till it was reduced

to nothing. The King, therefore, enraged at such inhuman treatment, assembled all his family, and, after having performed certain ceremonies with the principal Bramins, he ordered his palace to be set on fire in several different places; and it being constructed of wood, the unhappy Prince and all his family were immediately burned.

As soon as Haider Aly was informed of the death of the King he left a garrison of two hundred infantry and five hundred horse, and set out with the rest of his army, for the country of Coimboutour, which is about forty coss on the road from Calicut to Maissour. About two months after he had left Calicut, a brother of the King appeared before the place with an army of twenty thousand men; and having some intelligence with the inhabitants, took it by assault, and put all the garrison to the sword. Three hundred men alone escaped, by taking refuge in a pagoda.

When Haider received an account of this event, he immediately detached Assouff Khan with five thousand infantry and a thousand horse, with positive orders to engage the enemy; the brother of the King accordingly gave him battle, but having been defeated in two separate engagements, and fearing lest he should be shut up in the town, he quitted it during the night, with his whole army and all the inhabitants, and retired into the woods.

There he remained three months, without attempting any act of hostility; and having lulled them by his conduct into a state of security, he appeared unexpectedly before the place, and retook it. He condemned Assouff Khan to lose his head, killed a great number of his soldiers, while the rest fled away to the territories of Haider to inform him of this disastrous event. He accordingly set out for Calicut, at the head of an army of six thousand infantry and two thousand horse; but, after two days march, he gave the command of his troops to Sevagée Rou, a Mahratta Bramin, who, on arriving before the place, was attacked by the King's brother; but having gained the battle, the latter retired, as he had already done, into the woods, and abandoned the place.

Haider Aly had quitted the command of his army to return in haste with his best troops to Seringapatam, when he received an account that Mahaderou, one of the Mahratta chiefs, was making preparations, and had, indeed, already put himself in motion to recover the domains which his predecessors had ceded to Haider in 1760. Though this circumstance was of great importance to him, he, nevertheless, determined to make his triumphant entry into Seringapatam.

Mahaderou, who did not meet with any considerable opposition, took possession of all the districts as well as forts which have been already mentioned: he retook the country of Sirpi, Ascota, Chinnabalaporam, and all their dependencies.

In the months of January and February, 1767, the Soubah Nizam Ali and Basselat Jung his brother, whose army was strengthened by a detachment of the English Company's troops, left Hyderabad to join Mahaderou: but the Soubah, who amused himself with levying certain imposts in different districts on his march, did not join him till the month of April. During this interval, the Mahrattas did not remain in a state of inaction, and had already made themselves masters of Chinnaradurgam, of Davilradurgam, and of the strong citadel of Mugdeghenny. In this last place they found the young King of Bednor, with the old Queen and her brother. They afterwards took several important places, and levied very heavy contributions.

Haider, who perceived the storm that was collecting against him, fortified his principal forts, and having fully garrisoned and victualled them, gathered together all his troops and encamped before the walls of Seringapatam, where he entrenched himself to the best possible advantage. Being resolved to wait the event, he gave orders that all the grain and provisions within thirty miles of Seringapatam should be brought to the magazines of that city. This he considered as a certain measure to prevent the confederate army from approaching. In the mean time he entered into a secret correspondence with the Soubah; and he had also dispatched a Vaqueel to Mahaderou, the Mahratta chief, who agreed to restore all the places he had taken, for thirty lacks of rupees; which he had no sooner received, than he retreated to his own country, without giving to the Soubah the smallest portion of his bribe.

Though the English detachment had received considerable reinforcements, General Smith, who commanded it, perceiving the duplicity of the Soubah, withdrew his army to the frontiers of the Carnatic. About the middle of May, the Soubah set forward to join the army of Haider Aly; and about the 24th of the same month, the English were informed that the object of their junction was to get possession of that country.

General Smith saw the danger that threatened him, and made continual requisitions to the Governor and Council of Madras to grant him the necessary supplies for the approaching campaign; but as they delayed their attention to his repeated remonstrances, Haider Aly and the Soubah entered with their armies into the valley of Burmal, and commenced hostilities.

The troops of the Soubah consisted of thirty thousand horse, ten thousand Sepoys, and a vast body of irregular infantry, with sixty pieces of cannon. The army of Haider Aly was composed of twelve thousand well disciplined cavalry, eight thousand Mogul horse, with a troop of sixty European hussars, a very large body of infantry, armed with European musquets, and forty-five pieces of artillery.

As to the English army, it consisted of no more than two European regiments, amounting, at most, to eight hundred men; seven battalions of Sepoys, of about eight hundred men each, a body of artillery, and five hundred horse belonging to the Nabob; with a troop of European horse, which contained only thirty men, and was commanded by Lieutenant Robson.

Haider being convinced that he should more effectually distress the English army by cutting off all communication between their camp and the country, employed very large detachments of cavalry for that purpose, who continually relieved each other. Fortunately, however, for the English, the haughty humour of the Soubah and his officers was soon dissatisfied with this tiresome mode of making war, and reproached their ally with not having fulfilled his promise of cutting the English army in pieces.

At this time the English army, being in great distress from the want of rice and other provisions, began its march towards the defile of Singurpettah, to get out of the valley of Burmal, and to re-enter the Carnatic. The Indian chiefs, therefore, determined to attack them, and they executed their design on the 2d of September, near the fort of Changama. The contest was maintained with great courage on both sides, but the Eastern armies sustained very considerable loss, and the English remained masters of the field of battle. The latter, however, could not avail themselves of their advantage, from a deficiency of ammunition; so that the General thought it right to proceed the following night for Trincomally. Haider Aly soon learned that the English were on the march, and sent detachments to harass them; but though they were impeded by these manœuvres, they arrived at Trincomally, and were soon joined by the southern division under Colonel Wood. Having recovered from their late fatigues, the whole army encamped at a small distance from Trincomally; and the Eastern powers soon re-appeared, and fixed their camp in a very advantageous position; from whence Haider made an idle parade of his artillery, as he was at too great a distance to annoy his enemies. General Smith had frequently manœuvred to make Haider leave his advantageous situation, but in vain.

At length, however, he succeeded, in consequence of a victory over the united army, on which occasion Haider and the Soubah lost twelve thousand men, besides those which were wounded; and the latter was compelled to leave behind him thirty-seven brass cannon, fifteen and twenty pounders, which were said to have come from the foundries of France; but when the Soubah afterwards made peace with the English, they were all restored to him.

Some time previous to the battle which has just been mentioned, Haider Aly had sent his son Tippoo Saib, with a large detachment of cavalry, to the environs of Madras, with orders to carry pillage and destruction along with him. He was, however, prevented from obeying his father's orders, by the activity of Colonel Call, the principal engineer, who collected all the force that was to be found, and completely protected the Black Town from the menaced inroads of Tippoo. In the mean time, the Governor of Madras received an express from General Smith, to inform him that he had gained a complete victory over the armies of Haider Aly and the Soubah. A general discharge of the cannon at Madras announced this important event; and no sooner did it reach Tippoo Saib, than he retreated in great haste to rejoin his father and the Soubah, who had fallen back to Caveripatnam. As the rainy season approached, their armies went into cantonments, while the English forces took up their quarters at Vellore, Wandewash, Conjeveram, &c.

The rains having ceased, in the latter part of November, Haider Aly assembled his troops, and having entered the valley of Burmal, invested the two mud forts of Tripotore and Vaniambady, and as they did not contain more than five hundred Sepoys, they soon capitulated. Haider then proceeded to besiege the citadel of Ambour, a place of considerable importance, and situated on a rock, at the foot of which is the town, defended by a mud wall. The English commandant, perceiving that any effectual defence was impossible, retired with his troops into the fort, and dispatched an express to the Governor of Madras to inform him of his situation. The English army, therefore, received immediate orders to assemble, with all possible expedition, at Vellore, and it was soon enabled to march to the succour of Amboor. On their approach, Haider Aly raised the siege, and re-entered the valley. The Soubah followed him with his army, and proceeded to Caveripatnam, where he encamped; but Haider stopped at Vaniambady, where he chose a very advantageous post, being resolved to try the strength of his army alone against the English.

On the 8th of December, the English appeared before Vaniambady, where they found Haider Aly; an engagement followed, in which he was worsted, but made his retreat in such good order, that the English did not think it prudent to follow him. He directed his route to Caveripatnam, where he joined the Soubah, and was again beaten by the English, with whom the Soubah, tired of the war, entered into a treaty of pacification.

Haider Aly, finding himself without allies, left a strong garrison at Caveripatnam, and led back his army into the Maissour country. Thus terminated the campaign of 1767.

In January, 1768, the English began the campaign in two distinct parts. The division which directed its operations to the southward, was commanded by Colonel Wood, who received orders to march towards Davembarra, and from thence to Tingrocolat, Atour, and Selim.

The northern division, commanded by General Smith, advanced up the valley of Burmal, and sat down before Caveripatnam, which it soon reduced; he then invested and made himself master of the important fortress of Kitna Gurrey.

During this time, Colonel Wood obtained very signal advantages with the army which he commanded in the south.

The English at length determined to make a more serious attack on Haider Aly, by besieging his capital, Seringapatam, and Bangalore. They were confirmed in this design, on being informed that the government of Bombay had engaged in an enterprize against the possessions of Haider Aly, on the coast of Malabar, and had taken the forts of Mangalore and Onor, after having fortified the island of Bombay. This diversion favoured the views of the government of Madras. But Haider Aly was no sooner informed of this expedition, than he led the greater part of his army to the coast of Malabar; when the Bombay troops, being convinced that they were not in sufficient force to resist the Indian chief, whom they imagined to be at that time occupied with the army belonging to Madras, took to flight, and lost their artillery, with a considerable number of prisoners.

At the same time the divisions of the army of Madras, commanded by General Smith and Colonel Wood, though they had not received the heavy artillery which they expected from Madras, formed a junction on the 7th of October, and set forward to meet Haider Aly, who returned triumphant from the coast of Malabar. They in vain strove to bring him to a general engagement, as he could always

retreat with a degree of expedition which they could not adopt to follow him; and did not fail to employ his cavalry in harassing them without intermission. At length, however, he was reduced to such a situation, that he offered terms of peace to the government of Madras, which, unfortunately, were accepted the 4th of April, 1769; as in the position in which he found himself at that time, he might have been driven out of the Carnatic, or been obliged to purchase peace on any terms that might have been dictated to him.

Haider Aly remained in a state of peace to the latter part of the year 1770, and, during this interval, he applied himself to the government and domestic concerns of his country; but his repose was not suffered to be of long duration.

At the end of this year a vast Mahratta army appeared to attack him, which consisted of sixty thousand infantry, ten thousand cavalry, with some field-pieces; but they were indifferently served.

Haider, who had not a sufficient quantity of cavalry to oppose to such a torrent, contented himself with giving his army a very advantageous position, at some miles distance from Seringapatam. It was composed of eight thousand men, the flower of his cavalry, and thirteen thousand infantry, well armed with European muskets. His artillery also was served in a superior manner, and in several slight engagements, he had the advantage.

Morarou, an ancient Mahratta chief, who, in the last war was an ally of the English, and whose camp had been forced by Haider Aly, still continued to preserve his former resentment. He had strengthened his army with that of another Mahratta prince, Trimbuch Mama, and offered the reward of a thousand rupees to any one who should bring the head of Haider.

Morarou counselled Trimbuch Mama to send some detachments on the side of Seringapatam, to deceive Haider, and draw him from his post, which he had maintained for eight months, and the stratagem succeeded. Haider Aly, forgetful of his former precaution, was led by degrees to a considerable distance from Seringapatam, from whence he drew all his supplies; and Trimbuch availed himself of the opportunity to place a large detachment between that city and Haider's army, so that the latter was reduced to the dangerous necessity of regaining his former position by open force; but in this attempt he was attacked by the Mahrattas, his army was totally routed, and he himself, with a few of his people, escaped with difficulty to his capital.

This was a terrible misfortune for Haider, who found himself without an army, without resources, without friends, and without allies; but his courage never forsook him; and, though he was besieged by a powerful army, and his country ravaged by the enemy, he indulged the hope, that his former fortune would return. In fact, the Mahrattas, having no heavy artillery, were reduced to the necessity of turning what would have otherwise been an active siege, into a lingering blockade.

In the mean time, Trimbuch Mama wrote in the most pressing terms to the Nabob of the Carnatic, and to M. Dupree, then Governor of Madras, to obtain troops and cannon, in order to reduce the capital of Haider Aly. The Nabob was disposed to comply with the request, but the Council of Madras thought that they were bound to keep faith with Haider, and that they could not be justified in violating the peace of 1769.

Haider also, in his turn, applied to Governor Dupree for assistance, but the latter seemed determined not to interfere in the contest, and equally refused assistance to both parties.

The Mahrattas being, at length, in great distress for provisions of every kind, contented themselves with desolating Haider's country, and then retired to their own. Mahaderou died soon after his return; when a civil war took place among the chiefs, who contended for his succession; and to this discord, which lasted for several years, Haider Aly was indebted for his future glory.

The Mahrattas were no sooner departed, than Haider collected a small army, with which he attacked and retook all the forts that they had taken from him, and soon purged his country of those dangerous brigands. Thus he soon established tranquillity in his dominions, and, by the encouragements he held forth, induced the natives who had been driven away, to return and rebuild their villages, and resume the cultivation of their districts. He then employed his whole attention to the restoration of his army, and in a few years he had formed a body of troops, both as to numbers and discipline, which must give an extraordinary idea of his talents and perseverance. They were as follows:

Twenty thousand cavalry.
Thirty-eight thousand infantry.
Forty pieces of brass cannon.
Five hundred camels.
Two hundred elephants.

Bullocks without number.

Upwards of twelve thousand troops dispersed in different garrisons.

Such was the amount of Haider Aly's army in 1775; and from that time to the year 1780, he enjoyed an uninterrupted state of peace and tranquillity.

Towards the latter end of July, 1780, he entered into the Carnatic, and, on the 29th of that month, sent a large detachment of troops to Porto Novo, which they reached by forced marches; when they surprised and pillaged that town, which had ever been considered as a free port for all nations. He made the Dutch and Danish Residents prisoners, and by such a measure manifested his intention to drive the Europeans out of that peninsula.

While Haider was ravaging the country, the English ordered their troops to assemble at Conjeveram, under the command of General Hector Monro. On the 8th of September that officer, having notice that Colonel Baily was pushing forward with the northern detachment, to form a junction with the main army; and knowing, at the same time, that a large body of troops, commanded by Tippoo Saib was encamped near the route that Colonel Baily must take, dispatched Colonel Fletcher that very night, with a detachment to reinforce him; and these two detachments formed together a body of three thousand five hundred men. In the course of their march they were attacked by the united forces of Haider Aly and Tippoo Saib, and one of their tumbrels, laden with powder, blowing up during the engagement, that misfortune threw the column into disorder. Tippoo observing this circumstance, poured down his cavalry; and, though the English troops made a most obstinate resistance, the greater part of them were cut in pieces, and Colonel Baily, with all the surviving officers, taken prisoners, and sent to Seringapatam. Haider, immediately after this victory, sent a detachment of cavalry, commanded by a M. de Lally, to harass General Munro, who, on receiving the intelligence that Colonel Baily was defeated, retreated to Chinglepett. After this loss, the English army was no longer in a condition to resist Haider Aly, who now traversed, without opposition, the whole southern part of the Carnatic.

In the month of April, 1781, Haider invested the fortress of Tiagar, which, though impregnable from its situation, was obliged to surrender from the want of provisions. At length he entered the country of Tanjour, and not only destroyed all the villages he found in the course of his route, but even pillaged the temples of the Gentoos, which had hitherto been respected by every other sect and religion.

The late alliance which Haider had formed with the French had contributed, in some degree, to the check which the English had received near Conjeveram; but the signal victory that was gained by Sir Eyre Coote, near Porto Novo, on the 30th of June in this same year, changed the posture of affairs.

This battle enabled the English to undertake, with their Admiral, Sir Edward Hughes, the siege of Negapatnam, which surrendered to their united forces on the 12th of November.

In the month of December Haider Aly undertook the siege of Tellicherry, but was obliged to retreat from that enterprize with considerable loss.

In the mean time, the English army being reinforced by troops from Bengal, Sir Eyre Coote proceeded to Wandewash, which was besieged by Tippoo Saib, who, on the first intelligence of the approach, retreated towards Gingi, which he took with little opposition.

On the 20th of August Sir Eyre Coote appeared before Tripassore, which capitulated, very fortunately for him, on the 23d, as the advanced guard of Haider Aly's army appeared at the moment when the town surrendered, and the English had no more provisions remaining than for one day: as there was plenty in the town, Sir Eyre Coote immediately resolved to attack Haider, who retreated to the very place where he had defeated the small army of Colonel Baily; and, contrary to his usual practice, determined to wait for the English army, being influenced by a superstitious belief, that this situation would be fortunate to him: he did not, however, leave every thing to fortune, as he availed himself of every advantage which his position afforded him.

The battle, which continued from nine in the morning to sunset, was vigorously contested, but Sir Eyre Coote gained the victory. The English commander now determined to relieve Vellore, which was in a state of the utmost distress, as it had been for some time prevented by Haider Aly's cavalry from receiving the least supply of provisions. Haider, not altogether discouraged by his last defeat, hazarded another battle before that place, when his army was entirely put to the route, and Vellore effectually relieved.

While these events were taking place in the north, Colonel Braithwaite was not equally successful in the south: on the contrary, in an engagement with Tippoo Saib, near the village of Walletoole, in the Tanjour country, he suffered the same fate as Colonel Baily in the preceding year.